The Pivotal Role of Community Building in Electronic Commerce

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Abstract

Firms competing in the arena of Electronic Commerce (E-Commerce) strive to understand the new business potentials which the Internet offers. This paper considers Virtual Communities of Transaction as an important arena to realize these potentials. Since they can grow trust, cultivate a collective awareness, and stress community knowledge, they can be a valuable component of E-Commerce Sites. We focus on electronic product catalogs (EPCs) as a popular example of a component in the E-Commerce setting and propose an architecture for an "enhanced EPC" – the Participatory Product Catalog (PEP). The PEP brings the notion of Virtual Communities to E-Commerce by combining aspects of product information and community building for business use. PEPs offer (1) the social building of trust, (2) the ability to foster the growth of valuable community knowledge and (3) the effective use of personalization strategies. To personalize PEPs, we present the "My PEP" approach which uses collaborative filtering to alter the interface and the underlying data store. Concluding remarks stress the pivotal role of community building in successful E-Commerce strategies.

1. Introduction

Using information technology to support online business can be advantageous to all parties. Sellers aim at reducing their transaction cost and at integrating the customer interface to their internal IT-systems and processes [5], [3], [13]. Buyers strive for easy access to product related information (such as price, availability, and terms) which will lower their search cost [2]. Middlemen in this setting, electronic intermediaries, find niches for their expertise as well [2], [20], [26].

However, to be truly advantageous to all parties, and offer all participants the chance to find a comfortable niche in the E-Commerce marketplace, this paper will argue that it is necessary to evolve generic components into dynamic, trust-building entities. As a concrete example, we will show how the standard Electronic Product Catalog (EPC) component of many E-Commerce applications can fruitfully be extended into a Participatory Electronic Catalog (PEP), an entity which offers the full social benefits of community building in the commercial environment.

The paper is structured as follows. We start with a short examination of Virtual Communities, explaining their origins in social interaction and the recent emergence of Virtual Communities of Transaction on the Internet. We concentrate our analysis on their marketing potential and 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 (3) the effective use of personalization strategies on the basis of customer profiles and collaborative filtering. We then present the evolution of EPCs into the Participatory Electronic Product Catalog (PEP), a new approach which extends the traditional product information base with community-building mechanisms. The final section offers concluding remarks on the value of community-building components in E-Commerce architectures.

2. The Value of Virtual Communities in E-Commerce

The term “Virtual Community” can be looked at in several ways. Rheingold [19] 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" [10].

Following Schubert [22] 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. Their communication is thus independent from restrictions of time and place." The question then becomes, how can the idea of Virtual Community be transferred to the business domain? As we discuss in this section, socially motivated aggregations of people in electronic networks (Virtual Community of Transaction) present certain business success factors which can be targeted strategically.

2.1. Virtual Communities and Social Interests

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 [11]. 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. The main value of these communities lies in the creation and maintenance of loyalty between the participants.

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. However, such information is hard to come by in standard Internet scenarios. 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. This is the well known problem of an absence of coordination and communication pathways. When customers become mutually aware, it becomes feasible to unite them into a community of common interest leading to a relative gain in transaction power vis-a-vis the sellers.

2.2. Emerging Communities of Transaction

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" [27]. 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 [19], [28]. A question of central importance, and of continued uncertainty in modern E-Commerce, is the creation of "trust" in the business relation.

Spar and Bussang [25] 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 [14]. The prevalence of communities is likely to supply a certain degree of security and trust [7], [12]. As Figallo states, "Trust is the social lubricant that makes community possible" [8].

Let us shift our focus now to the more specific business case of a *Community of Transaction* which deals with the exchange of goods and services, or more specifically *the purchase transaction* itself. This can emerge between business partners as well as between companies and private end consumers. Schubert [22] proposes a categorization scheme for Virtual Communities where the Community of Transaction is a specialization of the main class "Community of Interest" and the more specific sub-group "Business Community". These special forms of communities use an electronic business medium (we suggest a PEP platform) for the support of exchange of goods and services, payment and delivery.

2.3. Potentials of Communities of Transaction

Whereas the development of Interorganizational Systems (IOS) which mainly support Communities of Commerce (business-to-business) has been pressed ahead in recent years [13], 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' profiles represent a key strength of these community. The following section presents some promising characteristics of Communities of Transaction.

Two different kinds of information 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 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 and the provision of communication pathways between the participants allows for a dynamic Community Space and in many cases helps to build and maintain a *trustful* E-Commerce environment.

2.4. More on Trustworthy Environments

Peppers and Rogers speak about "agent objectivity" [17] when they refer to the trust and confidence that arise from mutual customer recommendations. They claim that objectivity is a real selling proposition that can 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: "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." [17]. Companies such as Amazon.com make use of this concept supplying customers reviews and ratings on their Web sites. The platform becomes an "objective agent", an intermediary among the customers themselves.

2.5. Incentives for Collaboration

Setting incentives for the collaboration within the community is an important aspect which must not be underestimated. The willingness of people to cooperate has been discussed in recent literature about recommender systems (e.g. [1], [18]) and more generally in [16]. The absence of incentive mechanisms in these systems leads to the emergence of free riding and a resulting low number of evaluations. Reliable systems must offer personal or social incentives for the input of recommendations and somehow avoid the pitfall of selection bias in the basket of contributions. The above mentioned authors identify three main mechanisms: (1) Subscription-based retrieval of information coupled with a compensation for the evaluators (dependent on the number of their readers), (2) transaction-based charge and compensation for retrieved contributions (based on a clearing mechanism) and (3) expulsion of members in the case of too many outstanding contributions.

The following table summarizes aspects for the regulation of the level of cooperation within a community:

Positive Incentives
• Monetary compensation • Discounts, coupons • Social obligation ("help and you get help") • Satisfaction of personal needs (e.g. "recognition as an expert") • Public appreciation [8] e.g. by pointing out extraordinary contributions on prominent Web pages • Specials: more disk space, special user name
Negative Incentives
• Expulsion from the community • Withdrawal of right of access to community knowledge • Penalties

Table 1 : Incentive system for collaboration in a community

Virtual Communities live from the active participation of their members [8]. The well known principle of "network externality" applies. The more extensive the community knowledge base the higher the value for the single member.

3. Electronic Product Catalogs

Electronic product catalogs are an important component of many E-Commerce applications. The following section briefly examines the current status and shortcomings of EPCs in E-Commerce.

3.1. The Current State of EPCs

In the *Business-to-Business* sector buying firms often enjoy easy to use desktop software to locate and purchase goods. For example, the desktop procurement systems offered by Ariba and CommerceOne are specifically tailored for this market [9]. However, there are different rules which apply to *Business-to-Private* sales. A single customer, lacking market power, must embark on an often arduous journey to search the Web for product information, prices and conditions. The EPCs that an individual might find are thus ad-hoc and disconnected from others' buying efforts. In addition, private end consumers do not get the benefit of extensive after-sales-services and are thus often dependent on mutual support. One example is the software business where only big companies can afford expensive support contracts for hotline services. This is one reason why Newsgroups forums where users and programmers ask questions

continue to be popular on the Internet over several decades. These forums are made up of Communities of Interest which are usually focused on a product (e.g. Lotus Notes) or on a topic of common interest (e.g. parenthood).

To help build such a community, an online vendor can tie an interest group to his electronic product catalog [24]. This platform constitutes a business medium for the bundling of product information and community knowledge. The collection of community knowledge creates a number of advantages for the members:

(1) Communication modules (BBS, chat rooms, Newsletter) support the community building process and extend the functionality of a mere catalog. Know-how is stored in databases within the common business medium and is made available for all members.

(2) The product catalogs and the contained information "from customers to customers" becomes more objective (by collecting "neutral" customer opinions) and thus is more trustworthy for the potential customer.

4. The PEP Approach: Building a Community of Transaction

The preceding section made it clear the Electronic Product Catalogs, by themselves, are static and do not offer much possibility of interaction. This section will introduce the Participatory Electronic Product Catalog (PEP), an example of a Virtual Community of Transaction, which usefully extends the EPCs with key coordination and communication mechanisms.

4.1. The PEP Architecture

The Participatory Electronic Product Catalog (PEP) realizes the Virtual Community of Transaction in an E-Commerce setting. The following figure illustrates the architecture of a PEP, which can be operationalized in various ways depending on the given business model (Berryman et al., 1998). The components of the PEP will be presented in the following sections.

The PEP platform facilitates interaction processes between customers (private as well as businesses) and online merchants. The integration of product information (*merchant view*) is realized with the help of the mediation mechanism of a MEPC (mediating electronic product catalog) which combines different single vendor catalogs into one integrated EPC [15]. The c*ustomer view* represents the community of buyers. Users are identified by means of customer profiles with the possibility of

treating every customer individually (in terms of user interface, automatic product selection and fulfillment of special product needs). Community knowledge is stored in a special database and can be linked to specific product information. Newsletter, BBS and chat rooms are generic communication modules which stimulate the communication between the members. The recommendation service is a typical feature of communities and can act as a special incentive for the individual customer to actively participate in the community medium.

A PEP platform can be used by a single vendor (e.g. Amazon.com), or it can be hosted by an intermediary as in the case of Travelocity or TISS which sell third party products to the end consumer. The third business model can be an open market, auction sites (e.g. EBay) or existing alliances of buyers (e.g. TPN).

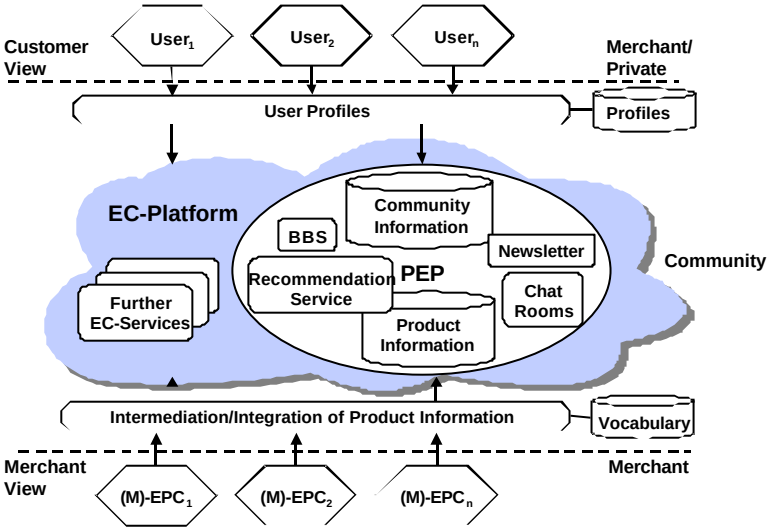

Figure 1: The PEP architecture

The PEP is integrated into an E-Commerce platform. The PEP components and contents are explained in the following list.

Users

Users of the system are the members of the community (private and business customers).

Customer Profiles

Profiles can be used for the individualization of the user interface and the product selection for the single customer. **Different types of profiles** (see [22] for further discussion):

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

Generic community services (Newsletter, BBS, chat rooms)

Community services are the communication components for the community. There are *asynchronous* services such as BBS and Newsletters as well as *synchronous* services (chat rooms, IRC, virtual worlds, etc.)

Recommendation Service

Recommendations, with the use of customer profiles, can be mapped to are personalized suggestions offered to an individual customer. In a typical recommender system people provide recommendations as inputs, which the system then aggregates and directs to appropriate recipients [1]. In some cases the primary transformation is in the aggregation; in others the system's value lies in its ability to make good matches between the recommenders and those seeking recommendations [18]. This is a special case of collaborative filtering which we briefly present in the next section.

Product Information

The product information database either contains the product data of one single merchant or the aggregated product information of multiple vendors. Community knowledge (e.g. problem solutions, tips and tricks) can be linked to the respective product.

Community Information

The community information database contains the contributions of the members (and thus their questions, their answers, and their general know-how). The product information in the EPC serves as the basis for discussions about specific products. Apart from the general discussion among the community members, customers have the possibility to comment on products or ask for help, make ratings, discuss problems and solutions. This information is directly linked with the product information. Amazon.com, for example, collects customer reviews and ratings for books and offers these contents to the community of book readers on their Web site. The PEP thus helps the host to increase his level of "agent objectivity". The community information database stores all the community's contributed knowledge which forms – together with the profiles of the users – the true heart of the community platform.

Community profiles may facilitate additional possibilities for personalization without even requiring an extensive transaction history. Due to the self-selection of characterizing attributes and the assignment to the matching affinity group, a system which has already "learned" from like-minded members can instantaneously offer its expertise to a new customer.

4.2. Collaborative Filtering

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 2, is generally known as "Collaborative Filtering".

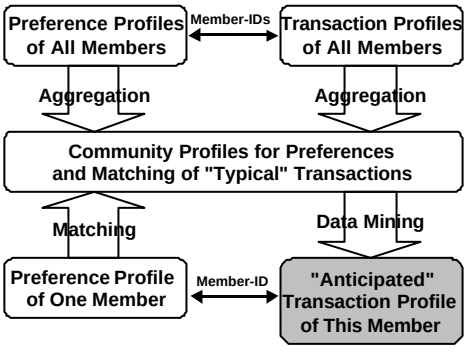

Figure 2: Collaborative filtering

Peppers and Rogers [17] call sub-communities of customers with similar taste "affinity groups". By linking

affinity groups with recorded purchase transactions of a big number 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. Amazon's "1-Click-Ordering" or Barnes & Noble's "Express Lane" are examples for such services.

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4.3. Supporting the Transaction Phases

The PEP addresses existing problems of EC-applications. The addition of coordination pathways in product data discovery and the integration of community services stimulates the emergence of an "objective agent". Provided enough community knowledge can be collected from the members, the functionality of a mere product catalog can be extended by additional services which are advantageous for all members. In addition, the existence of a virtual community creates a trustworthy atmosphere. This helps to overcome typical problems such as real or perceived lack of security and lack of user acceptance which pose significant barriers in today's E-Commerce applications. Figure 3 shows how PEP can support the knowledge discovery and intention phases of the transaction.

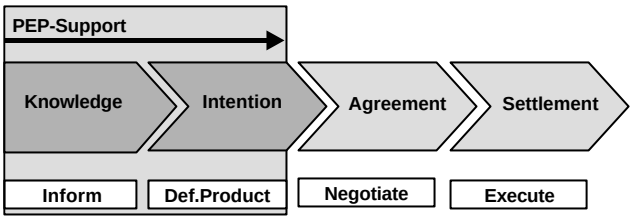

Figure 3: PEP support for transaction phases

Whereas classical EPCs mainly support the second transaction phase (defining the product specifications), the PEP brings strength especially to the first phase (collection of knowledge about the product and the manufacturer/vendor [21]).

4.4. Harnessing the Power of the PEP – "My PEP"

The PEP can exploit knowledge about the community, which usually comes in the form of customer profiles tracked by the party which hosts the EC-platform (e.g. the online merchant), and knowledge that is shared between community members.

Peppers and Rogers only focus on the knowledge *about* the community when stating: "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." [17]

PEPs can improve the EC-platform by improving their personalization services:

(1) The *interface* to the product catalog, or in other words "the product selection" which is automatically offered to a specific customer based on his history of interests or actual transactions, and

(2) The *product or service itself*, which means that a new product is specifically created for an affinity group within the community of transaction.

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 of time and distance).

Schubert and Ginsburg [23] identify two different levels of customization for EC-systems.

(1) *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 mechanisms 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, and so on. A Web systems which is known for this kind of profiling is Firefly.

(2) *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 specifically 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.

PEP-enabled EC-systems go beyond interface customization and present the possibility for new products which target groups of potential buyers with common requirements. Elofson and Robinson [6] present examples for the group-customization of products from the insurance industry where many community 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 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 products" in which a special product 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.

5. Concluding Remarks

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 information 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, and the importance of community knowledge which enables the personalization of Web Commerce Sites. The proposed architecture for the Participatory Product Catalog (PEP) combines these aspects into a common approach for a modern business medium which effectively supports the building of communities and the support of E-Commerce transactions.

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 the these markets. The understanding of these social structures will be key to designing a socially and technically efficient marketspace to best suit the needs of buyers and sellers alike and to meet the challenges of the underlying technical infrastructure.

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