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Communities - Business Models and System Architectures: The Blueprint of MP3.com, Napster and Gnutella Revisited

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Abstract. *Information and communication technology opens up an unprecedented space of design options for the creation of economic value. The business model “community” and the role “community organizer” are determined to become pivotal in the digital economy. We argue that any online business model needs to take communities and community organizing in the design of communication and the system architecture into account.*

Our discussion is guided by the media model [9]. We characterize the relation between a community and its medium and we analyze the role of communities in business models. We illustrate the means to organize communities with the cases (1) information services, (2) price mechanisms and (3) music sector online with MP3.com, Napster and Gnutella. We analyze the interdependence between business model and system architecture and explore the trend towards the business model “community”.

Keywords. Business model, community, medium, system architecture, communication.

1. Motivation and Introduction

Information and communication technology is determined to renew the way economic value is being created. We observe that traditional business models are often not successful as the online implementations. We observe furthermore that only few novel and valid business models have been implemented by now online. Those successful models set themselves apart in their communication design leading to a deconstruction of traditional value chains and the emergence of value-webs [12,20]. The music sector online with MP3.com, Napster and Gnutella is a prominent example for successful implementations of novel business models.

We argue that information and communication technologies provides only the design options for communication. Various authors have pointed out that novel designs are needed. Rheingold [8] and Schubert [13] explore the communities that emerge online. The cluetrain manifesto suggests to consider online markets as communication within communities [5]. Hagel and Armstrong [2] analyze the economic impact of communities and the need for novel business models. Tapscott et al. [20,21] and Selz [15] explore the emerging value webs. [12] describes the need for a novel communication design and the proceeding digitalization of communities. Those authors lie their emphasis on social or economic issues.

We take a more holistic perspective. We consider communities as to be constituted by agents and a medium and we are interested in the interrelation between a business model and the system architecture that implements this business model. We argue that communication and information technology facilitates reverse markets, in which customers eventually have more information and power than producers and intermediaries. We argue that therefore any business model has to be designed first to meet the needs of consumers and second to acknowledge that superior role of customers. The community organizer structures and organizes a community and its communication accordingly. We argue that in various cases, community organizing remains as the only role.

This paper contributes to the discussion on the design of business models and the design their of interaction platforms. We contribute an analysis framework to capture design and implementation issues in a structured way.

Our approach is structured as follows. First, we give with the media model the analysis framework that guides our discussion (Sect. 2).

In the first part of our analysis, we discuss the relation between a community and its medium and distinguish communities according to the way in which they are supported by a platform (Sect. 3).

In the second part, we analyze the role of communities in business models. We consider contribution, motivation, values and economic impact of communities (Sect. 4).

In a third part (Sect. 5), we analyze how organized communities take over roles in business models and relate those business models to system architectures. We illustrate with three cases and various examples implemented online, (1) information services, (2) price mechanisms and (3) music sector online. We argue that the four cases provide a blueprint for the design of business models, system architectures and communication. They illustrate the trend the towards the business model community and the role of community organizing in the digital economy.

2. The Model of Media

The model of media [9] guides our analysis of communities and their media, of business models and system architectures, and of communication and service design.

We follow the notion of a *medium* as developed in sociology. Societies can be defined as ‘system of places’, where every agent has an place with rights and obligations.

Those societies are called *media* and they bind the agent at a place [11].

A *community* is a set of agents together with a medium, i.e., *Community* = set of agents + medium. Clans, firms, nations, marketplaces are examples for communities consisting of agents and media [4,10]. *Agents* may be humans, software agents, organizational units – any entity that plays a role in the game of exchange and communication [10].

Fig. 1 Medium as Sphere for Communities of Agents

We think of *media* as the spheres in which the agents interact and which bind the agents to a place. The informal relations among humans within a clan as well as, e.g., the formal interaction processes implemented in a workflow or groupware system both have this binding power. In a clan, the members act according to those rules to avoid getting expelled. Users of a stringent workflow systems have to follow implemented sequences of processing steps and the enterprise of which the workflow system is part of enforces the agents to adhere to the rules implemented in the workflow system. Note that the notion of a medium applies to artifacts, to social systems as well as to artifacts as communication platforms embedded in social systems. The *platform* is the physical part of a medium. We are interested in electronic platforms.

Media are described in terms of three main components [9,11]:

1. A *logical space* with syntax and semantics of the information that may be communicated via its channels. Note that this includes information about some domain (worlds), and information about the medium itself, i.e., its organization, the channel system and the agents.
2. A *system of channels* to distribute and exchange information over space and time.
3. An *organizational system* to describe with *roles* the places for the agents with rights and obligations and with *protocols* the interactions of agents on the channel system.

A medium consists of a channel system for the transport of information over space and time, a logic, for capturing syntax and semantics of the information and an organizational system (roles and protocols) for structuring the behavior of its agents.

A community is characterized by a common language and world, by common values and interests. The agents are connected via a medium on which they act in roles.

We denote communities that communicate (primarily) on Internet as "Online Communities".

The Media Reference Model [11], depicted in Fig. 2, details generic components of a medium.

Fig. 2 Media Reference Model (MRM)

The four phases distinguish four kinds of communication acts - following the phases of a transaction:

- In the *Knowledge Phase*, agents exchange information and they establish their knowledge or belief.
- In the *Intention Phase*, agents signal intentions, developed from the knowledge provided in the knowledge phase and by linguistic means of the common logical space and services provided by the service layer for signaling, following their role and the protocols.
- In the *Contracting Phase*, agents negotiate contracts. The messages in this phase are binding, in the sense that they oblige agents to act as indicated. This phase ends – in the case of success- with a contract.
- In the *Settlement Phase*, agents act according the negotiated contract, using services offered for this purpose by the service layer. In commerce, this means, e.g., shipping of goods and transaction of money.

We refer to [11] for a description of the layers.

3. Communities and Media

The medium with the communication it facilitates, the places it provides and the binding of agents to places is a constituting part of the community. The platform facilitates the interaction and the term "community supporting platform" [17] captures this role of a platform for a community. In this section, we analyze the relation between a community and its medium. We distinguish hereby (1) digitalization and (2) interaction.

3.1. Digitalization

A property in the relation between agents and medium in the community is the degree of digitalization, i.e. the degree of digital representation of the community on a medium. We distinguish two kinds of communities

- Online communities that employ a medium to facilitate communication and

- Digital communities that rely on community supporting platform and a digital representation of the community on the platform for communication.

Subsequently we illustrate those communities in cases.

3.1.1. Online Communities

Online communities employ a medium to facilitate communication. They rely on active contributions of the community members. Typically, the organization and social relations within those communities resemble traditional notions of communities of the real world.

We give as examples for (systems of) Online communities (1) the Usenet, (2) the Well and (3) Geocities and (4) the communities organized by single vendors.

The Usenet has emerged as a system of communities across various electronic networks. Each newsgroup is dedicated to a particular topic and each newsgroup constitutes a community of subscribers. Communication takes place asynchronously by posting and reading posted messages. Each user may subscribe all publicly available newsgroups and post information to all groups (with the exception of moderated groups). The code of conduct is captured in the Netiquette. Among the most important groups are the ones that deal with soft- and hardware.

Particular to this system of newsgroups is its openness and the means for self-organization. The newsfeeds maintain the information posted on the clients in Newsgroups on the various newsfeeds consistent, there are protocols on creation and deletion of groups on technical level as well as on the communication level. The network is open for new users, new newsgroups as well as new newsfeeds. Particular is that new interest groups emerge very rapidly and a small disense or short-term information overload eventually leads to splitting up the community in new newsgroups (For a more detailed description of technology see, e.g., [19]). Note, that this system of communities has a strong non-commercial culture and is indeed independent of commercial interests.

The Well (www.well.com) is considered to be the classical example for a system of Online Communities. Its discussion forums are open only to subscribers of the service. Organization of the system of communities is done by the providers of the interaction platforms. Particular are the close and persistent social relations. Note that the Well has been founded to be accompanied by "real" meetings of the Online communities' members as to foster deeper social relations. As thus the focus of this community is the Bay Area with San Francisco.

Geocities is a system of communities that fosters interaction in a limited number of discussion forums and provides in particular means for the members to provide information on homepages. The service is open to all registered users and registration is free of charge.

The first Online communities were hardly more than virtual counterparts of "real" communities. In those communities technology just renews the (multi)-media representation of information, the quantity and speed at which information is conveyed. Technology "just" lifts the geographic barriers of communities that used to shape communities, when means for transporting information over space where scarce. The lifting of space and time barriers gave rise to a new predominant organization criterion - systems of topics. Those systems of communities attempt to foster interaction among groups of

members and they attempt to foster also close social relations.

With the rise of ECommerce, economic aspects of communities gain importance. Manufacturers and vendors organize communities. E.g., most newspapers and other media try to encourage interaction on a platform (e.g., CNN.com) and a lot of vendors organize communities to learn about consumers needs and to make the community help themselves, e.g., in the case of problems with software. In those cases the social relations of those communities are often not the main motivations - it is the interest in products, product developments and for support those. Still those communities rely on active support.

3.1.2. Digital Communities

The value of a community and its contributions in ECommerce has been widely discussed in the literature (see, e.g. [2,8,14,22]). However, the motivation of humans to contribute actively pieces of information is quite limited and, often, active contribution demands some computer proficiency. It seems just to be a sensible next step that the platform takes over the role to support the community: The platform exchanges information between the members: it gathers, evaluates and distributes this information. Precondition is a digital representation of the community.

Consider, e.g., the automatic recommendation services featured by many Online Shops. The community of customer shares information through those services - however this information is being autonomously gathered, evaluated and distributed by the platform - and not contributed explicitly. The community and its interactions are digitized in form of profiles and the business rules in personalization.

Often, this digital aspect of a community is more important than the active contributions: E.g., Amazon provides services for the customers to interact: customers may send book recommendations via EMail to friends. Customers may submit book reviews to be published on the site and those book reviews are rated by customers again. Up to this point, the community of consumers corresponds to the traditional Online Communities. The platform of Amazon exchanges information between the customers in the recommendation service - to recommend books (and other goods) that had been bought by consumers with the same profile and that the customers had not yet ordered Online. Note, that Amazon establishes hereby the respective organization in terms of roles. Moreover, Amazon identifies (systems of) communities, as, e.g., the buyer communities which are structured according to their domain names. There are buyer communities of large organizations and geographically defined communities.

Both active contributions and the computer generated communication are a value add for the consumer. However, it seems that it is probably not the explicit communication of reviews that makes the difference for the economic success. E.g., at Amazon, it is the sheer quantity of transactions and its evaluation that allows Amazon to recommend books and to provide useful information to Amazon.

3.2. Interaction

The precondition for a medium to take over a proactive, supporting role in a community is a digital representation of the community within a medium on a platform. We distinguish hereby two dual notions:

- Externalization, where the community is represented and implemented in a design process on the medium. Examples are, e.g., operating systems or workflow systems which represent roles and protocols in accounts, groups and access rights.
- Internalization, where the community structure is "detected" by the medium. Examples are personalization systems which detect the roles and communication protocols and implement them in role systems and business rules.

Those two dimensions can be refined according to the media model. All components of a medium, the logical space, the channels and the organization of a medium can be represented and this representation can both be implemented or emergent. This is depicted in Fig. 3.

Fig. 3 Relation between agents and medium

The logical space in terms of syntax and semantics can be implemented, e.g., within a glossary. The key terms of a community and their meaning and relations can be subject to some analysis as done, e.g., in a data warehouse.

The channel systems can be designed to facilitate communication, e.g., to facilitate communication as modeled in processes and prescribed in organigrams.

The organization can be implemented, as e.g., in a system of accounts and the associated access privileges or it can be emergent as the result of interaction among a platform.

3.3. Relation Community - Medium

To sum up the relation between agents and a medium in a community. We identify two characteristic properties: the digitalization that describes in how far a community takes advantage of technology and the externalization and internalization that captures whether the community is results of a design and implementation process or whether the medium results from interaction via a medium. Note however that those properties are not entirely independent from each other. E.g., prerequisite for internalization is a digital community to take advantage of technology.

4. Business Model Community

The communication design is a crucial in every business model. Various authors have pointed out that the digital economy demands for novel designs and have emphasized the relevance of communities in business models. Hagel and Armstrong [2] explore the economic impact of communities, Tapscott et al. [20,21] the value-webs of interaction. The cluetrain manifesto [5] suggests to consider the creation of economic value to be a conversation within a community and Schmid [12] points out the need for novel communication and production designs.

In this section, we explore the roles of communities in business models, i.e., the roles a community may play - appropriate organization precluded.

Following Timmers [22], we consider a *business model* to be (1) an architecture for the product, services and information flows, including a description of the various business actors and their roles and (2) a description of the potential benefits for the various business actors and their roles; and (3) a description of the sources of revenues. Timmers considers "Virtual Community" to be a business model in electronic markets and he characterizes this model as "The ultimate value of virtual communities is coming from the members (customers or partners), who add their information ... [22]".

Following the ideas of [2-4,13,16], we go beyond Timmers' understanding of the business models and consider social, political and economic impact of communities [3] in business models: Communities meet needs, they establish values, binding power of the medium and foster trust; they are the basis for switching costs, lock-in and network effects. Subsequently, we discuss those roles of a community and illustrate them with examples.

4.1. Interest, Motivation and Needs

Communication and communities meet basic human needs and constitute the characterizing community property of "common interest" (cf. Sect.2). Hagel and Armstrong categorize communities according to needs [2]:

- *Communities of interest*, in which the members of the community share interest and expertise in a specific topic. Examples are the bulletin boards of the Usenet, or motleyfool.com, a community whose members are interested in investments.
- *Communities of relationship*, in which people with similar experience meet to form meaningful personal relationships and share personal experiences. Examples are the Cancerforum on CompuServe and diabetes.com.
- *Communities of fantasy*, where peoples explore new worlds of fantasy and entertainment. Examples are online games and in particular multi-user dungeons as, e.g., Ultima Online (uo.com).
- *Communities of transaction*, in which the members share motivation to create economic value. Examples are the communities of partners in a supply chain or the communities that are established by B-2-B markets.

4.2. Values, Binding Power and Trust

This common interest of a community cannot be considered isolated. Common values are a prerequisite that the community members can actually meet their interest and mutual trust is a prerequisite for any community to prosper. Trust and binding power of the medium complement hereby each other. Let us explain this in more detail.

A common set of values distinguishing, e.g., valid and non valid propositions, good and bad products, ethical and unethical behavior are characteristic for a community.

Those common values are communicated, e.g., terms of use, in information about the community and its medium and implemented in the protocols which to follow. Glossaries determine the meaning of relevant terms: Product information e.g., in a product catalog asserts the properties of products.

Those common values can be enforced by the binding power of a medium in governing the agents. E.g., a workflow system may enforce a user to perform a certain task - by not granting him other options than to follow a certain procedure. However, there are always values within a community that the platform cannot enforce the users to comply with. E.g., the workflow system can offer only one option to act - it cannot actually force any agent to perform this action.

Thus, binding power alone does not suffice. Interest and motivation of agents to participate (cf. Sect. 4.1) and the trust that is required of an agent to compensate for the lack of binding power of a medium have to be considered.

Trust is a prerequisite for any community. Agent have to trust any information to believe it. The more information a piece of information carries, the more trust is necessary to believe the information. Moreover, agents have to entrust processes and other agents. Trust correlates with the inability to monitor and control other agents of which the welfare of an agent depends on [18]. Trust moreover, is a means to reduce social complexity. It compensates for lack of ability to monitor on the one side and for lack of knowledge and understanding on the other side.

Let us discuss concepts and implementation to establish trust in Online communities. In "offline" commerce, personal relations grown over time the inability to leave or change the social and local context as well as private and public institutions constitute trust. Such relations and institutions however equipped to provide a similar trust level do hardly exist online.

A variety of means to establish common values and mutual trust have been developed:

Communities as, e.g., epinion and dooyoo (epinion.com, dooyoo.com) collect product reviews by consumers on a neutral platform. Amazon collects reviews of, e.g., books by customers and from other sources, as e.g., newspapers. Particularly popular are the consumer reviews in tourism. Note, that typically those reviews are evaluated and reviewed themselves to prevent fraud. Rating services, as e.g., on EBay (ebay.com), at the auctions on Amazon.com or the Kasbah [6] capture the trustworthiness of agents based on past performance. Moreover, trust in processes and agents in general is fostered by the public forum a communities constitute.

Non-compliance with the common values becomes public immediately and the damage to the business would be considerable.

To sum up, communities contribute information on products, processes and agents to facilitate well-informed decisions. This information is organized by vendors as well as by independent intermediaries. Collecting and organizing this information and making it persistent constitutes the trust generating environment that social relations have provided over time. Thus, an organized community can take over roles that are traditionally occupied by private or public institutions in gathering, evaluating and providing information and in enforcing agents to comply with values and in establishing values within a community.

4.3. Economic Impact

A common motivation is prerequisite for agents to join a community, while values, binding power of the medium and trust facilitate transactions within a community. In this subsection, we illustrate that the role of a community is even deeper routed: Switching costs, lock-in and, in particular, network effects originate in the community. I.e. the community itself has particular impact.

Let us briefly sketch the economic basics. The term "network economy" describes the shape and connectivity of communication infrastructure and the resulting value-webs [15,16,20]. This connectivity is provided by the communication infrastructure and by the quasi-standardization in terms of usability of Online media. Metcalfe's Law captures one of the characteristic properties of this network economy: The value of a network equals the square of its nodes (cf. [16]). Strong complementors are vital for a strong position within such a network [1]. The behavior of single agents is guided (among others) by switching-costs, i.e., the costs an agent encounters when switching media, by the lock-in, i.e., the costs an agent encounters for entering or leaving a medium. Switching costs and lock-in determine the binding of an agent to a medium.

Network effects capture the phenomenon that the number of people finding it worthwhile to join a network correlates with the size of the network, resulting in exponential growth of networks. Network effects are the result of both supply and demand side economies of scale. The characteristics of supply- and demand side scale of economies apply in particular for information goods [16].

Note that network effects, lock-in and switching costs are essential in generating revenues. Network effects make the revenues correlate with the size of the network; lock-in and switching costs prevent eroding of revenues.

Online communities have developed various means to implement those concepts. Let us give an example: The recommendation service and the personalization of Amazon are examples on how a community organizer establishes network effects switching costs and lock-in: The more transactions a single user performs, the better the recommendation service works for her - the quality of the service itself correlates with the size of the community and the number of transactions. I.e., persistence of past transactions and the evaluation of user behavior establish switching costs, since a user cannot get the same quality of

service from any other Online shop - unless she registers all books bought from Amazon. The knowledge that Amazon has gathered about a user establishes the lock-in for user at Amazon and the lock-in on the Online book shop segment. The correlation of size and quantity of transaction with the quality of the service establishes network-effects: the better the service the more customers will find it worthwhile following its recommendations and join the community.

The example illustrates also which core competency, it takes to make those economic rules apply: organizing and structuring the communication in services [17]. Network effects apply for networks not necessarily for communication on those networks and their quantity. Only well-designed services structure and organize the communication such that an individual user gain from ever increasing number of nodes and transactions. Amazon for instance refines structures and organizations in the services, e.g., in the buyer communities to cope with the increasing quantity of information.

In general, it is a consequence of connectivity and standardization that Online business models can hardly rely on the platform as a source for generating revenues, since any business idea and the design of a platform can be copied quite easily - as long as those are not rooted on core competencies. Conversely, from the viewpoint of users, all Online media are -due to strong standards for communication and the design of "look and feel" within genres just "one click away". Thus, the customer relation and the knowledge of single users and about users is the source to establish lock-ins. Prerequisite for network effects is to design communication and services to scale.

4.4. Summary

The role of a community goes beyond the contribution of information. When abstracting from the kind and domain of information a community contributes, three functions that characterize communities remain.

- Interest, the human needs of an individual agent a community meets.
- Values, the binding power of a medium and the trust that is required from the single agent in participation.
- Economic impact, in terms of lock-in, switching costs and network effects that occurs from the community.

Thus, a community has various roles - it remains to analyse the relation community-medium and show how to implement the business models in system architectures and to illustrate the state of the art in particular fields.

5. Business Models and System Architectures

The design of business model comprises the design of communication and the design of the medium. In Sect. 3, the relation between a community and its medium has been explored. In Sect. 4 the roles of communities within business models have been explored. In this section we analyze the relation between a business model and the its implementation in terms of the design of a medium, more precisely its system architecture. A system architecture is hereby the set of all design decisions made in an implementation of a platform. We are interested only in

some aspects, namely the decision on centralized or decentralized structures and the design of the communication and information flow on those services. We consider in this analysis in particular the value chains of the businesses.

This analysis illustrate the trend towards the business model "community". We consider three cases (1) information services, (2) price mechanisms and (3) the music sector online. Those three cases have a lot in common:

- Currently, a variety of business models and system architectures coexist. Some of them are online counterparts of traditional business models - some of them feature novel designs.
- One can observe the trend towards the business model community organizing; communities take essential roles such that traditional roles gets replaced by "community organizing".
- The community based models have distinctive advantages over traditional ones concerning scalability and quality of service.

Our motivation in choosing those three cases is that gathering, processing and distributing information or price coordination are a part of almost every business model. Thus, the cases generalize The music sector online however illustrates the share power and speed at which things evolve - and that communities actually organize online - on the basis of incentive structures, a critical mass and no (legal) design constraints or no means to make a community to adhere to those constraints.

5.1. Information Service

The gathering, processing, evaluation and ranking of information are core competencies of information services, as, e.g., search engines.

Fig. 4 Value chains of search engines

Fig. 4 depicts three value chains of search engines (1) of conventional search engines, (2) of Direct Hit (directhit.com) and (3) of Google (google.com).

We consider the steps (1) gathering information, e.g., through robots, (2) the processing of this information including, e.g., indexing (3) the ranking done to discriminate, e.g., spam from valid pages, (4) the storing, (5) the request (by a user), (6) the query in the internal database (7) ranking of search results to compute an

ordered list of results and (9) the evaluation results of the user to determine relevance. We discriminate three roles for actors, namely consumer (C), search engine (S) and Internet community (I). Let us describe and discuss the three value chains.

Conventional search engines, as e.g., Yahoo, Altavista, Lycos gather and process information, rank it and store it (in databases). The user (customer) requests information and the search engine performs a search in the database, ranks the results, responds and the customer evaluates the results and chooses which links to follow. The search engine implements the knowledge of processing, rating, storing - the user only requests information and evaluates the results.

This system architecture has several disadvantages - it uses only the knowledge of programmers for processing and ranking information. All the processing is done by universal and syntactic means of full-text processing. Domain specific knowledge and semantic issues are hardly considered. Moreover, the system architecture does hardly scale. Search yields typically too much or too few results - independent of the number of users and the size of Internet.

Direct hit takes advantage of the customer community to take over the function of ranking. The links, users follow are considered to be relevant and gain in relevance within in the ranking. Direct Hit observes the behavior of users to detect the users knowledge on good links and uses it for ranking. The arrows in the value chain in Fig. 4 depict the influence of the evaluation to the two ranking steps. Direct Hit just organizes the community.

Note that this kind of search engine improves quality with the number of users and it scales with the size of Internet. This architecture learns the knowledge of users with time - and it can profit from the semantic level of "understanding" of users about relevant pages in general as well as in particular knowledge domains. Direct hit organizes the community of users. This function of community organizing is depicted in dashed stage.

Google goes even further in letting communities contribute. It organizes the consumer community and the Internet as a whole to contribute the ranking. The ranking of a page depends on the number and rating of the links that point towards this page. Hereby, the rating of a link correlates with the relevance of its source. E.g., links from servers in the "edu" domain are considered to be more relevant than links from the "com" domain. I.e., the relevance rating is done by the whole Internet (or at least by the part which is known to Google and its search engine). Anybody who contributes to Internet contributes information on relevant information sources - only relevant information sources are "awarded" by users to be linked to. Google leverages this information that is implicit in the link structure of Internet to rating. Google contributes only general heuristics (depicted as dashed lines) and organizes the community, while the majority of information originates from the Internet community.

This architecture draws the knowledge about good and relevant pages mainly from all the users on Internet - they are supposed to know good pages and to implement this in links. This community of Google is therefore larger than the one Direct Hit considers. Google captures also the better kind of knowledge: links already represent

knowledge on good resources - not on guesses on which page might be relevant as on Direct Hit. Both Google and Direct Hit capture the general and syntactic knowledge - like conventional search engines- and the semantic level of understanding and the domain specific knowledge of users. Note that the approach of Google scales: the quality of service improves with size and link density of Internet.

To sum up this case of Information Services. We observe that stages of the value chain and the respective functions are being taken over by a community which is organized by the search engine. The search engine observes the community and gains from it the "understanding" of good pages and domain specific and implicit knowledge that only humans used to dispose of. Thus, organizing the community has an enormous value add wrt. quantity and quality of knowledge.

5.2. Price Mechanisms

Let us consider a classical business model of a producer offering goods and services to customers through an intermediary. The intermediary gathers and processes information and provides it to the customers. Intermediaries may organize the community of customers to contribute their knowledge (cf. Information Service).

In this section, we illustrate the roles customer communities may play in price mechanisms. We consider (1) the conventional model as implemented, e.g., in Online-Shops, (2) Priceline, (priceline.com) and (3) Powershopping, as e.g., implemented by letsbuyit.com.

The value chains are depicted in Fig. 5. We consider the stages (1) Production (2) Offer (3) Marketing (4) Coordination with distributing information, matching supply and demand and contracting and (5) Accepting the offer. We consider the roles of customers (C), intermediary (I) and Producer (P).

Fig. 5 Value chains of price mechanisms

Let us explain the three value chains.

In a conventional model, as, e.g., an Online Shop, the good or service are produced. The intermediary offers the goods, does marketing and communication with the

customers, coordinates offer and demand. The customer "only" accepts the offer.

At priceline.com, both producer and intermediary do marketing (producer for the product, intermediary for offer), the customer makes the offer, the intermediary coordinates offer and supply and the producer accepts the offer. At Priceline, the roles of who makes an offer and who accepts an offer are switched.

In powershopping, the producer makes the offer that varies depending on the number of customers willing to accept it. I.e., the customer influences the offer by accepting it (depicted with the arrow). Here, consumers, the intermediary and producer do marketing and communication. In particular the customers are motivated to communicate among each other and to persuade other consumers to join the buyers as well. The intermediary manages all the communication and particularly the communication among the customers.

To sum up the case "price mechanism". The functions of the intermediary and the customer change. The customers gain more influence. They take over the roles of making offers or at least of influencing offers and they take over roles in marketing. Recall the developments in information services and the discussion on values and in particular trust and the roles that a community takes over there. The role the consumer takes over in the price mechanisms is just complements the developments seen in previous examples.

Note however, that in all three system architectures, the customer has to employ an intermediary. Typically, intermediaries gain some revenue in actively acquiring and processing information about the individual customer. Customers eventually would strive towards autonomy on their user data. Agent technology can provide this kind of autonomy for the user [7,23].

5.3. Music Sector Online

Information services and price mechanisms organize customers in a novel way (cf. Sect. 5.1 and 5.2) The music sector online with its various applications is an example for the close relation between business model and system architecture. Moreover, this case illustrates that users are willing to adapt to novel business models and system architectures - on the basis of clear incentives. For digital goods on the basis of lack of (legal) design constraints or the lack of enforcing design constraints the role of community organizer may be the only business model to remain for the intermediaries of the traditional music industry. Note that we abstract from copyright issues and legal aspects in swapping mp3-files here.

The traditional value chain of electronic media and the novel value chain of digital media are depicted in Fig. 6.

Electronic Media

Digital World

A : Artist M : Music industry C : Consumer S : Service

Fig. 6 Value chain of electronic and digital media

Let us describe the stages. The artist has an idea, implements it as contents -possibly- in co-operation with a studio. Contents are packaged to obtain a product, the product is marketed and either multiplied and distributed on the respective carrier or broadcasted [24].

In electronic media, the artist has the idea, works in the studio, the music industry provides the studio, does packaging, marketing, multiplication, distribution and broadcasting [24].

In digital media, the artist often owns the studio, does packaging and marketing (online). The consumers take over packaging, marketing (e.g., community based) they take over multiplication, distribution and even broadcasting on Internet. I.e., the value chain of the music industry (with their huge investments) is now being eroded by a Online value chain under the control of consumers (with very low investments). An Internet service may support in particular packaging, marketing and multiplication.

Subsequently, we refine this model and discuss a variety of business models and system architectures for the swapping of music. We present five system architectures and business models (1) dedicated ftp servers for swapping files (2) specialized search engines (3) mp3.com as a client server architecture (4) napster.com as a combination of client-server and a peer-to-peer architecture and (5) peer-to-peer architecture.

We illustrate the trend towards decentralized organization and show that community organizing is basically the only business model that remains valid for any intermediary in this sector. Moreover, we show how business model and system architecture coincide.

Dedicated ftp servers have been established as a first form of organization for swapping files and only later for mp3-files. The ftp-servers for mp3 files were either open to the public or closed communities. The files servers that were open soon suffered from an overload of consumers willing to download files, i.e., from the free-riding syndrome (hardly any uploads - lots of downloads). Closed servers enforced file-sharing in the sense that they implemented policies on up-loading and downloading.

This reduced overload as well as free-riding. The access to those file servers was mainly by ftp. Those servers were related to communication services, as e.g., news and chatrooms to facilitate exchange among the users. Consumers had to roam various servers to find specific pieces of music.

The architecture of those systems is a client-server architecture where the server provides mp3-files only. Thus, this architecture has only means to generate revenues from mp3-files and hardly any basis for other business models.

Dedicated search engines, as e.g., mp3.lycos.com that were specialized on "open" file servers have been established. Here, the user searches for a file, and follows the hyperlinks to a file server. Thus, the model is here client server for searching for files, client-server for gathering information and a client-server for downloading files (via ftp). The value-add that those search engines provide is a trust-fostering rating of reliability and speed of mp3-servers. Those search engines dispose of some services for community building (communication services and some personalization). The community building services provides some basis for generating revenues - however as one knows from the business models of search engines - this is not enough.

MP3.com considers itself to be an online repository of the users music files to facilitate access to those pieces of music everywhere on Internet (source: www.mp3.com). Users upload pieces of music - or identify themselves in the so-called beamer services as owners of a carrier (CD) for some piece of music. Each user has its account to access the pieces of music online. Access to music is granted via Internet technology and, in general browsers of all kind (including WAP). MP3 provides (yet unknown) artists to publish a CD online and offers to produce, ship and offer CDs on demand. The artist sets the price and receives 50% of the revenues.

MP3 offers a matching or recommendation service that points out artists and music to match an individual profile. MP3 offers various services of community interaction - the architecture is client-server based. The client has files, registry and all the information about the consumers and artists with the community services of recommendations and interaction.

Thus, MP3 accompanies the traditional value chain - it provides means to store pieces of music Online and provides means to manage the community. It opens up a new business model of Online publication of pieces of music. The server that holds all pieces of music and the information from and about the community as basis for community management can be the source for generating revenues. In particular, artists who choose to market their music Online need a good community management to find their customers - and thus, community organizing is for that aspect of the value chain also prerequisite.

Napster.com considers itself as "the world leading file sharing community" (source napster.com). The server Napster.com offers a directory of lists of files to be shared and software to participate in the community. Each Napster client offers all mp3 files on the hard-disk of the user to be shared within the community and registers those files in the directory. For searching for a file, the Napster client accesses the server and its directory of files at

napster.com. Swapping of files takes part following a peer-to-peer architectures. Napster.com offers interaction services and a recommendation service.

Compared to mp3.com, the structure is more decentralized - napster.com has all the information necessary for community management. The community (of consumers) contributes contents and the storage facilities for files and in digitized way also the profiles. The Napster-Clients are (concerning in particular the swapping of files) and server at the same time.

This architecture is more suitable for the digital economy than the one of MP3.com. Napster -as all other online applications - can hardly generate significant revenues from mp3 files. Community management however may generate revenues and Napster disposes of the necessary services and information - while the storage and bandwidth capacities needed from Napster are considerably lower than those of MP3.com.

Gnutella (<http://gnutella.wego.com/go>) is a file-sharing application without any central structure which is widely used to swap any kind of files. Gnutella clients form a net. To join the net, a client has to know at least a single gnutella client. Searching for files and swapping of files are done in a peer-to-peer architecture. A gnutella client is client and server for files - it offers all files in a dedicated directory to be shared on the net, swaps files, searches for files and requests files.

Gnutella clients do not offer any community building services, as e.g., communication or recommendation services. The software itself is free and open-source and currently, there exists a variety of clients. This makes it safe for users - there is no way to design the software such that it releases information about the user's behavior while it leaves no niche for community organizing.

To complete the business model, let us review the file sharing from the artists' perspective. In the business model of the music industry, the artist receives approx. 10-15% of the revenues. At mp3, the artist receives 50% of the revenues of the CD being sold. This ratio is even more attractive, when mp3 files are sold. E.g., at riffage.com the artist receives 85% of the revenues.

To sum up the case music industry online. There are various architectures that coexist on Internet. The files that are swapped can -at present not be used- for generating revenues for some sort of Online Intermediary. Thus, the two system architectures of FTP-Server and search engines which were focused on the files have no basis for generating significant revenues - the community services an Online community for swapping files are just too weak. The position of MP3 seems to be perfect - the server has to be accessed to get files and community building can rely on a lot of data that are known from the individual. However, since community organizing seems to be the main source for revenues - the architecture of Napster appears to be much more efficient. The system architecture makes sure that Napster gets hold of all relevant information - on the user and their preferences (at least when files are swapped) and community services encourage interaction via Napster (e.g. on the chat). However, gnutella basically ensures that files can be swapped without having a single point where all information can be gathered. Neither software nor information of the community can generate revenues - the

protocols makes gnutella to a self-organizing system (similar to Usenet) and therefore there is hardly any basis of generating revenues.

The co-existence of system architectures and business models is exciting. The concepts of MP3 and search engines are familiar to users - Napster and gnutella need a more Internet-literate user. However, the step from MP3 to Napster seems relatively small and all business models that try to generate significant revenues from the user will eventually be eroded by the mere existence of gnutella.

As seen before, the information services and the price coordination can be done as a community organizing - thus the music industry has little chance to built its future business models on those stages of the value chain. Again, the new business models that remains (for the music industry) is community organizing.

It remains to illustrate the power and swiftness of those developments. The MP3 Standard has been developed at the Fraunhofer Institute. It facilitates reduction of data to approx. 8% without noticeable loss of quality. There exists a variety of applications to encode music in mp3 files, among them mp3-encoder and CD-rippers. Various access devices support the MP3 standard - software applications as well as non-PC access devices, as e.g., mobile phones. By June 2000, approx. 10-15 millions of MP3 players have been distributed and 58 millions of Realplayers (without mp3-support) are in use; approx. 300 000 to 500 000 MP3 files are available, An estimated 13 million Americans and approximately 14 percent of all Internet users have downloaded music for free. Nearly half of the freeloaders are between 18 and 29, but 42 percent are between 30 and 49. Only 2 percent of Internet users have downloaded music for free that they own in another form, on a compact disc or cassette.¹ Thus, one can see how fast those organizational structures and systems can penetrate also the community of average users.

6. Concluding Remarks

Technology offers means to process and transport information and, more important, unprecedented design options for interactions - as all the examples of Online communities and system architectures illustrate. Communication has to meet the needs of the consumers - otherwise every business model eventually fails. We have exemplified how to meet the needs for information, for social relations including trust and transactions in those new spheres for interaction that technology provides. We have exemplified furthermore the roles the community can play for meeting those needs.

The economic potential of the business model "community" lies in the integration of an organized community in various roles and almost all stages in the value chain - and not only in the combination of social needs and transactions as many authors claim. The examples of the music sector online, information services and price mechanism illustrate the trend of increasing the participation of a community at all stages of the value chain and the power the communities eventually gain.

¹ Source Princeton Survey Research Associates 4/2000, <http://www.cnn.com/2000/SHOWBIZ/Music/06/09/music.swap.ap/>, 6/20/2000 and [1]

A system architecture is successful when it structures and organizes communication and the community to ensure quality and scalability of communication with the size of the community and the number of interactions. Here, well designed technology is prerequisite for making network effects apply. Technology makes it feasible to organize a community and to design interaction as to integrate the organized community at nearly all stages of the value chain and in various roles. Eventually well organized communities can take over core competencies of traditional business models. What remains to build new business models upon is the role to organize a communities.

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Reference List

- [1] P. Haertsch. *Wettbewerbsstrategien für Electronic Commerce*, Josef Eul Verlag, 2000.
- [2] J. Hagel III and A. Armstrong. *Net Gain: Expanding markets through virtual communities*, 1997.
- [3] J. Hummel and U. Lechner. *Ökologische Konsumentengemeinschaften*. In: *Nachhaltige Informationsgesellschaft*, ed. U. Schneidewind. Metropolis Verlag, 2000.
- [4] U. Lechner and B.F. Schmid. Communities and Media - Towards a Reconstruction of Communities on Media. In: *Hawaiian Int. Conf. on System Sciences (HICSS 2000)*, ed. E. Sprague. IEEE Press, 2000.
- [5] R. Levine, C. Locke, D. Searls, and D. Weinberger. *The cluetrain manifesto. The end of business as usual*. Perseus Books, 1999.
- [6] P. Maes, A. Chavez, D. Dreilinger, and R. Guttman . A Real-Life Experiment in Creating an Agent Marketplace . In: *Software Agents and Soft Computing, Towards Enhancing Machine Intelligence*, eds. H.S. Nwana and N. Azarmi. Springer Verlag, 1996.
- [7] P. Maes, R. Guttman, and A.G. Moukas, Agents that Buy and Sell: Transforming Commerce as we Know It *Communications of the ACM*, vol. March, 1999.
- [8] H. Rheingold. *The virtual community: homesteading on the electronic frontier* , Addison-Wesley, 1993.
- [9] B.F. Schmid. The Concept of Media. In: *Workshop on Electronic Markets*, ed. R.W.H. Bons. 1997.
- [10] B.F. Schmid. Zur Entfaltung der Macht des Kalküls in der Wirtschaft und BWL. In: *Perspektiven einer integrierten Managementlehre - Forschungsgespräche zur 100-Jahr Feier der Universität St. Gallen*, eds. P. Gomez, G. Müller-Stewens, and J. Rüegg-Stürm. Haupt Verlag, 1998.
- [11] B.F. Schmid. Elektronische Märkte - Merkmale, Organisation und Potentiale. In: *Handbuch Electronic Commerce*, eds. A. Hermanns and M. Sauter. Vahlen Verlag, 1999.
- [12] B.F. Schmid. Was ist neu an der digitalen Ökonomie? 2000.
- [13] P. Schubert. *Virtuelle Transaktionsgemeinschaften im Electronic Commerce: Management, Marketing und Soziale Umwelt.*, Josef Eul Verlag, 1999.
- [14] P. Schubert and M. Ginsburg, Virtual Communities of Transaction: The Role of Personalization in Electronic Commerce *EM - Electronic Markets.The International*

- Journal of Electronic Markets and Business Media*, vol. 10, 2000.
- [15] D. Selz, Value Webs - Emerging forms of fluid and flexible organizations 1999. University of St.Gallen.
 - [16] C. Shapiro and H. Varian. *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business School, 1999.
 - [17] K. Stanoevska-Slabeva and B.F. Schmid. Community Supporting Platforms. In: *Hawaiian Int. Conference on System Sciences (HICSS 2000)*, ed. E. Sprague. IEEE Press, 2000.
 - [18] Y.-H. Tan and W. Thoen. Formal Aspects of a Generic Model of Trust in Electronic Commerce. In: *Proc. of the 33th Int. Hawaii Conference on System Sciences (HICSS 00)*, ed. E. Sprague. IEEE, 2000.
 - [19] A.S. Tanenbaum. *Computer Networks*, 2000.
 - [20] D. Tapscott. *The Digital Economy: Promise and Peril in the Age of Networked Intelligence*, Mac Graw-Hill, 1995.
 - [21] D. Tapscott, A. Lowy, and D. Ticoll. *Digital Capital: Harnessing the Power of Business Webs*, Harvard Business Press, 2000.
 - [22] P. Timmers, Business Models for Electronic Markets *EM - Electronic Markets. The International Journal of Electronic Markets and Business Media*, vol. 3, 1998.
 - [23] N. Vulkan, Economic Implications of Agent Technology and E-Commerce *The Economics Journal*, vol. 109, pp. F67-F90 1999.
 - [24] M. Wössner. *Lecture Notes in Medienwirtschaft Winter Term 1999/2000*, Universität St.Gallen, 2000. (UnPub)