

# Virtual Professional Communities - Definitions and Typology -

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## Abstract

Professional communities provide the necessary environments for professionals to develop their skills and to share the knowledge and experience of their professions. In the digital age, virtual professional communities (VPC) can use emerging Internet technology as their cooperation platform and reduce constraints of geographic, organizational, or temporal boundaries. In this paper, we argue that while the use of information technology is highly innovative, the community concept is not. Professional communities are known throughout many centuries. The paper intends to provide the one-day workshop on VPC at the ICE conference with an initial set of terms and definitions. We distinguish a matrix of virtual professional communities along the two dimensions 'contribution of the VPC to the professional' and 'added value to the professional community', which can be expected to require distinct support.

## Keywords

Virtual Enterprise, Community of Practice, Network Organization, Virtual Collaboration

## 1 Introduction

Virtual, or on-line communities of professionals – especially IT professionals - are probably the oldest form of computer mediated working and go back to systems like Digital Equipment's VAX notes [Rheingold 1993]. Since 1994, user-friendlier graphic user interfaces (GUIs) and browser technologies made online communities broadly accessible as well to those who are no information technology experts. This new accessibility significantly expanded the market for many kinds of communities and initiated an industrial transformation process towards 'e-business', which is generally expected to become a 'knowledge economy'. Websites and portals emerge that allow both, the exchange of knowledge and the management of multiple relationships with colleagues, customers, or suppliers [Hagel and Armstrong 1993]. Professionals, by definition, are knowledge workers, who develop and maintain their professional body of knowledge in close relationships with their colleagues. In short, virtual professional communities (VPC) seem a most natural match between innovative technology and an existing organizational form.

However, after the burst of the dot.com bubble the need has become apparent for VPC too, that (Web-) technology alone is not sufficient and that we need a more encompassing understanding of commercial goals community purposes and control [Werry 2000]. While virtual technologies are innovative, forming and maintaining a community has been a basic human activity since time began [Mongoose 2002]. Medieval guilds of craftsmen, for example, are forms of professional communities and it seems worthwhile to adapt these early experiences to VPC. It does not wonder therefore that many different scientific disciplines offer their insights on this phenomenon. Sociologists define community as a set of social relationships and a virtual community as a network with a particular set of characteristics that uses computer support as the basis of communication among its members [Wellman 1997]. Computer scientists develop functionality like chat, audio conference, listserv, or group email system. Web developers develop online content databases for communities [Nielsen 2000]. Economists research relationships as the renaissance of a pre-industrial industrial organizational form [Piore and

Sabel, 1984]. In short, perspectives from multiple disciplinary sources need be integrated to realize the possibilities of prosperity that is embedded in VPC.

The purpose of this paper is to prepare the one-day workshop at the ICE 2002 conference and establish an initial set of terms and definitions for the discussion. We further offer a typology of VPC to enable discussion on the application of the VPC concept in different real-world settings. Within the constraints of a conference paper we will use literature and produce examples and anecdotal evidence to well illustrate the concepts. The remainder of the paper therefore is structured as follows. In the next section we define relevant terms and then turn to the typology of VPC. In section 4 we are concerned with the processes of creating VPC. We conclude the paper with three broad discussion proposals.

## 2 Definition of Terms

In this paper, we consider virtual community from both social and technical aspects. For the purposes of this paper the following definition seems suitable:

“A Virtual community is a computer-mediated social group which is based on the belief that humans are social creatures and that communities enables socializing, and the virtual community is the technological response to this inherent human need. “[Sudweeks and Rafaeli 1996]

Successful e-business like eBay claim that the driver for successful web sites is “that people seek social groups or classes that have interests in common with them and that community participants are more loyal, returning more frequently and staying longer” [Basex, Inc.].

Professional communities are a subset of virtual communities, which bring together professionals. Professionals are, for example, engineers, craftsmen, medical doctors, lawyers, accountants, academics, or consultants, who are trained in professional schools and in most cases have passed entry examinations, which other on-line communities like interest groups or customer groups do not have. Furthermore professionals in most cases have a formal membership in their professional community, for example as a registered accountant, a chartered engineer, a member of IEEE or similar. In some countries, this is even enforced by governmental regulation for certain professions like accounts or lawyers. In Germany, for example, craftsmen have to be enrolled in the ‘Handwerkskammer’ the crafts guild.

Professional community therefore show strong homogeneity amongst their members, since these have been selected and then trained in their early professional career. They share a common set of values, professional standards and conduct. Lawyers, journalists, and medical doctors for example are known to protect information about their clients; academic scientists do have their standards of sharing knowledge and giving mutual credit through citations. VPC do have to acknowledge and support such established standards. Such standards are enforced. Failures of individual members to comply with the standards are sanctioned and can lead to exclusion from the professional community and de-facto prohibition of his or her further professional working.

Professional communities do have a certain degree of organization, which allows positioning VPC in the context of other emerging organizational forms in the digital economy. Figure 1 depicts a continuum of increasing organization, which on the lowest degree shows market, traditional as well as electronic markets, which are governed by market mechanisms. The other extreme is the hierarchical firm, which has the highest organizational degree and is entirely administered. These two extremes were regarded as clear alternatives in traditional industrial economic models. Networked forms of organization emerge as new forms in the digital economy, which show intermediate degree of organization. We here distinguish between VPC and virtual organizations, because VPC are communities of individuals and for at least this

reason show a lower degree of organization than virtual organizations, which as well include the cooperation of entire organizations.

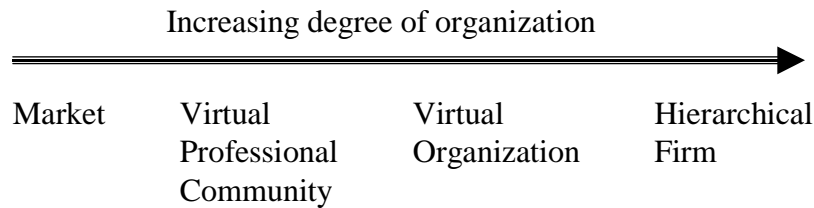


Figure 1: Degree of Organization of Virtual Professional Communities

It goes without saying that in most real-world settings more than one degree of organization exists in parallel. Already Chester Barnard [1938] observed this form of complex organization that whenever organizations cooperate, individuals have to cooperate too. In individual cooperation and personal networks organizational networks often are prepared [Katzy et al., 2001]. As well in transaction cost economics the moderating effect of communities - which Ouchi [1980] calls 'clans' - on transaction cost and the definition of firm boundaries is recognized. In short, while VPC are a distinct organizational form, they will exist in parallel with other organizational forms.

Each organizational form does have its specific characteristics and will therefore best work under certain conditions. Markets provide highest incentives with high risk, while hierarchies provide best security, however, with lowest incentives for its members [Chesbrough and Teece, 1996]. Virtual organizations show highly flexible or 'agile' [Goldman et al., 1995] behaviour in fast changing markets. The specific characteristics of VPC remain to be researched, but there are at least low concrete expectations of what VPC can contribute.

First, professional communities develop the body of knowledge of the professional community, for which they have developed detailed mechanisms. Knowledge generation and learning in an academic field is facilitated in conferences, where new ideas are discussed. Patent procedures in engineering have a similar function of identifying new developments and granting recognition for the inventor. Journals in an academic field have the function to serve as an archive of reliable professional knowledge, just like standards (e.g. ISO, EN) do in the engineering field. Peer review procedures in both cases secure the quality of the body of knowledge. Knowledge dissemination is undertaken in professional communities through trainings and publications.

Professionals are legally liable for taking part in the knowledge creation and dissemination processes of their community. Many technical contracts include the phrase of a professional having to perform 'state-of-the-art' work, which is reference to the accepted body of knowledge in the relevant professional community, or to perform work to 'state-of-science', which is a reference to the advanced developments of the community's professional knowledge.

Many VPC operate inside large firms, where they are often called CoP, 'community of practice'. Their specific challenge is the fragmentation of knowledge, which results from organizational differentiation in hierarchical layers, functional departments, or different geographical sites (Figure 2). The main driver for CoP is to increase the efficient use of once developed knowledge

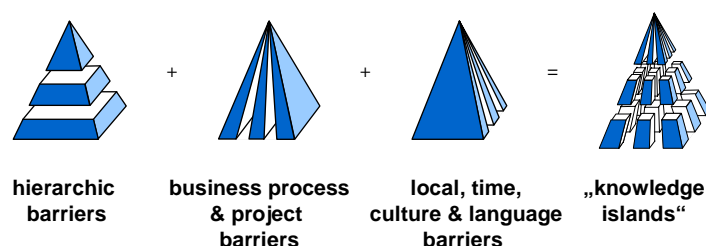


Figure 2: Knowledge Islands within multi-national Enterprise (Siemens)

along the entire business processes, especially the new product introduction process. The notion of knowledge in this context often is design documents, product application knowledge, or market data, which is narrower than the notion of explicit knowledge plus shared values, and norms in professional communities.

The second expectation towards professional communities is the generation of innovation that is based on high knowledge levels, or 'high-tech'. Silicon Valley is a most prominent example of such a community in a geographical area [Saxenian, 1991], where a new development is called Java (a slang word for cafe) because programmers from different companies have developed it during their coffee break in the street café. Research suggests that the biotech industry is based on innovation created in a professional community [Liebeskind et al., 1994], as well as the film industry in Hollywood [Goranson, 1999]. Such professional communities perform two functions, they peer review the quality of the technical development and they provide mechanism to turn them into successful applications. The latter includes the development of specific mechanism at the community level, for example the Venture Capital industry in Silicon Valley, which provides the funding for high-tech start-up firms.

We have argued that the organizational context in which a VPC is embedded is important:

Intra-firm professional communities improve knowledge sharing among employees to foster a creative and innovative enterprise culture, and enhance the firm competence. VPC inside the firm can be a means to create core-competencies and manage knowledge as a strategic resource across the levels of the organizational hierarchy, division barriers, and national culture difference. Intra-firm VPC can rely on a certain degree of infrastructure and administration from the management of the firm.

Inter-firm professional communities improve and strengthen the relationships with customers or engineering partners. Facing the new dynamic competency environment, more and more companies entail concepts like concurrent engineering, supply chain management, customer relationship management and form enterprise networks. VPC in intra-firm settings need to establish the management support in a cooperation agreement between the participating organizations.

Public professional communities bring together audiences on specific topics such as product application (SAP Interests group) or product development (the Linux community). Membership to such professional communities normally is open to all the qualified professionals interested. Here, the professionals with the common interest and similar working culture freely exchange their experience, share their information and foster the social relationship. As it is independent of hosting organizations, it has to marshal necessary resources and support from its own sources.

The terms and definitions provided in this section intend to allow for a multidisciplinary discussion of VPC. In the next section we derive ideal types of VPC. The objective is not that a realized VPC will exactly look like one of these ideal types; ideal types rather describe consistent configurations, which allow understanding the characteristics and behaviour of a VPC [Doty and Glick, 1994].

### 3 Types of Virtual Professional Communities

From what has been discussed in the previous section two dimensions emerge that allow spanning a 2 by 2 matrix of ideal types of VPC. On the one dimension VPC can be distinguished by their added value to the community. VPC either focus on efficiency gains in the usage of existing knowledge, which can quantitatively be measured as reduced cost and lead-time or increased quality in core processes of the business for which they are created. Other VPC are geared to creating innovation as the added value to their community. Innovation needs to be transformed into additional business (top line) for the creation of added value.

The second dimension of distinction is the contribution of a VPC to the individual professional. VPC can be distinguished in focusing on developing professional knowledge standards and thus contributing to building professional skills and expertise of each professional. Other VPC rather focus on connecting professionals to new business opportunities and thus enable exploiting the knowledge and the skills of professionals.

Figure 3 shows a matrix of four ideal types of VPC that emerge from combining the two dimensions. Let us identify the quadrants with A, B, C, and D. Examples for VPC in Type A are New Product Development (NPD) teams. Within the established frame of a corporate business process the goal is to increase efficiency in knowledge usage, which is measurable in lead-time reduction and cost savings within the process. For each individual professional, such as design engineers, application engineers, and maintenance engineers the contribution is fast building of professional knowledge on new products.

Examples of VPC of the Type B are staffing systems in consulting networks, or contract management systems of insurance agents, or medical professionals, who sub-contract orders from their insurance / consulting company or hospital depending on the required skills for a client project or order. Each professional remains responsible for creating his or her professional skills, while the community in total offers efficiency for its customers, which comes from allocating the right professional competencies to the right tasks. The contribution to each professional is access to a broad range of potential business, and efficient contracting mechanisms with low overhead.

Examples for VPC of the Type C are standardization bodies like ISO and EN or professional associations like IEEE and ACM. Universities and higher technical schools host professional communities of this type. Being member of such VPC gives access to knowledge sources to the individual professional, who can use this to build and maintain his or her professional competence. High standards of professional knowledge create value for the community through reliable services, or innovation. Training and education are concrete results of such VPC. However, added value for the individual is indirect and can incur long incubation times. The added value rather is a public good, which therefore relies in large parts on public funding.

Famous examples of Type D are regional networks like Silicon Valley and Hollywood in the US. The professional communities create the critical mass for high innovation rates in terms of new business and applications. The added value for the community is revenues from innovation; the contribution to each individual professional is access to advanced professional assignments, which allow for premium revenues.

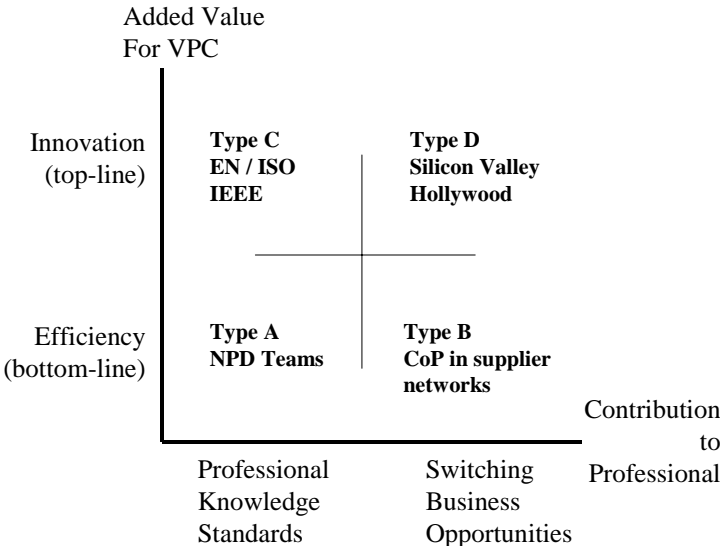


Figure 3: Typology of Virtual Professional Communities

Requirements for the supporting information infrastructure for each of the ideal types of VPC will be different. Type A VPC do require strong repositories and information warehouses, which ties into the business processes. Type B VPC require Web based negotiation and contracting solutions. Type C VPC need electronic journals and group support systems for their peer review processes. Type D VPC, in contrast, need information systems that allow fast switching of partners for new business opportunities.

The four ideal types are distinct in their assumption on what are the driving motivations for individuals to actively participate and further the professional community. Type A communities are administered communities, where management supervises contributions to the professional community and gives incentives. In consulting firms for example, projects are only accepted as delivered after the documentation has been submitted to the knowledge base, in engineering firms usage of knowledge bases can be included in the bonus scheme for each developer. Type B professional communities can rely on market mechanism, where contracts are only offered within the virtual community system. Bottom-line measures are quantitative and easier to measure. Innovation oriented professional communities are more qualitative. Type C professional communities are mainly based on the recognition that individual professionals can gain from contributions. Symbolic management, such as IEEE's price for the 'engineer of the year' play an important motivation to attract contributions. Type D professional communities are driven from an entrepreneurial motivation to take risk and create new businesses that might lead to returns in the distant future.

#### 4 Development and Creation of Virtual Professional Communities

We add this dimension of the discussion because the concurrent engineering community is rather young and has emerged over the last ten years. It was supported by public funding in the Ce-Net projects and has now reached a point of intended transformation into a European society for concurrent engineering. A number of practical questions need to be addressed: what services should the society offer? What are the next steps? How should the society be organized?

Virtual Professional Communities emerge, but do need management for their creation and development. Palloff and Pratt [1999] adopt five stages of group dynamics to the life cycle of a professional community development: forming, norming, storming, performing, and adjourning. We here adapt the group dynamics concept for the creation of a virtual professional community, which is based on experiences in creating a virtual professional community within the European Union [Katz and Buecker, 2000] (Figure 4).

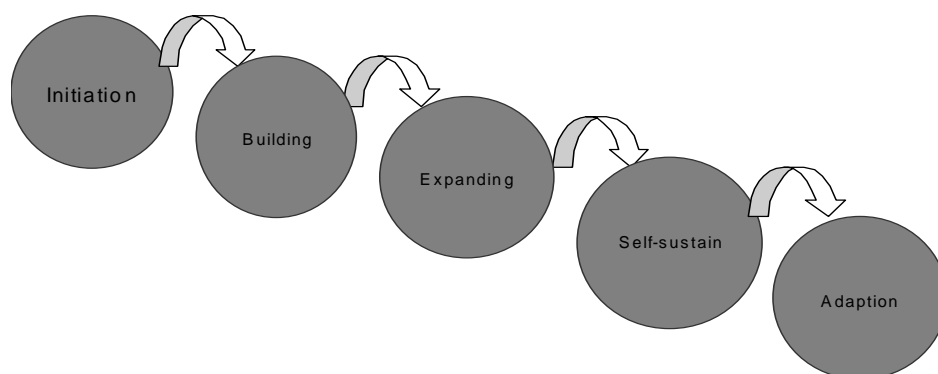


Figure 4: Virtual Professional Community Life-Cycle Model

**Initiation Stage:** A community is just starting to form. Individuals form the nucleus around their common interests or work. Professional knowledge and experience is collected and shared amongst the initial members of the professional community. The organizers can work directly

with members who represent. The stronger the ties in the social network, the stronger the common needs and common culture, and the simpler it is to set up the team. Critical factors in this phase are a clear purpose and the affiliation with respected individuals and entities to get endorsement from relevant reputable partners.

**Building Stage:** The core team creates values, standards and an organizing structure. It defines processes for how the community will operate. Members increasingly communicate and collaborate and new members join the community. Critical factors are face-to-face meetings organized by respected partners that help to cultivate the trust among the participants. A further important task is to discover what the community knows and profile it to the outside world.

**Expanding Stage:** The stage is vital to the virtual professional community. In this stage, the community operates with the defined structure and processes. The community should grow with its size. Community committee's are established and interact with the available community. Membership benefits are made visible to potential members. Critical success factors in this phase are clear and visible community purposes, membership benefit, and governance structures and policies.

**Self-Sustain Stage:** In this stage, member numbers of the virtual professional community reach stable levels. There are high-level trust within the community, and frequent information exchange among the members. The community needs to encourage the members to participate in the discussions, seminars, message exchange etc. Moreover, community also should keep the balance among privacy, functionality needs, security and content etc. Critical factors in this phase are membership rewards, incentive and reputation strategy.

The concurrent engineering community CE-Net is on the transition to the self-sustain phase.

## 5 Conclusions and Further Research

The objective of the paper is to provide an input for the discussion on what virtual professional communities are and how these can be supported with information infrastructures. Virtual professional communities are an interdisciplinary research field and contributions come from so distinct disciplines as computer science, management science, engineering, or psychology. If this field is ever to become a community in itself, it does need a unifying language, a set of definitions and shared knowledge. It is not necessary that these definitions will be those proposed in this paper. For us it will be sufficient if the paper makes a contribution to getting the definition process started and to contribute to a process of accumulation of knowledge on professional virtual communities.

Future research in this should take three directions, which directly flow from the argument of the paper. First, professional communities are a very traditional phenomenon. However, economic theories of rational 'scientific management' during the 20<sup>th</sup> century has not given priorities to understanding this mode of industrial organization. Research should be undertaken to capture this experience and adapt it to the new possibilities of the digital age. A second stream of research and development is needed to create better information infrastructures for the specific needs of virtual professional communities. Promising prototypes are developed, but these need to be tested in real-life settings to learn about their performance criteria. Finally, if virtual professional communities are to be an important mode of industrial organization in the knowledge economy, business research and organizational research is needed to understand how virtual professional communities contribute to the wealth of professionals and how they have to be administered.

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