

CLARIFICATION AND SUCCESS OF CONCEPTS OF "PROFESSIONAL VIRTUAL COMMUNITIES" AND "VIRTUAL TEAMS" INSIDE INTER-FIRM NETWORKS

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Abstract

Viewing social groupings as "Virtual communities" (VC) has become increasingly popular because of the emergence of Internet and of advanced Information and Communication Technologies (ICT). However some ambiguities are still remaining about their characterization. The paper proposes to clarify the definition of the concept of VC where they are an aggregation of individual professionals inside inter-firms networks. Also, this paper enriches current researches within the European project, ECOLEAD. This develops an analysis on how VC can be driving forces of inter-firms networks. Based on "Professional Virtual communities"(PVC) and "Virtual Teams" (VT) characteristics defined by ECOLEAD, this paper highlights key success factors of PVC supporting inter-firms networks.

Introduction

Advanced ICT have helped creating new organisational forms and coordination between firms. Therefore, firms have been redrawing their boundaries and we assist to the emergence of inter-firms networks.

In face of the revolution of ICT development and new firm's boundaries, the concept of "Virtual Communities" appears as an interesting mode of support and coordination of networks.

The objective of the paper is to clarify the definition of the VC concept in the case where VC are an aggregation of individual professionals willing to face the challenge of inter-firms networks, and also enhances current researches achieved in the European project, called ECOLEAD. Based on "Professional Virtual Communities" and "Virtual Teams" characteristics defined by ECOLEAD, this paper highlights some key success factors of PVC supporting inter-firms networks.

The first part of the paper aims at defining the concept of VC.

To achieve this objective, we propose to focus on three forms of professional communities which can be found in social networks: "community of interest", "community of practice" also called "CoP" and "epistemic community". These three types of communities can exist physically through face to face meetings. In this case we call them "Physical Communities".

Also, these communities can be "virtual" as interactions among members occur in a "virtual space". In this case, we call them "Virtual Communities" (VC).

Then, we propose to present the concept of VC, developed by the ECOLEAD project, considered to be major driving forces for the emergence, support and functioning of inter-firms networks. One of ECOLEAD objectives is to define an innovative concept called "Professional Virtual Communities". The ECOLEAD PVC are not only communities where members interact to share knowledge and experience, to socialize but communities where members have a strong business oriented vocation.

In the second part of this paper, we seek to analyse how PVC can support inter-firms networks and also which key success factors are required to PVC to succeed. The concept of communities appears as an effective coordination method to align collective learning by formal and informal contacts. Such as traditional or physical communities, PVC support and coordinate inter-firms networks. Accordingly, PVC have to face difficulties to create trust, share knowledge and to pass through embedded physical existing interactions among members.

Part I

PVC and VT concept

In the face of intense global competition and uncertain market conditions, firms have been adopting a variety of new organizational forms. They have been redrawing their boundaries in order to respond to more demanding global customer requirements. Also, the ICT development has created a new working environment. ICT facilitates interactions between firms by reducing geographical distances and also by offering new communication possibilities.

Modes of organizing economic activities emerge through coordination and cooperation processes. They are often named in economic and organisational science "networks". Networks concept is used in variety of disciplines. Networks are complex and unstable and we can identify an important number of different forms. In literature, some authors define the network as a "hybrid" or an "intermediary" form of organisation of economic activities in comparison to traditional forms such as market and hierarchy (Thorelli 1986, Williamson, 1985). Powell (1989) defines the network as a "third" organisational form. This theory represents a new organisational logic which is neither market nor hierarchy.

The goal of networks is to consolidate coordination of firms which are represented with heterogeneous and independent firms; we called them "inter-firm networks". Inside inter-firm networks, exchanges and collaboration among firms allow to respond to global customer demands.

Firms have to share competencies with other firms inside networks in order to respond to global customer demands. Inside inter-firms networks, firms focus on a limited number of competences for which they have a competitive advantage. These are labelled "core competences" (Prahalad and Hamel, 1990). The core competencies determine firm's activities.

Competencies are strongly linked to Knowledge. Because of the diffusion of ICT, Knowledge economy has emerged (Foray, 2000). Knowledge creation and sharing is increasingly seen as a competitive advantage for firms. In his analysis of Knowledge Economy, Foray (2000) has presented the process of creation, exchange and sharing knowledge as "collective processes". These can be formal and/or informal within networks (Foray, 2000).

Knowledge is embedded in particular interactions called “social networks”. These involve not only firms but also individual professionals within firms (Granovetter, 2000, Nahapiet & Ghosal, 1998). Exchange of complementary information and knowledge is possible within informal and formal situations only if they are coordinated by trust. Among inter-firm networks, a concept is needed to offer a competitive advantage by creating trust. So "communities" concept appears as an effective coordination method to align collectives learning by formal and informal contacts among individual professionals.

The concept of "communities" is currently used with a very wide range of meanings. The classical definition provided by the sociologist, Thomas Bender (Bender and Kruger, 1982) is relevant: *"A community involves a limited number of people in a somewhat restricted social space or network held together by shared understandings and a sense of obligation. Relationships are close, often intimate, and usually face to face. Individuals are bound together by affective or emotional ties rather than by perception of individual self-interest". There is a "we-ness" in a community: one is a member".* This definition insists on affective ties, mutual obligation and knowledge sharing.

A professional community is an aggregation of individual professionals who cooperate in order to face the challenge of Knowledge Economy (Foray, 2000).

We propose to focus on three forms of professional communities which can be found in social networks:

The first, a "community of interest", is composed of members sharing same ideas, beliefs and goals. Main characteristics of these communities reside in the fact that they are geo-located and have thematic proximity. Members of community of interest can have different profiles such as in the case of health communities.

The second, a “community of practice” also called “CoP”, is based on practice proximity. CoP can be informal, spontaneous and transdisciplinary. According to Lave & Wenger (1991), CoP is defined as a set of people who share concerns, a set of problems, or a passion about a topic, who want to deepen their knowledge and expertise in this area by interacting on an ongoing basis. For instance, CoP can be an association of experts in Telecom area. Even though CoP is an open community, requirement is that its members need to have something in common.

The third, an “epistemic community”, can be defined as a group of agents sharing a common goal of knowledge creation. According to Haas (1992), this is a group with an authoritative claim to policy-relevant knowledge within the domain of their expertise. Members hold a common set of causal beliefs and share notions of validity based on internally defined criteria for evaluation, common policy project and share normative commitments. An example of epistemic community is the Linux community.

These three types of communities can physically exist through face to face meetings. In this case we call them "Physical communities".

Also, inside these types of communities, interactions among members can occur in a "virtual space". In this case we call them "Virtual Communities" (VC).

Rheingold (1993) was the first to define VC and he has proposed that VC is a "*social aggregations that emerge from the Internet when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace*". Rheingold (1993) has introduced a virtual space to interact for a pool of members who participate in these communities. In addition to virtual interactions among members, he also introduces affective ties.

Also, Steinmueller (2002) has presented VC as a group of individual intentionally associated and who have accepted to interact with up to date ICT tools.

In accordance with these two definitions, we can define a VC as a "*pool of individuals who share common interests, values and ties and who interact in a virtual space*". A virtual space, also called in the literature "cyberspace" (Gibson, 1985 quoted by Marcotte (2003)) can be defined as a non physical space where interactions are electronic.

The general goal of VC is to reinforce interactions among members through a virtual space. Numerous electronic collaborative tools already exist. They are a mix of synchronous tools (chat, instant messaging) and asynchronous tools (groupware, email, forums...). The most popular are text-based such as email. Synchronous tools preserve instantaneity and rapid interactions and asynchronous tools generate traceability and more detailed information.

The existence and efficiency of VC's depends on ICT development. However, ICT are not the only element necessary to create VC.

ICT tools facilitate and boost VC's operations and development, but other factors such as loyalty and trust among members are required to allow VC to succeed.

The ECOLEAD (European Collaborative networked Organizations LEADership initiative) project focuses, inside one of its "Work Package", on VC because they are considered to be major driving forces for the emergence and functioning of inter-firm networks. This project is based on the assumption that *"In ten years, in response to fast changing market conditions, most enterprises and specially the SME will be part of some sustainable collaborative networks that will act as breeding environments for the formation of dynamic virtual organizations"*

Accordingly, one of ECOLEAD objectives is to set up the foundations for an innovative concept called "Professional Virtual Communities" (PVC). PVC defined by ECOLEAD are not only Virtual Communities which interact to share, create knowledge and experience but its members have a strong business oriented vocation through the creation of "Virtual Teams" (VT).

PVC have to create value among members, to offer life maintenance and the objective of ECOLEAD project is to create advanced collaboration spaces for PVC. The project takes into account different elements for the PVC welfare as business strategy for exploitation of the PVC paradigm, IPR (Intellectual Properties Right) protection principles in PVC, model for life insurance institutions and performance metrics supporting a collaborative culture.

PVC are formed by number of individual professionals with specific identical or complementary skills and competencies. Members are volunteers and they have diverse motivations to participate in the PVC. In ECOLEAD project, three types of motivations are strongly interconnected: knowledge sharing, socializing and business objectives. Members' objectives can be individual and personal in order to acquire new knowledge by interacting and sharing or professional by contributing to the achievement of strategic business objectives.

PVC can be an open/closed community and an autonomous system where the importance of the animator is predominant in order to make it succeed. Some other functions such as the initiator and the caretaker are of importance in order to enable the PVC's success. Caretaker is the person who is in charge of the knowledge management among the PVC. He or she also manages the PVC member's entries and exits.

PVC require easy to use and user-friendly ICT tools in response to member's demands and practices.

Unlike open source communities such as Linux, there is no anonymity among PVC members.

Therefore, and according to PVC development in ECOLEAD, PVC can be defined as "*a structured association of individual professionals interacting and exchanging information and knowledge in a virtual space. They share common objectives to improve their personal and professional competencies in order to facilitate business inside networks*".

The concept of VT is more and more used in the literature regarding educational learning and also professional communities. The use of virtual team is growing in popularity especially inside firms. Researches, regarding VT inside inter-firm networks, are more rarely investigated. To clarify this concept of VT, we propose to define first "a team" and after "a virtual team". A team is defined as an independent group of people who working together to achieve common goals and to complete assigned and temporary projects. Two main characteristics of a team, contrasting with the community, are "working together" and "temporary project". Then, a "Virtual Team" is considered as a team who has virtual interaction other than face-to –face interactions.

The ECOLEAD vision adds to current definition in literature a strong business orientation. VT is an association of selected members of PVC brought together to respond to specific customer demand. For that reason, VT are strongly business oriented and bring their expertise during the whole life cycle of creation- operation- evolution and metamorphosis of inter-firm networks.

In terms of ICT tools, ECOLEAD aims to develop an advanced collaborative platform including innovative disciplines, multi-modal ubiquitous collaboration spaces, trust support environment, ready to co-operate awareness services, VT performance measurement, match making and collaborative problem solving. This platform is intended to give PVC's members the position of being ready to cooperate.

Part II

PVC and VT inside networks

We have analyzed how PVC can support inter-firm networks. In the second part of this paper, we aim at studying how the concept of PVC (and VT) can be applied to two types of inter-firm networks.

The first type is "co-located networks". Firms are geographically "co-located" or geolocated. We have focused on Industrial Italian District and Silicon Valley case studies.

Industrial Italian District consists of geographically concentrated structure in low-tech sectors (for instance firms in manufacturing and hosiery sector). The development of these districts is directly related to the region's pre-industrial tradition. Becattini (1990) has defined them as "*a social-territorial entity which is characterized by the active presence of both a community of individuals and a population of firms in a naturally and historically bounded area*". Becattini (1990) added that "*the community of individuals*" that include a homogeneous system of values diffused within the district, invigorated by interaction and transmitted from generation to generation thanks to a system of institutions and rules "- firms, spread families, technical schools, churches, political parties, etc (Muzzy, Kautz, 2004).

Inside Industrial Italian District, individual professionals communicate and interact in a physical space. Exchanges are always face to face meetings. Strong geographical and historical anchorages keep physical interactions between individual professionals.

Saxenian (1994) has, also, investigated social networks in Silicon Valley. Silicon Valley is a set of population of firms and group of individuals with strong links. The sense of community, identified by Saxenian (1994), enables Silicon Valley firms to solve technical problems more easily and rapidly than technical people who were limited to contacts with other employees of their company. However, individual professionals didn't interact in a virtual space. Most of the information has been usually exchange in bar, café, after children's schools, in church, etc...Inside Silicon Valley, firms cooperate even if they are strongly competitive. But even if individual professionals of Silicon Valley are more ready to use new technology than in Italian industrial district, contacts among communities are still informal and remain face to face meetings. Few VC were identified.

This analysis has shown that the existence of PVC is not assured even in presence of high tech or low tech "co-located networks".

The second type is "distant networks": Firms are geographically dispersed. Faced to the difficulties to find relevant examples in the literature inside distant inter-firms networks, we have focused on "distant inter- R&D teams". In this type of "distant networks", we have highlighted a concrete analysis following works achieved by Gallie and Guichard (2002) about the impact of ICT sophistication on geographically distant networks inside the area of French space physics.

Between the two French teams, who took part in an international collaboration project in the space physics area (Gallie and Guichard, 2002), interactions are not only physical but also virtual: in this case, ICT tools allow reducing constraints of non geographical proximity. According to these remarks, we think that building PVC between geographically distant experts or researchers belonging to R&D teams appears as relevant to enhance an international R&D teams.

However, virtual interactions are not as successful as expected. Inside PVC, difficulties occur regarding the creation of trust and the transfer and sharing of knowledge among members.

PVC appear as a central element to reinforce exchanges between firms inside networks. Even if networks are "co-located" or "distant", firms seem to be unable to take advantage of ICT opportunities to increase resources value and acquire competitive advantage.

The main reason inside "co-located networks" is that geographical and historical anchorages create routines in the way of exchanging information; firms and individual professionals keep on relying on strong interactions in physical space.

PVC allow to reduce geographical proximity by also reducing time and costs communications inside "distant networks", but one of the critical issue remains the creation of trust among members.

As we have defined before, the concept of communities appears as an effective coordination method to align collective learning by formal and informal contacts. Such as traditional or physical communities, PVC support and coordinate inter-firms networks.

However, we demonstrate that PVC can exist inside inter-firms networks but their existence and success are not assured.

Inside "co-located networks, PVC have to pass through historical, cultural, social embedded communities by imposing new virtual interactions.

Inside distant networks, PVC need to be capable to create trust and to transfer knowledge among members.

Faced to these difficulties to create trust, share knowledge and to pass through embedded physical existing interactions among members, we detail, below, some propositions identified for the success of PVC (or generally VC) inside co-located or distant networks. Our researches focus on conditions required for PVC and also for VT to exist and success inside networks of firms. Six propositions have been identified:

- *Proposition 1: A limited size of the communities*

Community size has a major influence on any communities dynamic. A large size of PVC can motivate people to participate by creating a dynamic process of reputation. However, the larger the community is, the more its organisation is complex. Also, the larger the community is, the more its ICT tools to allow members to interact are complex. A limited size of the communities is relevant to facilitate the creation and development of PVC.

- *Proposition 2: A Structured organisation*

We distinguish here two types of PVC: open and closed.

Open PVC create encouraging effects to participate, but processes inside open PVC are more complex and present risks in term of visibility and control.

Closed PVC act as a club, with a control management of entry and exit of members. Processes are identified and under control, members are identified. However, one of the major risks is that this structured organisation operates as a "closed system" where critics and external ideas are progressively rejected. This also may lead to a feeling of "superiority" developed by its members towards people who act in the same domain but do not participate to the community. A closed community has to prevent itself from living in isolation.

Following ECOLEAD's PVC concept, PVC have to be an open community and autonomous system where core members have an important role. Core members include initiator, animator and caretaker.

Their roles are predominant in order to make open and autonomous PVC to succeed. PVC core members have to play an active role by organizing, structuring and controlling PVC and also by encouraging and motivating members to interact. A real structured organisation is required for PVC to succeed where control and hierarchy are managed by the core members.

- *Proposition 3: An alternative between virtual and physical interactions*

One of the key questions is under which conditions the trust emerges inside virtual interactions. If PVC is an extension of physical communities, trust already exists in these kinds of communities and inside virtual communities, members will have an “extension of the existing trust”. However, the creation of trust is completely different in PVC created "from scratch" because one may have never met or heard from other participants before. Physical and face to face meeting are required to create and spread trust among members and also to transfer types of knowledge as tacit knowledge (tacit knowledge represents non codified knowledge (Polanyi, 1966).

Interactions between members can be an alternative process of virtual and physical interactions:

- Physical interactions: Physical interactions are necessary before moving into electronic interactions because of the creation of trust and relationship. Working face to face is necessary to form relationships and to become familiar with individual work styles and temperaments.
- Virtual interactions: Virtual interactions are necessary to improve and reinforce physical interactions because they are valuable and also informal team-building sessions occur outside business hours. Also, informal and virtual meetings help team member's size up each other.

- *Proposition 4: Some proximity among members*

Proximity is another major element to PVC to succeed. This proximity can be geographical/physical but also thematic, historical, cultural, social or cognitive.

For instance, cultural or social proximity can substitute geographical proximity. Affective ties and trust among members can be enhanced by proximity.

- *Proposition 5: The role of the PVC animator*

This function is essential for the PVC efficiency and success. The animator (we prefer this term to "leader" because of the voluntarism of members) has to be someone challenging the PVC members. This task is made easier by the credibility he must have gained from the members. However, when dealing with VT in the scope of ECOLEAD's PVC, the business orientation implies that the function is somehow different because dealing with contractual issues: we suggest here to associate a broker who will be the interface responsible for the exchanges between the VT and its customer.

- *Proposition 6: Adaptive collaborative ICT tools*

The exchange between two interlocutors, not in the same place and not compulsory at the same time, is less real than between face to face.

However, some researches show that emotional feeling can be created during phone conversation exchange through voice and with the uses of avatars (tools uses), emoticons, (chat conversation), interactions in real time (chat, instant messaging). Collaborative tools can be customized according to member's demands.

In this context, PVC should allow its members to have common collaborative ICT tools understandings. PVC have to permit members to share simpler and easier ICT tools. To achieve that result, learning processes before introducing and implementing collaborative tools are required. That includes the creation of interconnected practices, common ICT tools and common experiences and objectives. Also collaborative tools can be synchronous or asynchronous. Synchronous tools preserve instantaneity and rapid interactions and asynchronous tools generate traceability and more detailed information. This is important for VT because one key success factor for trust establishing is substantive and timely responses. Virtual Teams with high trust levels provide extensive and quick feedback to queries. Replies have depth. Feedback is not delayed." (Zentani, 2002).

Conclusion

New challenges

To establish trust inside VC, several conditions developed below are required and are also interconnected. In ECOLEAD project, we are focusing our research work on how establish trust inside PVC by analyzing key success factors developed below.

As these can be interconnected, they can be applied during PVC life cycle which will typically follow four phases:

- Creation : from an idea, a customer demand, a decision is taken to create a PVC and to invite members to join the PVC
- Operation : VT through advanced ICT tools deliver expertise services to networks
- Evolution : minor evolutions in the scope of the PVC activities
- Metamorphosis: redefine the objectives and the purposes of PVC.

During each phase of the PVC life cycle, a special attention should be given regarding to a limited size of the communities, a structured organisation, an alternative between virtual and physical interactions, some proximity among members, the role of the PVC animator and also adaptative collaborative ICT tools.

The PVC life cycle is interconnected to the VT life cycle which also will follow four phases. However differences appear between these two life-cycles:

PVC life cycle is conceived on a long-lasting concept and presents no ending term, when VT life cycle, because of its business orientation and also of expected concrete results, is limited in time.

Accordingly, the last phase of VT is dissolution because at this moment, the work is achieved, and the VT is dissolved. But this phase is of great interest for the efficiency of PVC and allowing gaining experience and knowledge.

To reinforce the PVC concept as a driving force for networks of firms, two complementary analyses have been launched:

- The first one will analyse uses and practices facing advanced ICT tools. This research aims at understanding, formalizing and implementing an ICT user-centred process of innovation dedicated to PVC and inter-firms networks. Users needs and requirements will be analysed during all PVC life cycle phases. Our conception of ICT tools will include identified and evolutionary user's needs and requirements. Also learning processes before introducing and implementing ICT collaborative tools are required. These include the creation of interconnected practices, common ICT tools, experiences and objectives.
- The second one will focus on "how social capital can be virtualized through PVC". In the literature, social capital first appears in communities studies (Jacobs, 1965; Nahapiet & Ghoshal, 1998). For instance, Jacobs (1965) has defined "social capital" as: *"interpersonal relationships developed overtime which provide bases for trust, cooperation, and collective actions in such communities"*. As the social capital concept can be found in the PVC concept, we aim to study how innovative ICT tools can support the virtualisation of social capital inside networks of firms.

Annexe

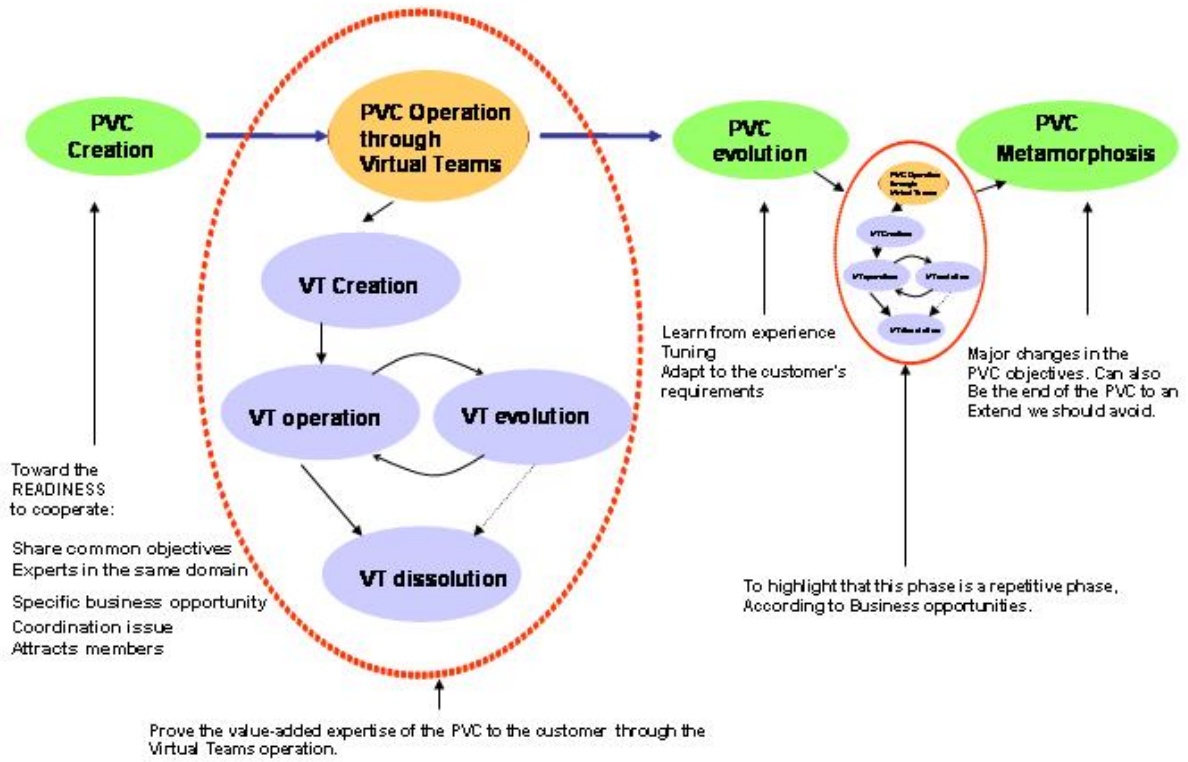


Figure 1: The ECOLEAD PVC Life-cycle

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