

OVERCOMING THE BARRIERS TO VIRTUAL TEAM WORKING THROUGH COMMUNITIES OF PRACTICE

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ABSTRACT

This paper examines the nature of virtual teams and their place in the networked economy. It presents a framework for categorising virtual teams and argues that fundamental changes have taken place in the business environment which force people and organisations to operate in two spaces simultaneously: the physical space and the electronic space. It highlights some of the issues of trust and identity that exist in virtual teams and argues that, due to certain barriers, only a small proportion of these teams reach a satisfactory level of performance. Using the evidence from two recent sets of studies, it highlights some of the barriers to effective virtual team working and demonstrates the critical importance of trust and social bonding to the functioning of such teams. It reports on the use of a Community of Practice in a virtual team and argues that this may provide one mechanism for overcoming some of the barriers. Finally, it argues that many of the problems stem from a lack of understanding of the new geography of the information economy and that, rather than accepting the notion that geography no longer matters, continued efforts must be made to understand the relationship between the physical world in which we live and the electronic world of virtual team working.

1. INTRODUCTION

Globalisation is an issue currently affecting many organisations and is one that has profound implications for the nature of work (Karimi and Konsynski 1991; Manheim 1992; Ives and Jarvenpaa 1992; Sachs 1995). In order to work effectively in an international setting companies are increasingly turning to trans-national teams (Castells 1996; Lipnack and Stamps 1997; West 1997). These are seen as an effective and flexible means of bringing both skills and expertise to bear on specific problems. Working in a distributed environment will affect teams in that they will lose opportunities for informal collaboration and knowledge sharing. Working in a more internationalised context places further strains on the way a team works as they not only have to cope with geographical distance, but also time, culture and possibly language differences.

In the new economy knowledge is increasingly seen as central to the success of organisations and an asset that needs to be managed (Boersma 1996). Since the 1980s, many organisations have taken steps to outsource, downsize and deskill in an effort to remain competitive (Davenport 1998; O'Dell 1998). Outsourcing, downsizing and programmes of planned redundancy all mean a reduction in existing staffing levels and as people leave, they take with them a valuable stock of corporate knowledge. This can be both knowledge of how the work is done in practice, and knowledge of a particular domain (Sachs 1995). Domain knowledge can be relatively easy to replace but the knowledge of how a company operates is built up over many years and can be irreplaceable, at least in the short term. In addition, many organisations now have to cope with the increasing internationalisation of business that forces collaboration and knowledge sharing across both time and distance. There is now an urgent need for new ways of sharing knowledge in such groups.

2. DESCRIBING VIRTUAL TEAMS

The concept of the virtual team is not clearly defined and it often overlaps with concepts such as the virtual or networked organisations, the virtual workplace, virtual communities, electronic commerce and some forms of teleworking (e.g. Igbaria and Tan 1997; Grimshaw and Kwok 1997; Hightower et al 1997; Knoll and Jarvenpaa 1997; May 1998).

In order to classify all of the different possible situations the following scheme is proposed based on eight possible scenarios. Four belong to the situation where team members work for the same organisation while the other four belong to the situation where team members are from different organisations (see Fig 1). In the former situation, expertise may be drawn from members of the same organisation, e.g. production planners and production operatives (Kimble 1995). The latter situation is more common in projects that require the participation of consultants or external assessors, or, in Business to Business activities such as those involved in B2B e-commerce. Further classifications can be made on physical proximity, i.e. whether or not team members are local to each other or are geographically separate. Additional classifications are determined by work-cycle synchronicity, i.e. whether or not members interact in the same or different time periods.

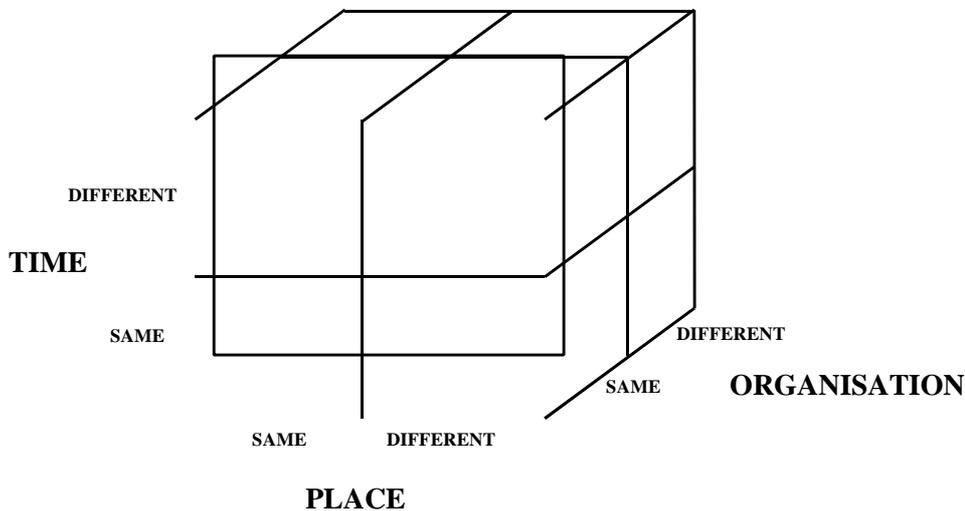


Figure 1: A classification of virtual team working

As will be illustrated throughout this paper, the spatial and temporal separation of team members can significantly affect the effectiveness of virtual teams, both within the same organisation and when working between organisations.

3. THE BUSINESS ENVIRONMENT FOR VIRTUAL TEAMS: LIVING IN TWO SPACES

Before discussing the findings from the case studies, it is necessary to explore the changes in the nature of the business environment. The convergence of computing and telecommunications has led to core activities being reorganised around information. An essential aspect of virtual teams is their ability to exploit the features of this new electronic environment.

Since the late 1980s, numerous studies have been carried out on the geography of the information economy (e.g. Hepworth 1989; Goddard 1992; Li 1995). One of the main conclusions is that to understand the new spatial dynamics of corporate activities we need to shift our focus from the geography of space (geographical separation) and place (the unique characteristics of particular socio-cultural setting) to the geography of flows (Castells 1985; Hepworth 1989; Goddard 1992). ICTs allow information to be accessed from, or transmitted to, remote locations instantly (Hepworth 1989).

Therefore, the locational patterns of the (networked) information cannot truly represent the geographical patterns of its use.

The neglect of space and place is surprising given the inherent geographical nature of information systems. In a recent study Li and Williams (1998) argued that with the rapid development and proliferation of ICTs, and the firm establishment of the information economy, organisations increasingly have to operate in two spaces simultaneously - the physical space and the electronic space. These two spaces are not mutually exclusive and they sometimes overlap with each other. However, many of the rules governing these two spaces are fundamentally different. To survive in the information economy organisations must not only exploit geographical differences and overcome geographical constraints in the physical world, but they also have to exploit opportunities and face threats in the new electronic space (Lombard and Ditton 1997).

Our notion of time is significantly affected by the emergence of the electronic space. An important dimension of the industrialisation process has been the standardisation of time in our work and social life. By changing the nature of the friction of distance, the question of time and its significance in our work and everyday life is also reopened. Global virtual teams can pass work-in-progress around the clock among the three main economic centres (America, Europe and Asia). Even in the same time zone, work-in-progress can be suspended in time (stored) which gives virtual team members the chance to organise individual time more effectively.

Similarly, with the emergence of the electronic space, the nature and characteristics of place have been radically redefined. This is not to say that the physical place is no longer relevant to individuals and organisations. On the contrary, local characteristics will continue to affect the effectiveness of communications between people from different places, even in the virtual place. Indeed, although in the electronic space the friction of distance has been eroded other frictions of distance derived from differences between place (e.g. local culture and language) will continue to work. However, the new information age also creates a tension. Structural change creates an environment of instability for employees. New organisational formations are formed based on the pervasive use of networked communication media for economic and social activities. In the face of these changes, people struggle to reaffirm their identity in the new electronic environment (Castells 1996).

4. VIRTUAL TEAMS IN PRACTICE: IDENTITY AND TRUST IN VIRTUAL TEAMS

The issues of trust and identity are crucial for the effective formation and functioning of virtual team. Identity plays a critical role in communication where knowing the identity of those with whom you communicate is essential for understanding team interactions (Donath 1996). Yet, when team members are separated by spatial and temporal borders, identity is ambiguous. Many of the basic cues about personality and social roles that we are accustomed to in the physical world are absent.

In the physical world, there is an inherent unity to the self. The body provides a convenient definition of identity: the norm is one body, one identity. Though the self may be complex and variable over time, the body provides a stabilising anchor. The virtual world is different. It is composed of information rather than matter. Information spreads and diffuses; there is no law of the conservation of information. The inhabitants of the electronic space are diffuse and free from the body's unifying anchor. One can have as many electronic personas as one has time and energy to create.

Similarly, trust is also an important enabler of co-operative human action. Many authors highlight the importance of trust in the success of teams (Larson and LaFasto 1989; Katzenbach and Smith 1993; Handy 1995; McMahan 1999). Without trust the management of a virtual organisation cannot be conceived.

Jarvenpaa and Leidner (1998) conducted a study about the creation and maintenance of trust in global virtual teams whose members transcend time, space and culture. The study identified various actions

and communication behaviours that favoured the creation of trust in virtual teams. They observed that those teams that were not focussed on a task reported low levels of trust, but recognised that task focus existed in parallel with a social focus. They also highlighted the importance of the first “online-impression” because the first messages of the team members appeared to set the tone for how the team interrelated. Greater trust was developed at the early stages of virtual teams through a balanced mix of social and task communication, enthusiasm, optimism and initiative. In the longer term, trust was greater in teams that developed set patterns of communication and responded promptly to other team members.

The key point is not that different forms of trust exist, but the observation that face-to-face meetings in physical space fosters social-based trust that carries into the electronic space and that, once a team has started computer-mediated working, the role of action-based trust also needs to be considered.

5. THE CASE STUDIES

Using the evidence gathered from two recent studies this paper will first explore the concept and functioning of virtual teams and then highlight some of the barriers to effective virtual team working. It will then demonstrate that a Community of Practice, if properly supported, may help to overcome some of these barriers thereby improving the effectiveness of these virtual teams.

6. STUDY ONE: THE EXPERIENCES OF TEN VIRTUAL TEAMS

This study consists of ten case studies of virtual teams in different organisations. The case studies demonstrate the wide applicability of virtual teams across sectors and the benefits they can afford organisations and individuals. They also illustrate some of the potential barriers to virtual working posed by the spatial and temporal separation of team members. Information was collected through face-to-face interviews combined with other forms of correspondence such as e-mails, faxes, company reports and telephone calls. Summary information about the case studies is given in Table 1 below.

Table 1: Some Background Information of the Case Studies

	Main Activity	Organisation	Time	Place
Case 1	Software support	Same	Same	Both
Case 2	Software development	Both	Both	Different
Case 3	Software development	Different	Both	Different
Case 4	Law firm	Different	Same	Same
Case 5	Secretarial services	Both	Same	Different
Case 6	Research/consultancy	Same	Both	Same
Case 7	Market research	Different	Both	Different
Case 8	Medical services	Same	Same	Different
Case 9	Medical services	Same	Same	Different
Case 10	Phone enquiries	Different	Same	Different

6.1. Background of the ten virtual teams

The first example (Case 1) is a virtual team between a CASE tool (Computer Aided Software Engineering) supplier and their main customer in the UK. The supplier develops a diverse range of software applications for customers in aerospace and defence, telecommunications, electronics, energy, system software and manufacturing. As part of its services the company provides constant, high quality, technical support to its customers. In the past these services were maintained by the supplier by sending experts to the customers' premises, but a virtual team solution has enabled the company to formulate an effective way of supporting its customers with greater responsiveness and efficiency.

Similar applications were identified in two other companies: one is a team of software developers in Northern Ireland who develop software remotely for a main client in London (Case 2). The other is a team of software engineers (Case 3) working from their separate homes to carry out joint software development projects in a distributed fashion in Scotland.

Another interesting virtual team was identified in a large law firm with several offices in Germany (Case 4). With only a small number of branch offices and limited number of clients, the provision of a full range of professional legal services in remote locations is expensive. In many such situations, the result is a poorer, less extensive service in rural areas. In this case, a virtual team solution was developed involving a main office and two branch offices in northern Germany. The intention was to not only enhance services in remote locations but also reverse the previous situation by having a range of experienced legal experts available in remote locations. Thus, a particular legal expert would not have to remain in the main office but could provide services from a branch office.

Similar virtual teams were identified in several other sectors. In France, a business services company (Case 5) set up an information system to support communications between its central office in Paris, three satellite offices in the suburbs and several regular clients. The system enabled direct communications, parallel viewing of documents and parallel working on word-processed documents while in simultaneous voice and visual communications. This allows complex editing and formatting issues to be quickly resolved.

In southern Italy a system was developed to link together several academic and research institutions to provide, collectively, a full range of research, training and consultancy services needed by industries (Case 6). In a market research firm (Case 7), a new system was developed to support the collaboration of a team of market researchers, consultants and managers working from their own homes. In Scotland, a system was developed between a large central hospital and a small clinic in a remote island (Case 8). Medical experts in the central hospital use the system to transmit high quality X-ray images together with other audio visual and text support to facilitate remote diagnosis. Similarly in Greece (Case 9), a new system was developed to provide full-time medical consultancy between a major teaching hospital in a large urban area and some small clinical units based in remote rural areas. The final case study was a home-based telephone enquires service in Portugal (Case 10) where an ISDN network was used to support the management and supervision of home-based work and communication between co-workers to avoid isolation and to gain guidance.

The above case studies illustrate the benefits of virtual teamwork to the organisations and individuals involved. However such new forms of work organisations are not problem-free; to achieve their full potential there are a number of difficult barriers to overcome.

6.2. The barriers to virtual team working

The evidence from the case studies clearly indicates that there are a number of technical problems ranging from unreliable systems and incompatible networks to slow computers and traffic congestion during certain times of the day. However, compared with the technological barriers, organisational

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and cultural barriers are perhaps a more serious impediment to the effectiveness of virtual teams. Many managers still rely heavily on frequent visual contacts with employees to be reassured that their staff are working.

From the case studies, the most challenging aspects of working in virtual teams is the issue of trust in the new electronic environment. This is most clearly demonstrated by the examples where team members have to share work-in-progress electronically. For example, software developers (Case 2 and Case 3) are reluctant to share half-finished programmes with others. Similarly, consultants and market researchers are often unwilling to share half-written reports with colleagues (Case 6 and Case 7).

Even when team members are prepared to share information and knowledge with each other, the sheer time and effort required to manage the logistics of communication can be a serious problem. Perhaps because of this, developing trust, a shared team culture and agreed procedures for effective communication - the essential common ground (Clark & Brennan 1991) of a successful virtual team - remains elusive.

In the following sections we will argue that some of these barriers can be overcome through the Communities of Practice (CoPs), which may provide a mechanism for strengthening and enhancing the effectiveness of virtual teams.

7. COMMUNITIES OF PRACTICE

The concept of a Community of Practice (CoP) was first introduced by Lave and Wenger in 1991. Partly as a response to the changes in the business environment outlined earlier in this paper, the notion of a CoP has been expanded to encompass a far wider range of definitions (e.g. Seely Brown 1991; Manville and Foote 1996; Stewart 1996; Seely Brown 1996; Wenger 1998; Wenger and Synder 2000) that were not part of Lave and Wenger's original idea.

As a result of this proliferation of definitions, the term Communities of Practice is now applied, perhaps erroneously, to a range of groups, from project teams (Lindstaedt 1996) to functional departments (Sandusky 1997). There have been several attempts to define CoPs in a way that is relevant to commercial organisations and even attempts by some consultancies, such as Andersen Consulting, to formalise them (Simonson 1996).

As we have seen, many commercial organisations now operate in a geographically and temporally distributed environment. In order for such communities to function they will have to operate (at least in part) in the virtual world. Lave and Wenger's (1991) and Seely Brown and Duguid's (1991) examples of CoPs are co-located. However, the increasing internationalisation of business raises the question can a CoP be virtual?

8. STUDY TWO: COMMUNITY OF PRACTICE IN PRACTICE

The second study consists of two case studies (Hildreth, Kimble and Wright 1998; Hildreth, Kimble and Wright 2000) of virtual CoPs in commercial settings. It examines the applicability of CoPs to virtual teams and highlights their potential benefits. The first was a case study undertaken at an international actuarial organisation. It identified a number of groups that could be characterised as CoPs, some of which had a distributed aspect to them, although none were wholly distributed.

The most important finding concerned the way in which the different CoPs related to each other. Figure 2 illustrates the links that may exist between a co-located CoP and other individuals who may not be co-located. It also shows that members can be members of other Communities of Practice and

that links may develop between Communities of Practice. To some extent, this mirrors the networks of organisations that develop in the new networked economy described by Castells (1996).

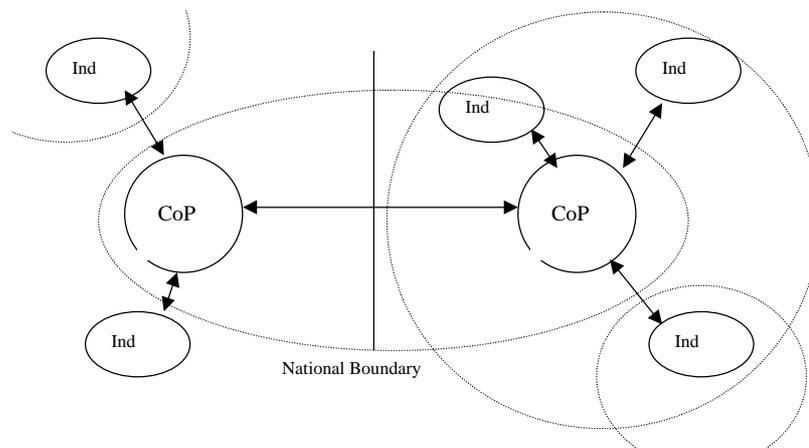


Figure 2: The model of CoPs found in the first case study.

The next case study describes three days in the functioning of a virtual team and was undertaken in the research arm of a major international company. The group being investigated was the management team of IT support. Again, the group had a virtual and a co-located aspect. There was a group of four members co-located in the UK, a group of five members in the USA and one member in Japan.

The sharing and creation of documents was the central activity during the period of this case study. In particular, the majority of the activities focussed on a planning document that was being developed by the UK core of the group. This document was of particular interest because, whilst it was being created for one purpose, it was also used for many others. The document was based on a template that had already been developed in the US, which meant that all members of the CoP were familiar with the layout and contents. It was evident from an interview that the UK core had designed this document with the aim of crossing national and organisational boundaries. Because they had already developed strong working relationship with their peers in the US, and felt that they knew them very well, the UK core could develop the document knowing their peers in the US would have confidence in the process. In addition, the participation by the UK and US core in this common activity bonded the group even more. A simple planning document became a catalyst for virtual collaboration.

The relationships between the cores had developed over time and, in most cases, were based on people having met each other in the physical world. A lot of the community's work was undertaken separately within the UK and US cores, but members meet regularly on a six-monthly basis. In between these meetings, they maintained communication via e-mail, voice mail, telephone conferences and Microsoft NetMeeting. They felt that during the periods of electronic communication the momentum of the group gradually slowed, until a physical meeting picked it up again.

There are some important implications of this face to face element for distributed team working. The members felt that meetings in the physical world allowed them to get to know each other far better than electronic meetings. The importance of having a good personal relationship with the other members was regarded as essential by all of the members, as this carried the community through the periods of electronic communication. The members gained a greater feeling of identity and common purpose through knowing each other. As one respondent described it '... you need that personal relationship if you are to go the extra half mile for someone': the community's members felt that they *knew* who they were dealing with - even if it was via e-mail.

9. CONCLUSIONS: OVERCOMING BARRIERS TO VIRTUAL TEAMS THROUGH COMMUNITY OF PRACTICE

Working in virtual teams poses problems not usually encountered when groups of people work in the same building. Examples include the constraints (and advantages) of time zones, lack of non-verbal cues, cultural differences between team members and problems of trust and identity. Virtual team members often need to share work-in-progress with others, which may require team members to adopt new attitudes. Developing a team culture and common procedures are essential for the development of credibility and trust among team members in a virtual environment. To be effective virtual teams have to develop new ways of sharing knowledge and understanding in the electronic space.

The implications of the two spaces for virtual teams are profound, and many lessons can be learnt from new theories on the geography of information economy. Instead of living in the physical space and place, and overcoming distance by transportation, organisations and individuals now have to deal with different combinations of physical and electronic spaces and places. These spaces and places can co-exist with one another and can be integrated flexibly. The geographical and organisational flexibility derived from these combinations implies that organisations have to adapt the way they manage their internal activities and external relations. Although decisions concerning who, what and where locate remain critical, the range of possible options for both organisations and individuals has increased significantly. How to exploit the two spaces and manage the enormous complexity associated with this will be one of the most significant challenges to management in the next decade; virtual teams need to be understood in this broad context.

Today only a small proportion of virtual teams reach a level of performance that goes beyond what the individuals concerned could achieve independently (Benson-Armer and Hsieh 1997). New research is needed to understand the problems faced by virtual teams if they are to achieve their full potential. The CoP appears to be one vehicle for more effective virtual team working. It makes some inroads in tackling the complexities and challenges in the new business environment and it can be integrated with both the physical and the electronic environment.

The face to face element of the CoP in the last case study overcame many of the cultural and distance barriers derived from the new information economy. This enabled relationships to develop quicker and go further. If a strong relationship is developed in the physical environment, members of the community are more likely to 'go the extra half-mile' for each other. The feelings of identity and trust developed in this way provide a sound basis for subsequent electronic collaboration. This study also demonstrated how different boundaries (group, organisation, cultural and national) could be crossed by building trust and understanding so that the CoP becomes a way to share organisational knowledge.

Finally, many of the barriers identified in this paper derive from a lack of understanding of the new geography of the information economy. Contrary to the myth, created by Utopian authors and promoted by the popular media, that geography will cease to matter this paper argues that geography has never been more complex or more important to organisations and individuals. The emergent electronic space significantly increases the complexity of the business environment and the geographical flexibility of organisations and individuals. Rather than accepting the notion that geography no longer matters, continued efforts must be made to understand the relationship between the physical world and the electronic world of virtual team working. A CoP is only one method for addressing organisational and cultural barriers and overcoming frictions of distance. Theoretical frameworks are needed to understand the different aspects of virtual team working and to guide their development in real organisational settings. Virtual teams must be seen in the broader context of the new organisations and the new business environment of the information economy.

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