

Balancing Learning and Efficiency Crossing Practices and Projects in Project-based Organisations: Organisational Issues. The Case History of “Practice Groups” in a Consulting Firm

Saverino Verteramo and Monica De Carolis
University of Calabria, Rende, Italy

s.verteramo@unical.it
m.decarolis@unical.it

Abstract: Project-based organizations have received increasing attention in recent years as an emerging organizational form to integrate diverse and specialized intellectual resources and expertise. A typical problem of these structures is the difficulty in sharing knowledge in and across projects. Besides, project teams are temporary and therefore much learning may be lost when they disband. Very often the storage of lessons learned is not effective; the databases are not widely used and the people are too engaged in their projects to share knowledge or help other people cope with similar problems. The inherent contradiction between organizing for meeting short-term, project task objectives, and the longer-term developmental nature of organizational learning processes asks for innovative organizational solutions. How can a project-based organization be simultaneously oriented to project-outputs and learning?

The processes of knowledge capture, transfer and learning in project settings rely heavily upon social patterns and processes. This situation emphasizes the value of considering a community-based approach to managing knowledge. Several authors suggest adding a new “dimension” (a “home” for learning, integration and development of specialized/technical competencies) following a “Crossing-approach” that leads to design organizational solutions in which project teams (focused on their strengths: outputs, processes or market segments) and learning groups, like CoPs, coexist.

The aim of the paper is to investigate the critical points in designing and implementing these innovative organizational solutions (e.g. group design, reward system, participation modes, support mechanisms, formalization degree) that are difficult to manage and little investigated in the literature.

We conducted an in depth case study research of an Italian IT Consulting firm: VP Tech. This analyzed firm introduced a particular kind of CoPs called “Practice Groups” (PGs) in a typical project-based organizational structure. The Practices are knowledge domains (expertises) transversal to the projects or market areas. VP senior executives chose the main strategic practices to be developed and decided to aggregate the main internal experts (PGs) around these knowledge domains. The goals of PGs are to strengthen and diffuse the knowledge developed during previous projects, to monitor the state of the art, and to support professional training and problem solving for people involved in the projects. In VP Tech, PGs represent a:

- network in which specifically useful information can be found;
- learning locus in which professional competencies can be improved;
- social network in which both knowledge exploitation and exploration take place.

The conducted case study shows:

- the different phases and “crisis” in implementing this organizational solution;
- the specific and innovative mix between formal and informal organizational levers adopted;
- the circular and virtuous relation between projects and practices.

Keywords: project-based organization, communities of practice, knowledge sharing, groups design

1. The issue of Knowledge Management in project-based organizations

According to Newell et al. (2006), there are several and “dichotomous” views of knowledge and Knowledge Management (KM).

Following the perspective defined “knowledge as possession”, knowledge can be made explicit and shared among persons and groups. Examples of codified knowledge can be “artifacts” such as intranets, documents, databases, manuals, guidelines and reports. Critics of this view instead emphasize that knowledge is situated in social and organizational practice and relationships. Knowledge (or rather knowing) is not so much possessed as social and embedded in practice (Lave and Wenger, 1991). According to Brown and Duguid (2001), it is the shared know-how (that develops from shared experience within communities or networks of practice) that enables the sharing and circulating of explicit knowledge.

In a similar way, Swan et al. (1999) distinguish between cognitive and community approaches to KM. According to the cognitive view, knowledge is referable to objectively defined concepts. On the other hand, the Community view sees knowledge as embedded and constructed in social networks and groups. Rather than study knowledge as something that people have, as an object that could be generated, codified and transferred, this approach focuses on the process of knowing regarded as something that people do (Bellini and Canonico, 2008).

At a strategic level, Hansen et al. (1999) describe KM strategy as “codification” and “personalization”. “Codification” focuses on making knowledge explicit and spreading information. In contrast “personalization” is based on the concept of network within people can learn through dialogue (Hansen et al., 1999). Personalization approaches require space and time to enable the “getting together” of people to develop interpersonal networks.

At the level of KM Systems, Alavi (2000) distinguishes between “repository” and “network” approaches. The former is based on building and implementing knowledge repositories and retrieval technologies. In the second approach, technology is used to connect people and to identify the location of different kinds of competencies.

The previous introduced “dichotomies” can be compatible rather than mutually exclusive.

This is a theoretical key point for the project-based organization that:

- generally has the tendency to follow the “Knowledge as possession” view and the “codification” approach. At the level of the project, much more often the “product knowledge” (“what” was done) rather than the “process knowledge” (“how and why” it was done) is captured. The community model or personalization strategy of KM can support the solution of these problems;
- has to face the inherent contradiction between organizing meeting short-term, project task objectives and the longer-term developmental nature of organizational learning processes (i.e. Bresnen et al., 2004).

The following are the main problems of managing knowledge and improving learning processes in project-based organization (Keegan et al., 2001):

- lack of time and reflection at the level of the project team. The project-time pressures can inhibit learning processes. Besides project teams are temporary and therefore much learning may be lost when they disband (tendency to “reinvent the wheel”, rather than learning from the experiences of previous projects);
- the trade-off between centralized vs decentralized approaches in knowledge creation, validation and dissemination processes. There is, in fact, the tendency to centralize learning (senior managers or specialized departments collect and validate the “lessons learned” elaborated by the team members) and to defer learning to future points in time (significant time passes among the identification of the possible improvements, their explicitation, their dissemination to the organization, the effective emergence of a similar problem, the idea of someone to reuse this knowledge);
- the reduced interactions with colleagues with similar competencies to exploit specialized knowledge domains. Besides, people are too engaged in their projects to share knowledge or help other people cope with similar problems.

These problems are manifested in attempts to reduce the learning of project teams to simple summaries and poorly maintained databases that few people have the time to use. From an ICT point of view the main challenge is to design KMS that make knowledge re-use in and across projects easier. From an organizational point of view the problems of managing connections among people with the same area of expertise and people with different area of expertise (generally collected around a project) are crucial (Migliarese and Verteramo, 2005).

According to McDermott (1999), this goal can be gained by adding a new “dimension” related to Communities of Practice (CoP) to the project-based organization. In the “Double-Knit Organizations” (DKO) Project Teams (focused on outputs) and CoPs (focused on learning) coexist.

The aim of the paper is to investigate the critical points (from both a theoretical point of view and by an in-depth empirical case study) in designing these innovative organizational solutions (e.g. group design, support mechanisms, formalization degree) that are difficult to manage and little investigated in the literature.

The paper has the following structure: in section 2 and 3 we underline the potential effectiveness of organizational solutions based on the crossing-approach and we present the open questions in regards to their design and management. In Section 4 we describe the analyzed case study (VP Tech) and the methodological approach used. The case study shows how a successful Italian consulting firm has crossed practices and projects (that is learning and efficiency). This organizational solution is considered a critical success factor. In the last section we draw the conclusion of the empirical research and the related lessons learned.

2. Crossing CoPs and project teams: An organizational solution for improving KM in project-based organization

Organizations are increasingly using project teams to accomplish specific tasks and to increase flexibility (Newell et al., 2006).

Depending on size and complexity, projects can be organized differently (Meredith and Mantel, 1995). A project, for instance, may be accommodated in a pure project organization, a self-contained section that is devoted exclusively to the project and will be disbanded when the project is completed.

This solution can show some limits. In particular, a pure project organizational structure can “lose” knowledge and learning opportunities: there is no “repository” or defined sub-structure aimed at collecting and developing functional and specialized knowledge. When team’s members lose touch with their peers, they can have trouble keeping up with developments in their field (McDermott, 1999).

In addition to this, knowledge related to project output is captured, but there are several difficulties in acquiring knowledge related to process (how the project has been conducted and the knowledge generated during the project).

In this sense projects and project organizations require exceptionally efficient knowledge management, if they want to learn from their experiences (Kasvi et al., 2003).

A first solution to support learning processes and knowledge management is to enlarge existing specific jobs by knowledge related tasks (generally in the HRM function or Information System area) or to design new *ad hoc* roles. A second solution is to adopt two formal axes: projects and the functions (matrix organization). In both cases:

- there is the problem in balancing the formal power of the new or enlarged roles or functional departments with the formal power of project managers;
- the potentialities of informal professional social network are ignored along with the social dynamics that can be developed and turn out useful for competitive and strategic goals.

In this framework, the DKO (McDermott, 1999) that links project teams with CoPs seems to be an innovative organizational solution.

Communities of Practice have been described as a “privileged locus” for learning, creation and transferring knowledge – internally as well as externally – outside traditionally known organizational networks. The focus of the research about CoPs has moved, over time, from the study of small groups and of the learning processes which take place within them, to other subjects: organizational aspects (e.g. organizational mechanisms and managerial systems to support CoPs) and the innovative potential of CoPs (with special reference to the role of ICTs) (De Carolis and Corvello, 2006). The common element of these three subjects is the view of CoP as (1) a collection of people that engage in activities that encompass a common interest and ongoing learning through practice (a CoP is bound together by shared interest in a knowledge domain) and (2) a self-organizing system based on two elements: practice and identity (Lave and Wenger, 1991).

Members share interests, specific competencies, routines, formal and informal rules (Garrety et al., 2004). Generally, purpose and goals are formed around knowledge needs, are hazy (CoPs rarely have a specific result to deliver to the organization), and are medium-term.

Although they are typically self-organizing, CoPs benefit from organizational supports. They need “intentional” cultivation (Wenger et al., 2002), and people should have time and encouragement to participate. Managing a community means making and developing connections between members. Some

coordination is needed. The community coordinator helps the community to focus on the knowledge domain, maintain relationships and develop its practice; he acts as a “contact maker” (Ruuska et al., 2005).

Even if size and membership are less defined and more dynamic if compared to project team, the community social structure represents a “home” for professional identity of members.

It is a social network which allows members to interact regularly with a selected professional environment and to learn through the dialogues, and, in case of geographically dispersed workers, without the support of a shared physical work space. In this sense, ICT systems play a relevant role to support distance interactions and discussions, norms and ground rules.

CoPs, operating within a project-based organization, allow for concentration of expertise (Garrety et al, 2004). They have flexible boundaries, no reporting relationships and are essentially self-managed and self-organizing. These are the main differences with the traditional “functions” in the matrix organization. In the same way as “functions”, they represent a form of integration and development of specialized/technical competencies. In an original way they exploit the potentialities of informal professional social networks and are often the preferred way members can get feedback from knowledgeable peers.

Combining project teams and CoPs seems to be an effective way to make an organization simultaneously oriented to output and learning.

3. The open questions in crossing CoPs and project teams

From a theoretical point of view, the crossing-approach seem to be an effective solution for supporting knowledge and learning processes in a project-based organization.

How to implement this approach from a practical point of view seems less clear. This paper goes more deeply into emerging theoretical and practical issues in designing and managing a DKO, where CoPs and Project Teams are crossed. For example, it is difficult to balance the emergent and informal nature of CoPs with the managerial necessity for design and control. This problem can be related to the literature about “intentional cultivation” of CoPs, that is, their intentional promotion and support, and to the literature on groups design and effectiveness (Gladstein, 1984; Hackman, 1987). In order to identify the main open questions in implementing a DKO and considering CoPs as units of analysis, we have connected the two literature streams and identified the main design variables and factors that affect the effectiveness of CoPs. Moreover we have divided these elements in three classes:

- *input variables*: what organization “gives” to group;
- *processes*: how this group operates;
- *output*: what group gives to organization.

For each of the classes we have identified the following main open questions (summarized in table 1).

Table 1: Organizational variables and factors that affect the effectiveness of CoPs

Input (<i>what organization “gives” to group</i>)	Process (<i>how this group operates</i>)	Output (<i>what group gives to organization</i>)
Structure design: size, membership, competences needed, roles, hierarchy Design and formalization degree of tasks Resources: time, work space (physical or virtual) and financial resources HRM mechanisms	Coordination systems used Emerging roles Communication systems adopted Group culture Identity degree	Contribution to: Strategic goals – medium term Operational goals – short term

3.1 Input variable.

The main variables that organization can define to design and support CoPs are:

- Structure design: size, membership, competences needed, roles, hierarchy;
- Design and formalization degree of tasks;
- Resources: time devoted to group activities, work space (physical or virtual) and financial resources;

- HRM mechanisms (in particular evaluation system, reward system, career development).

The “emergent” nature of CoPs and how to manage them is the first open question. Liedtka (1999) rejects the top-down approaches and the related traditional formal control systems. They would be inconsistent to the informal and voluntary dynamics that support knowledge sharing processes. Wenger et al. (2002) have a more barycentric position. They underline the possibility (1) to turn to informal control systems and a management that support the “natural” interactions performing a passive and external role (absence of interferences) or, on the other hand, (2) to turn to a strong sponsorship and to support the birth of what would arise spontaneously (identity as community member and natural knowledge flows). In this framework, it could be very useful to use planned meetings, social events, learning projects and/or the design of specific roles to carry out the knowledge management project. Scholars (McDermott 1999; Wenger et al., 2002) underline that it is possible to create “intentional” CoPs: these are intentional in their focus, start-up activities and support but, in order to develop the trust, connection and knowledge sharing it is necessary to support the natural process of Community development rather than impose an artificial one.

In all cases, the management should make explicit/visible the practices and single out the Communities.

This means to partially define the main tasks of CoPs and to give time and suitable spaces (physical or virtual) to employees in order to encourage and support trust based relationships and knowledge processes. Even when team members intend to share insight and information with other teams, team goals often pull so strongly on people’s time that they simply cannot find the time to do it. CoPs inevitably compete with teams for people’s time (McDermott, 1999).

The technological systems to support the remote interactions are different (synchronous communication systems, resource sharing systems, group processes support systems) and can have more or less effective results depending their real use in the community.

The level of involvement and the time spent in community activities should have an “organizational value”, in terms of evaluation and reward systems and carrier plans. Deci and Ryan (1985), however, argue that extrinsic rewards (e.g. monetary rewards, tangible gifts) will have a negative impact on intrinsic motivation and hence performance. Another open question is, therefore, if and how to reward.

The main problems are (1) to balance formal organizational needs (control and supervision) and the natural organization of practice (knowledge developing processes) and (2) to give the adequate degree of organizational support. It seems to crop up the critical balance between formal and informal structure (Crozier and Friedberg, 1978). The level of organizational support is critical in two ways: on one hand Communities require recognition and support, but on the other hand, voluntary and informal aspects may lose their value if there is too much interference.

3.2 Processes

To describe the real life of CoPs (how CoPs evolve, emerging dynamics etc.), we can observe the following elements:

- Coordination systems used (i.e. rules, planes, procedures, meetings);
- Emerging roles (coordinators, leaders);
- Communication systems adopted (face to face and/or virtual);
- Group culture (competitive/collaborative);
- Identity degree (awareness to be a member and level of real involvement).

It is a shared opinion that groups aimed at managing knowledge are self-organized and that members choose time and modalities of participation in the group life, respecting the boundaries outlined by formal design. Several studies show that sometimes it is ineffective (or counterproductive) to define, for example, roles and coordination systems that members of CoPs only partially accept or use. More often in CoPs some role is emergent (e.g. leader, coordinator) and, in time, tacit and social behavior rules are established (e.g. when and who to contact, tools used). A first risk is that the management designs formal roles superabounded or inconsistent with the modalities spontaneously activated by the members of a CoP. More generally, organizations have to refine their ability to perceive “organizational noise” (Ciborra et al, 1984) that is the low signals about the real dynamics among members. It could be necessary to identify the emerging roles, rules and systems adopted: sometimes it is better to “follow the crowd” rather than to persist in *ex-ante* designed solutions.

Typically CoP is a fragile structure that can quickly disappear when conflicts and disengagement undermine the mutual trust. These pathologies can depend both on contingent problems among members and on collaborative/competitive culture. It could be necessary (1) to pay attention to low signals of conflicts (2) to develop adequate conflict resolution mechanisms and (3) to promote a collaborative culture.

3.3 Output

We can value the contributions of CoPs to the organization in terms of:

- strategic goals –medium term (learning path, development of core competencies, innovation processes);
- operational goals – short term (training systems and solution of daily working problems).

When the activities/problems are ambiguous and not well defined it is difficult to define output levels, to plan activities and to define effective management control and evaluation systems. Moreover, an overly structured formal control and evaluation system can be seen as an “intrusion” and, therefore, negatively affect knowledge dynamics that are at the basis of CoPs.

CoPs are created in order to face poorly defined problems of learning and knowledge creation and sharing, where classic organizational forms can be weak.

In these situations, it seems to be more effective to value “contributions” of CoPs to solve new, contingent and unexpected strategic matters or operational problems, rather than to strive to design an effective *ex-ante* set of control variables. A CoP works well (it is vital) if it is effective in “case of emergency”.

4. The case history of VP Tech

4.1 Methodological approach

This paper has been developed within a FIRB research project regarding the role of KM for the competitive advantage of SME, started in 2005 in Italy and involving several important Italian Universities. Following the case-study methodology of research (Yin, 1994) the empirical work has been conducted during the last three years: three sessions of in-depth interviews have been conducted with VP Tech top management, some “Practice Group” (PG) leaders and members of PGs. Document acquisition was also carried out (Table 2).

Table 2: Plan of the conducted interviews

Number of interviews	Phase	Timing
2x3	Organizational Analysis and study of the KM solutions adopted	2006
1x4	Analysis of Practice Group dynamics	2007
2x2	PGs effectiveness analysis	2008

The interviews, concerning the same key-points, were aimed at analysing the organizational and technological solutions adopted for KM, with particular reference to the PG’s dynamics (questions about creation and development, emergent problems, reward systems effectiveness, communications tools used etc.) and their contribution to organizational performance. The findings of this analysis have been read and confirmed by the informants themselves.

4.2 IT security: the core business of VP Tech

VP Tech, established in Cosenza (South of Italy) at the beginning of 2001, operates in the IT consultancy sector. Its principal activities relate to the planning and integrated management of all that concerns IT security. VP Tech is a global partner for IT security, covering both the consultancy aspects of security organization and strategy and the realization and integration of technologies for the supply of turnkey solutions.

In the following table (Tab.3) the basic facts are given.

Table 3: Basic information on VP Tech

Objective	To offer the market a group of Security services capable of combining the consultancy, technological and economic aspects in order to create value for its clients
Sectors catered for	Telecommunications, manufacturing, health and public administration, and presence in the financial market
Clients	Telecom Italia and TIM (telecommunications), San Paolo IMI and Intesa Sistemi e Servizi, Unicredito, Capitalia (financial institutions), Regione Lombardia – Progetto SISS (public administration), Pirelli (manufacturing)
Certifications	Certified in accordance with ISO 9001:2000 since 2003
Staff	Approximately 200 professionals distributed across the offices of Cosenza, Milan and Rome
Turnover	Approximately €20m (year 2006); €24m (year 2007); 28,5 €m (year 2008).
Market Share	Approximately 10% in “Italian Information Security Services” (2007 IDC data). It was 5% in 2003.
Principal collaborations	Close relations with universities and R&D centres and technological organizations at national and international level and access to European funding

Currently, VP Tech has a staff of 200 professionals distributed across the offices of Cosenza, Milan and Rome and a turnover principally deriving from the realization of projects for medium-large firms. Its turnover of €24m (2007) represents the 10% of the Italian market in IT security services (2007 ICD Data).

In this sector (ICT Security) the ability to innovate is a critical success factor. In fact technological development represents a driver for new forms of business in markets such as banking, telecommunications, health and public administration. These new forms of business (ICT based) require new ICT Security policies, both at the strategic and operational level.

VP Tech top management thinks that an effective knowledge management policy has a central role, both at the strategic level (support of innovation) and at the operational level (efficiency in projects and in solving customers problems). The rapid dimensional growth of the firm increased this need (from 20 practitioners in 2002 to 200 in 2008). VP Tech in fact works by projects and it deals with the typical problems of project-based organizations. To face these problems, the VP Tech KM solution currently uses:

- technological levers based on a centralized information management system. This system collects the lessons learned and the contributions of the individuals. Access is managed via multiple levels differentiated by role;
- organizational levers based on the introduction of the Practice Groups (PG) in the organizational structure: this configuration (acknowledged by top management as a critical success factor) can be seen as a particular form of DKO.

4.3 Supporting KM in VP Tech: the introduction of practice groups

The design and implementation of a KM solution based on a centralized Information Management System was not a problem for an IT consulting firm used to producing and managing project documentation. Nevertheless, VP senior executives were conscious of the intrinsic limits of these solutions used to support learning and innovation. The main idea in VP has been to support the creation of groups specialized on topics relevant for the firm from a strategic point of view, where typical learning processes and dynamics of CoP develop.

To this end, VP senior executives decided to select the “practices”, that is the main strategic expertise of the firms to be strengthened. Practices are topics transversal to the projects or market area: currently there are five workgroups (the Practice Groups, PG) covering different topics (three of them are explained in table 4).

Table 4: The practice groups in VP Tech (2008)

Practice Group	Focus	Members
Identity & User Management	Methodologies and Tools for IT users authentication and permission management.	40
Data privacy	Regulations and standards analysis, policy and procedures definition for secure personal data management.	15
Business Continuity	Methodologies and Tools for business continuity and for adverse events impact reduction.	15
Web application Security	Methodologies and Tools for IT security improvement in web-based applications.	15
Project Management	Methodologies and Tools for efficiency and efficacy improvement in project management.	15

The goals of these PGs are to consolidate and diffuse the knowledge developed during previous projects, to monitor the state of the art and to support the problem solving of people involved in the projects.

Each employee can join a practice, depending on his competencies or will to grow professionally. PG activities are mainly voluntary and they are developed as extra-time during the work within the projects.

People in PGs meet both physically (workshops, training courses) and virtually by means of forums, newsletters, and other collaborative ICT tools supporting dispersed workers (VP has three distinct offices and people often work at the customers).

The nature of practice groups has been partially modified during recent years following an interesting learning path.

At the beginning, these activities were absolutely informal and deliberately self-determined by the PG members: a practice leader was chosen by top management among the acknowledged experts in the practice theme, but its coordination role was soft and informal. Nevertheless, very soon this voluntary approach was not enough, due to the limited time people can spend. VP executives decided to make the PG activities more visible and formalized. Therefore, a few years later they decided to enlarge and enrich the tasks of PGs.

In particular, it was decided:

- to design a “coordination team” supporting the practice leader: owing to the high level of their competences, practice leaders are nearly always busy and, so, they can spend little time in PG activities;
- to assign some formal tasks to the “PG coordination team” (for example they help the Human Resource Manager in evaluating the personal plan of technical training proposed by the employees, in supporting the professional entry in the organization, in organizing internal courses, or external learning experiences, and they can manage a training budget);
- to reward the efforts and the results reached by the coordination team, also linked to overall performance of the firm.

4.4 The crossing-approach in VP Tech

The organizational structure in VP Tech can be considered as a form of “Double-Knit” Organization (McDermott,1999): the project-based structure has been enriched by the introduction of the internal Practice Groups. From an organizational point of view PGs are discontinuous (due to the periodicity of the work), permanent (due to the composition of the people involved) and homogeneous (due to the shared competencies of the members) groups of experts, specialized by themes and lines of service. The initial idea was to stimulate the creation of internal CoPs supporting learning and innovation. Nevertheless the real implementation has transformed the nature of PGs into something partially different from typical CoPs.

Using the schema proposed in section 3, we can describe the organizational variables and factors characterizing the implementation of PG.

4.4.1 Input

We can observe a medium level of formalization for each variable: the boundaries of the PG are defined by the top management: each member since the engagement is assigned to a specific PG, even if during his carrier, the employee can choose to become a member of other PG. The top management has chosen to limit the size of PG. At the same time each PG is composed by members working on different projects (market areas) and different offices. This heterogeneous membership enables the enrichment of the problem solving processes thanks to the multiple points of view around the PG topics.

New roles (the “practice leaders”) aimed to coordinate the PG activities have been introduced. During the time the coordination has been reinforced with the “coordination team”, previously described. It is important to underline that a new hierarchical relationship has not been introduced. The VP structure is not a matrix, but a project-based organization integrated by transversal groups with knowledge related tasks. These tasks are established by top-management and range from operational support in training activities to exploration of new business opportunities. The PG coordination team has a budget at its disposal to carry out its activities (150.000 Euros in 2007). With regard to HRM mechanisms, the evaluation system includes the assessment of the level and the quality of participation in PG and extrinsic rewards are provided.

Recently the company portal has been enriched with tools like discussion forum, blog and so on. Each PG has now a dedicated and organized virtual space that supports the knowledge flows. A large editorial-committee (the practice leaders are members too) manage the contents and participation levels are high.

4.4.2 Processes

The PGs processes are self-determined in terms of modalities of participation, communications systems used, and emerging roles. The management has adopted a medium formalization degree of the input variables (structure, tasks, etc) and several mechanisms to support PGs (reward systems, ICT tools, financial resources etc). At the same time VP tries to respect the informal and voluntary nature of these groups and it avoids affecting group processes.

The VP Tech management has demonstrated the capacity to be able “to perceive low signals”. For example, the practice leaders are primarily chosen starting from their technical competencies, but due to the voluntary nature of activities their charisma and relational abilities are carefully considered in order to make the involvement of people easier.

Modalities of participation and activities are various and different among the PGs, but typically people feel free to propose new themes and to point out interesting news. Looking at the practices each employee has a map of what are the most valuable areas of interest, who and where are the experts, and how it is possible to contact them to ask for help in daily work or to improve their own competences. In the ICT sector the innovation rate is high, and the technical competences risk to be “perishable”: the active participation in the practice group life is perceived as an opportunity to keep itself abreast of the technical developments rather than a top-down additional task.

4.4.3 Output

Over time PGs and their activities have taken on a central role for the firm’s overall competitiveness. Virtuous dynamics have been produced: people actively and freely are participating in PG life, offering personal availability, and pointing out news useful for the community.

PGs have been able to both support the operational exigencies (in daily problem solving and in training needs) and to prove proactive and creative in exploring new technical solutions or business ideas. One of the most interesting results is that some order has been born from the new ideas that have emerged during the discussions inside the practice activities. In these cases VP, on its own initiative, has been able to propose solutions for emerging problems, anticipating client’s requests.

PGs are seen as a strong element of identity both at the company and professional level. Practice leaders are often acknowledged as experts in their field outside the firm: they actively give some contribution in professional meetings, public conferences and professional or academic journals. Several common research projects are conducted with important Italian universities and research centers. In doing so, VP Tech is able to monitor the external state of the art and to strengthen its internal knowledge.

More generally, VP Tech considers PGs as their own way towards innovation and development of core competencies.

It is possible to state that PGs contribute:

- to the development of market insight capability: PGs represent the place in which to point out and to discuss innovation possibilities; this is a widespread and bottom-up process;
- to the evaluation of the gap between one’s own competencies and the competitive needs. When a new competence has to be explored, a new practice group (or a sub-group) can be created by the top-level;
- to the acquisition of new technical competencies. The PGs manage the training programs in their own knowledge domain;
- to the development of the problem solving capabilities. Thanks to PGs it is possible to know “who knows what” (Cohen and Levinthal, 1990), where to search for information about how past and similar problems have been solved (best practice). All this following a faster process than into the past.

Through the Practice Groups in VP Tech a circular relation between projects and practices has been developed: the projects nourish the practices and vice versa. In the projects people acquire competencies, improving the practices through knowledge store and sharing (exploitation). In the practices new ideas are recognized and technical innovations are able to generate new projects (exploration).

5. Lessons learned and conclusions

Crossing Project Teams and CoPs (Double-Knit Organization, McDermott 1999) seems to be an effective way to make an organization simultaneously oriented to output and learning.

Referring both to group design literature and CoPs intentional cultivation literature, this paper analyzes the main open questions in implementing a DKO. We have identified three classes of variables/factors that affect CoPs effectiveness and are crucial in implementing DKO (see table 1).

Following this scheme of analysis we have conducted an in depth case study in a successful Italian IT consulting firm. The introduction of PGs has transformed this project-based organization into a DKO. VP Tech executives acknowledge PGs as a critical key success factor. We have followed the implementation process during 3 years and we have analyzed the emerging problems and the adopted solutions. Referring to the proposed scheme, the implementing choices (previously described) have been the following:

- a medium level of formalization in input (what organization gives to PGs);
- self-determined group processes (how PGs work);
- operational and strategic contributions (what PGs give to organization).

Over time the PGs have become something partially different from traditional CoPs. These differences are summarized in table 5.

Table 5: PGs compared to CoPs

Characteristics	CoPs	PGs
<i>Support/design</i>	Emerging from interactions. It can be internal or inter-organizational. It can be identified and supported (intentional cultivation)	Internal groups Medium level of formalization High level of support
<i>Goals</i>	Less defined, generic, longer term goals formed around knowledge needs	Strategic and operational goals (exploitation and exploration processes)
<i>Size (numbers of members)</i>	Not well defined	Small groups
<i>Membership</i>	Less stable, partially defined by top-management	Stable and partially defined by top-management (in starting steps)

The choice to assign operational tasks (in addition to strategic medium term goals) stimulates the community to interact frequently and on actual problems, therefore, PG is constantly active. The groups’ small size and their heterogeneous membership have been a relevant design solution. In small groups, the community dynamics (collaboration, control of disengagement, problem solving processes) are more simple and

effective. Heterogeneous membership (members work on different projects and in different sites) supports knowledge sharing processes among projects. At the same time small groups make the design formal systems to evaluate groups' effectiveness less necessary.

PGs are considered effective if they are able to work well in "case of emergency" and if they are proactive in developing and exploring knowledge.

Therefore, this paper shows how:

- crossing "learning locus" and Project Teams can be an innovative solution in order to solve some typical problem of KM in project-based organizations;
- CoPs are an effective learning locus in project settings. Communities support knowledge exploration and exploitation processes from, across and between projects. They are a network in which specifically useful information can be found, in which professional competencies can be improved and a home for professional identity;
- CoPs need to be "cultivated": design efforts and various supports to CoPs are necessary particularly in the starting phases in order to comprehend the dynamics and to introduce some correction. The case study shows that the organizational top-down initiatives can partially change the informal nature of CoPs. PGs are, in fact, more structured, stable and formalized than traditional CoPs;
- PGs are an effective organizational solution for managing knowledge in project based organizations: the projects nourish the practices and vice versa. In the projects people acquire competencies, improving the practices through knowledge storage and sharing. In the practices new ideas and technical innovations able to generate new projects are recognized.

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