Chapter 10

Group Processes and Group Support Systems

This chapter will discuss the concepts of workgroup and project team, team life process, different Group Support Systems (GSS), and distributed teams. The topic of GSS continues the list of IS types studied in the course. A new moment in the study is that the GSS (as a type of IS) do have its own typology that consists of six items – Project Management System, File Sharing System, Application Sharing System, Workflow Support System, Teleconferencing System, and Group Decision Support System.

Introduction

Many organizations critically depend on group work or teamwork. By working together, people join their competences and work efforts. This may result in a performance that exceeds individual performance. When this happens, there is an effect of synergy – individual energies getting into sync. Many successful companies have started by two or more people teaming up while descending down the challenging path of entrepreneurship. Examples from the high tech industry are Microsoft, Apple, Google, and Intel. Each of these companies was established by a two-member team. Usually, one teammate was a business person, while the other was an engineer.

Some companies cannot do work otherwise but in teams. Examples are computer software and hardware producers, consultants, engineers, corporate R+D, the public accounting industry, and the civil construction industry. In these companies, most of the work is organized through projects. In these project-driven companies, people do not go to their individual cubicles and desks, but to a team space. Of course, the team space may not be physical but a "cyberspace" that is created via telecommunications networks and IS. The companies resting on project-based teamwork may have an organizational culture that supports teamwork. In other companies, however, teams are just one way of organizing. In our time, organizations increasingly try to take advantage of teamwork.

While the need to share burden and accomplish more than individually possible motivates the creation of teams, the synergistic teamwork is not to be taken for granted. Success conditions include the matching of personalities and styles of thinking, effective communication, appropriate leadership, and just plain sticking to the project task and plan. But there are
downsides to teamwork that have to be managed, or benefits of teamwork may never materialize.

There are specialized IS developed exclusively for workgroups — Group Support Systems (GSS). For example, project teams may be supported by a system for sharing project documentation in electronic format. But there is also system support outside project teams when group work is formed on a temporary basis, as is the case with previously mentioned Group Decision Support Systems. GSS are particularly important when team members are not collocated in the same space but are dispersed at different locations.

**Workgroups and Project Team**

A workgroup is a collection of people working together on a specific task for a defined period of time. Although it is apparent that a company is the larger whole that contains workgroups, a workgroup looks like a company in small. People work together, filling certain roles, and deliver a product. But a workgroup has a defined life span, and its task is limited in scope. In contrast, a company usually has no defined date of disbanding, and it can complete many different tasks.

Key defining aspects of workgroups are the task, work roles, and timeline. A task defines what a group is established for. If what needs to be done is not clearly defined, then a workgroup usually does not move very far. Much like in a company, the group work to be completed is divided among group members. For example, in a software development team, some members analyze the business problem, and other members write software for an IS that will solve the problem. The timeline is another key aspect because the life of a workgroup is timed. Without a clear schedule of specific activities making the group task, a workgroup may go over budget and end up without accomplishing its purpose.

When people perform work individually, they may just occasionally need to communicate or cooperate with one another. However, in a workgroup the members “rub shoulders” most of the time. Communication is frequent as the members need to pull together and cooperate. They depend on each other much more than do the employees working on individual jobs. Recall that coordination in any process can be sequential and parallel. Both these apply to the group work. But workgroups can also use reciprocal coordination. Member A does a piece of work that member B takes and performs some work on it; then, the work is back to A, then again to B; and so on. This is how face-to-face conversation runs, when people listen to each other and try to build on each other’s ideas. Similarly, the engineers can take turns in drawing moves as they are working on the same diagram. Since interdependence between workgroup members is high, group communication deserves a special attention.

Leadership is also very important in work groups. It is about the capability to inspire and lead. A manager may or may not be the leader, and leaders may emerge on the basis of competence and respect given by peers (equals) and superiors (managers). Membership composition also
matters for the workgroup success. It is about personalities and styles of thinking. When people see things and think in a similar way, it is easier to cooperate. But too much of similarity may not always be the best option. If everybody always thinks the same, then it may be that just one member really thinks, while others simply comply.

Uniform thinking actually is a problem in group work called groupthink. This may happen because there is a strong opinion leader in a group. Groupthink also happens when group members do not look outside the group in order to get informed and to learn from others. Instead, the group sticks to old habits, functioning as a closed system. Another problem in the group work happens when some members fail to put in their fair share of work. This causes the problem called “free ride” or “social loafing.” Free riders wait for others to do their work. There are different kinds of work groups in organizations. The most relevant for us is project team, the work group involved directly in the production process of an organization. GSS are for the most built for project teams. Everything said for work groups in general does apply to project teams. The term “team” is supposed to convey a spirit of group unity, sport competition, pressure, and a struggle to succeed.

Project teams directly carry production in project-driven organizations. They may have a significant autonomy in managing the project work, project budget, and time. A project team reports to management at landmark points, but otherwise it is pretty much on its own. When a project is completed and officially closed, the project team disbands.

![Figure 1. Teams carry production in project-driven companies](image)

An example of project team-driven organizations is Protegra, a successful Winnipeg-based company that delivers management consulting backed by custom-built IS. All work at Protegra is performed by project teams. A Protegra team has three to five members. Team roles are defined as programmer, technical architect, application architect, business analyst, consultant, and project manager. However, Protegra’s culture modifies this standard organization in many ways. For example, a project manager does not have ultimate say in all project matters. Rather, leadership is established on the basis of competence corresponding to technical demands that differ from one project to another. Also, key decisions about a project are usually made collectively by all team members. Fair contribution to project work, open communication, and knowledge sharing are additional cultural expectations before members of every Protegra’s team. All these characteristics define a company that is based on teamwork rather than deploying teams as a secondary method of organizing.

**Project Team Life Process**

A project team goes through a life process that consists of 5 steps or phases. These phases are: Forming, Storming, Norming, Performing/Developing and Using Group Mind, and Disbanding.
The process is cyclical because members of disbanded teams form new teams for new projects.

(Figure 2).

Each of these life process phases is a sub-process in itself. The Forming phase involves team formation, management appointment, setting up of the goals and timeline, and allocating the budget. At Protegra, employees can choose between accepting and rejecting a suggested team membership. In other companies, management decisions about team setup are mandatory.

Although a team is set up on paper, social dynamics really start working only in the Storming phase. That is when the members adopt project goals, individual roles are defined, and leadership is established. Leadership may have a formal grounding in official management appointments. But it can also arise on the basis of competencies that a project requires, as in Protegra’s case.

Phase 3 called Norming is about creation of project documentation, such as plans and schedules. The project is divided into individual tasks. They are timed, and team members are assigned to them. All this is captured in a master schedule. A Project Management System (one type of GSS) may provide planning support in this phase. In addition, communication channels and systems to be used during the project execution are specified.

**Performing Phase and Team Disbanding**

When a project team is all set to go, it starts working on its project. This is phase 4 in the team life process called Performing (Figure 2). It is the most important phase as the project work is being executed. A PMS now serves for control purposes to track the execution of planned activities. It also stores and retrieves the project documentation. Tracking of document versions is one of the standard functions. During the Performing phase, a parallels sub-process of Developing/Using Group Mind may unfold.

As team members work together, they align the terminology and learn more about each other. They also learn who knows what in the professional domain. This is important in problem solving that requires diverse expertise. The members learn how to coordinate their work given the individual competences. They may also develop a group memory so that everybody remembers certain parts of the professional problem solving that the team goes through. A GSS
may serve as the extension of group memory. But only the team as the whole is really able to reproduce what has been learned. Group members can also spontaneously adjust the initial roles so that they function more effectively as the team. All these are elements of group mind. Eventually, a team comes to resemble a brain. This outcome may or may not happen. But when it does, the team is likely to achieve a higher performance.

In addition to executing the project work, team members socialize. Socializing generates bonds that contribute to a better project work. It happens in shorter time slots that are inserted in the flow of work as well as in dedicated occasions. Such occasions may be informal encounters at the end of a work week or at the events dedicated to celebrating landmark achievements. If team members are not collocated, teleconferencing systems substitute for meetings in person.

The Performing phase ends when a project team delivers the product of their work. The product has to be accepted and approved by the appropriate authority.

The fifth and the last phase in the project team life process is Disbanding. Within it, the team has to create final reports. Ideally, the team also reflects on its experiences and records new knowledge. This newly acquired professional knowledge represents part of organizational memory to be used in the future. A company neglecting to capture what is learned never gets very smart. An official decision with dates and signatures closes the team’s life process. After that point, the team may still maintain access to project documentation but has no budget or decision making privileges.

**Group Support Systems**

Group Support Systems (GSS) are IS for facilitating group work. GSS critically depend on computer networks. When GSS emerged in the late 1980s, they used private corporate networks. A decade after, GSS began migrating to the Internet. The following is a selection of the most popular GSS. Common to all is that the complexity of group context poses challenges for managing these systems. As discussed above, personal, communication and leadership aspects distinguish the workgroup context. These reflect on adoption and use of GSS. The implication is that managing GSS requires a particular attention and care.

**Project Management System**

A Project Management System (PMS) supports the performing phase in the project team life. The main functions of a PMS are scheduling of a project and monitoring its execution. Therefore, a PMS supports management activities of planning and controlling. A PMS has been used for team-based project work in various areas, including R+D, product development, information systems, consulting, marketing, public accounting, engineering, architecture, event management, and show business. Protegra uses its custom-built PMS in every project.
Figure 3 shows the main entities behind the PMS database. They reflect project management needs. Specifically, a project contains activities that employ team members and require resources (IT and perhaps other technologies, facilities, materials). Tasks are covered financially by a project account (one or more). Put another way, project planning and then monitoring its execution boils down to people, activities, money and resources.

Figure 3. Team project entities

Figure 4 shows the PMS entities mapped into a schedule (so called Gantt chart). The leftmost column lists activities, while the drawing space shows them in relation to execution time and performers. This particular example shows a project of developing an IS for inventory management. The schedule was created in the PMS when the project was planned (phase 3 discussed above), and it is being used for controlling the project execution (phase 4). The purpose of various symbols shown in the chart is to enhance monitoring of the work execution. For example, some tasks are critical to execute exactly by due dates.

Pay rates are entered on a different screen. The system calculates planned labour expenses automatically by multiplying hours for an activity by a pay rate. When project execution is underway, the PMS tracks the execution and calculates real expenditures and variances from the plan. As well, it can produce process diagrams and various reports.

Figure 4. Scheduling and monitoring activities, people, and time via PMS
A PMS can also have additional, custom functions. One example is the system Internet Notebook developed for supporting a project at Boeing-Rocketdyne. The project task was to build an economical rocket engine in 10 months. The project team drew engineers from Boeing and two partner companies. The project was very successful – on time and under budget. It delivered a new engine design that was much simpler and cheaper to make.

The Internet Notebook PMS deployed laptops and Internet links. It provided a number of functions beyond project scheduling, such as a shared repository of design documentation, email notifications on project progress, and hypertext links on useful learning sources (see Figure 5). The system proved to be useful. However, some of the system’s functionality high on the managers’ agenda was not used much. In particular, the team members infrequently used the functions for documenting new experiences and for indexing new documents. Managers hoped that these functions would help to capture new knowledge so that it could be reused in the future. However, engineers preferred to avoid using the functions because they required additional time and effort. This is an example of missed expectations due to hardly predictable behavior of GSS users.

![Figure 5. Internet Notebook PMS at Boeing-Rocketdyne](image)

**File Sharing System**

The most basic type of GSS is File Sharing System. It is always a module in PMS, as discussed above. It can also be a stand-alone system.

In its simplest form, the File Sharing System is storage of various files accessible via a network. An enhanced version would have indexing capabilities. An index is a brief description to a stored content, and its purpose is to ease retrieval of the storage. An index in a File Sharing System can take form of keywords.

A more advanced form of a File Sharing System uses a full text database with the capability of directly searching the content stored. Access privileges can be managed to support a division of responsibilities and authority between members of a project team.
Examples of a File Sharing System are various drop boxes, publicly accessible Internet systems (e.g., Google Drive), and different proprietary systems (e.g., SharePoint).

**Application Sharing System**

The Application Sharing System allows for the sharing of screens and programs between different computers. Residing on different locations, users can see the same application software running on their screens (Figure 6). They take turns in controlling the cursor: one of them uses a system function, while the other is watching. Then they switch the roles. Control over the cursor may be taken simply by pressing the carriage return on the keyboard.

![Figure 6. Application Sharing System](image)

An example is the engineers working on the same drawing. One of them draws in the shared document, while her remote teammate is watching. Then this teammate takes over. Of course, the shared document can be of any sort (word processing, spreadsheet, etc.).

**Workflow Support System**

A Workflow Support System electronically connects project tasks into a seamless process. The physical distance between teammates does not matter. Software for Workflow Support System come as a finished product (off-the-shelf software) or may be custom-built. The former is actually a set of development tools for setting up process layout (who/what is in the process, how these are connected), private email, file transfer channels, file sharing repositories, and flow tracking (where an electronic document at a certain time is). Examples of software products are SharePoint, QuickBase, and Claromentis.

A custom-built Customer Workflow Support System was deployed for supporting the customer help desk in a U.S. software firm. The work process included front-line representatives and back-line experts. These professionals would collaborate as teams when a buyer of the company’s software called to seek solution to a problem. A front-line representative would answer on the soft phone (a phone plugged into the computer). Then, the representative would
talk with the client and try to solve the client’s problem. The system had a database of questions and answers and product documents that the representative could search. If a representative would be unable to complete troubleshooting, he/she was supposed to engage a designated back-line expert, again via the system with embedded communication lines.

The help desk and the Customer Workflow Support System worked well. However, to surprise of the company’s management, the planned organization did not play out as expected. In particular, the back-liners were engaged just infrequently as the front-liners were trying to do all the work by themselves. The call times were going over the norm. So, this team work process suffered losses on both the front-line and the back-line (due to inactivity). To resolve this problem, management decided to insert a supervisor role for interfacing the front and the back-line (Figure 7). A supervisor was supposed to monitor the work of front-liners and initiate an engagement of a back-liner when troubleshooting by the front-liners went overtime. In effect, the organization of work in the customer support team had changed.

![Figure 7. Customer Workflow Support System](image)

This case underlines again the fact that any GSS needs a close management attention. This system was well designed, but dynamics of the group context caused that communication between the front- and back-line team members did not meet management expectations.

**Teleconferencing System**

The Teleconferencing System allows the teams with spatially distributed membership to hold meetings. Instead of travelling to a meeting location, the teammates can stay where they are and still discuss project-related topics. A teleconferencing system is essentially a communication system. So, all forms of communication channels can be used, such as video, voice, and text.
Early Teleconferencing Systems used proprietary technologies and were expensive. Corporations used to arrange special meeting rooms with TV monitors and large data-projected screens. Today, Teleconferencing Systems deploy inexpensive software and hardware for desktop and mobile platforms, and Internet links. Sometimes these are called Web conferencing or webinar systems. There are many teleconference products; one of the popular systems is Skype.

**Group Decision Support System**

The Group Decision Support System (GDSS) was already mentioned in the context of parallel coordination (the topic of process design) and of decision making. A GDSS is used for group brainstorming in strategic decision making. Typically, a group of decision makers would sit together or at several locations, and type their ideas on their individual PCs that are connected in a network. The system functionality includes text creation, text transfer from individual PCs to a shared screen, displaying text via a data projector, voting on commonly agreed options, and automatic scoring and graphical displaying of votes.

With a GDSS, group decision makers save the time while brainstorming in parallel rather than sequentially. The result is a bigger volume of the brainstorming output than the face-to-face brainstorming can generate. In addition, group decision makers may be more honest because brainstorming is anonymous. So the people do not need to fear that expressing critical opinions would get them in trouble. One does not see what others type, and when ideas are displayed on the shared screen, they are never traced to their authors. Anonymity can provoke ideas of a higher quality.

Bur-Brown Corporation, a US-based producer of electronic components, used GDSS used in strategic planning. The company experienced an increase in quantity of brainstormed ideas and time savings. But it also discovered that the group size mattered: smaller groups worked better than larger ones. Another conclusion was that the GDSS gave appropriate support for a part of planning process but that it could not replace the whole process.

The Bur-Brown experience may not apply to other organizations. But they may have distinct experiences corresponding to their own characteristics. The message again is that any GSS requires a close management attention and care.

**Distributed Teams and GSS**

A team whose members are permanently dispersed in the geographical space is called distributed or virtual team. A distributed team cannot function without deploying help of GSS, and all the GSS types discussed in this chapter have a place in such a team.
All characteristics of a project team apply to a distributed team. But it also faces some specific challenges. One is about aligning workflows over space and time. Time synchronization is a particular challenge when time zones are totally opposite. Winnipeg’s company Protegra experienced this when trying to sync project activities in Winnipeg with activities in Japan. When people work separated from each other, the likelihood of drifting from original company norms grows over time. Another challenge is: how to maintain trust in invisible others?

For many of these challenges, effective communication is an important part of the solution. It should be approached as a process at detailed level. Timing, turn taking, checks, and the selection of appropriate channels – all these aspects matter for achieving effective communication in distributed teams. For example, problematic issues are better to be discussed via a voice or video channel than via text messages (email, texting).

Questions for Review and Study

1. What are the success conditions for group work?
2. What are the main phases of the project team life process?
3. What is group mind?
4. What is Project Management System and how is it used?
5. What is File Sharing System and how is it used?
6. What is Application Sharing System and how is it used?
7. What is Workflow Support System and how is it used?
8. What is Teleconferencing System and how is it used?
9. What is Group Decision Support System and how is it used?
12. How do GSS fit with distributed project teams?