3. PROJECT MANAGEMENT CONCEPTS

THE MANAGEMENT SPECTRUM

- Effective software project management focuses on the four P's: but not arbitrary,
  - People
  - product
  - Process
  - project
- People factor" is so important that the SEI has developed a people management capability maturity model (PM-CMM).
- PM-CMM defines, recruiting, selection, performance management, training, compensation, career development, organization and work design as well as team/culture development.

PEOPLE

- One published report by the IEEE [CUR88], the engineering vice presidents of three major technology companies were asked the most important contributor to a successful software project.
- VP 1: I guess if you had to pick one thing out that is most important in our environment, I'd say it's not the tools that we use, it's the people.
- VP 2: The most important ingredient that was successful on this project was having smart people . . . very little else matters in my opinion. . . . The most important thing you do for a project is selecting the staff . . . The success of the software development organization is very, very much associated with the ability to recruit good people.
- VP 3: The only rule I have in management is to ensure I have good people—real good people—and that I grow good people—and that I provide an environment in which good people can produce.

The Players

- The software process (and every software project) is populated by players, who can be categorized into one of five constituencies:

1. **Senior managers,**
2. **Project (technical) managers,**
3. **Practitioners,**
4. **Customers,**
5. **End-users**

Team Leaders

- Book of technical leadership, Jerry Weinberg [WEI86] suggests a **MOI** model of leadership:
- **Motivation.**
  - The ability to encourage (by "push or pull") technical people to produce to their best ability.
- **Organization.**
  - The ability to mold existing processes (or invent new ones) that will enable the initial concept to be translated into a final product.
- **Ideas or innovation.**
  - The ability to encourage people to create and feel creative even when they must work within bounds established for a particular software product or application.

Team Leaders

- Another view [EDG95] of the characteristics that define an effective project manager emphasizes four key traits:
- **Problem solving**
- **Managerial identity**
- **Achievement**
- **Influence and team building**

The Software Team

- As, various human organizational structures for software development,
  - Better or worse
  - Organizational structure cannot be easily modified.

The Software Team

- Mantei [MAN81] suggests three generic team organizations:

1. **Democratic decentralized (DD):**
   - This software engineering team has no permanent leader.
   - However, task coordinators are appointed for short durations and then replaced by others who may coordinate different tasks.
2. **Controlled decentralized (CD):**
   - This software engineering team has a defined leader.
   - who coordinates specific tasks and secondary leaders that have responsibility for subtasks.
3. **Controlled Centralized (CC):**
   - Top-level problem solving and internal team coordination are managed by a team leader. Communication between the leader and team members is vertical.

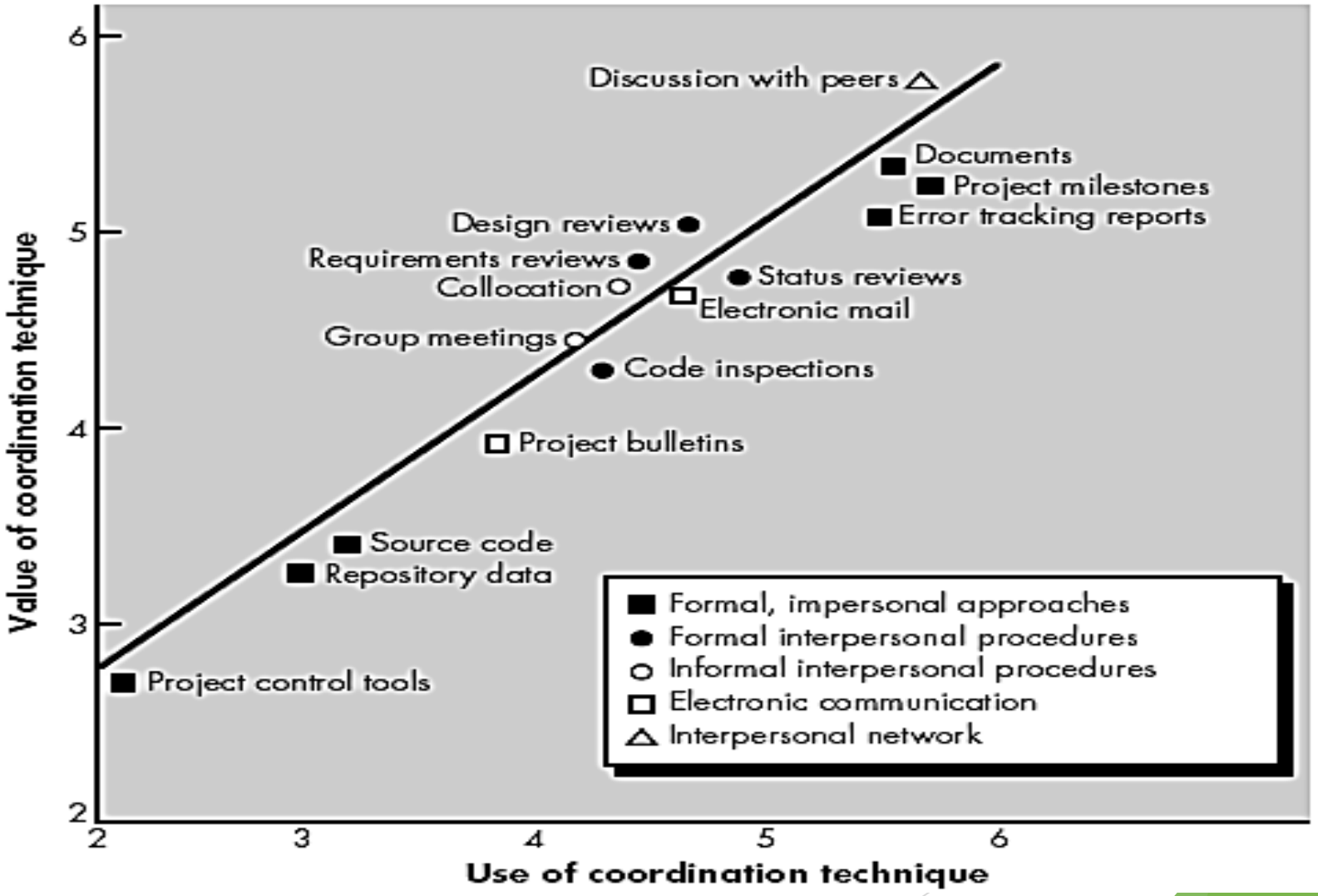
The Software Team

- Seven project factors that should be considered, when planning the structure of software engineering teams:

1) The difficulty of the problem to be solved.
2) The size of the resultant program(s) in lines of code or function points.
3) The time that the team will stay together (team lifetime).
4) The degree to which the problem can be modularized.
5) The required quality and reliability of the system to be built.
6) The rigidity of the delivery date.
7) The degree of sociability (communication) required for the project.

Coordination and Communication Issues

FIGURE 3.1
Value and Use of Coordination and Communication Techniques



THE PRODUCT & PROCESS

- Home Work

THE PROJECT

- In order to manage a successful software project, John Reel [REE99] defines ten signs that indicate that an information systems project is in jeopardy:

1. Software people don’t understand their customer’s needs.
2. The product scope is poorly defined.
3. Changes are managed poorly.
4. The chosen technology changes.
5. Business needs change [or are ill-defined].
6. Deadlines are unrealistic.
7. Users are resistant.
8. Sponsorship is lost [or was never properly obtained].
9. The project team lacks people with appropriate skills.
10. Managers [and practitioners] avoid best practices and lessons learned.

THE W5HH PRINCIPLE

- Boehm suggests an approach that addresses project objectives, milestones and schedules, responsibilities, management and technical approaches, and required resources.
- He calls it, the **WWWWWHH** principle or a series of questions that lead to a definition of key project characteristics and the resultant project plan:
- Why is the system being developed?
- What will be done, by when?
- Who is responsible for a function?
- Where are they organizationally located?
- How will the job be done technically and managerially?
- How much of each resource is needed?

CRITICAL PRACTICES

- The Airlie Council has developed a set of "Quick Look" questions [AIR99] for a project:

1) **Formal risk management:**
   - What are the top ten risks for this project?
   - What is the chance that the risk will become a problem and what is the impact if it does?
2) **Empirical cost and schedule estimation:**
   - What is the current estimated size of the application software (excluding system software) that will be delivered into operation? How was it derived?
3) **Metric-based project management:**
   - Do you have in place a metrics program to give an early indication of evolving problems?
   - If so, what is the current requirements volatility?

CRITICAL PRACTICES

4) **Earned value tracking:**
   - Do you report monthly earned value metrics?
   - These metrics computed from an activity network of tasks for the entire effort to the next delivery?
5) **Defect tracking against quality targets:**
   - Do you track and periodically report the number of defects found by each inspection (formal technical review)
   - Execution test from program inception and the number of defects currently closed and open?
6) **People-aware program management:**
   - What is the average staff turnover for the past three months for each of the suppliers/developers involved in the development of software for this system?