

Lecture Slides for Managing and Leading Software Projects

Chapter 11: Organizational Issues

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Chapter 11 Topics

- The Influence of Corporate Culture
- Assessing and Nurturing Intellectual Capital
- Key Personnel Roles
- Fifteen Guidelines for Organizing and Leading Software Engineering Teams

Objectives of Chapter 11

- After reading this chapter and completing the exercises you should understand:
 - the elements of corporate cultures
 - the importance of mission and vision statements
 - assessing and nurturing intellectual capital
 - key personnel roles
 - responsibility versus authority
 - fifteen guidelines for organizing and leading software engineering teams

Additional Sources of Information

- The frameworks, standards, and guidelines presented in each of the preceding chapters; namely, CMMI-DEV-v1.2, ISO/IEC and IEEE/EIA Standards 12207, IEEE Standard 1058, and the PMI Body of Knowledge address organizational issues to varying degrees.
 - The relevant elements of these standards and guidelines are summarized in Appendix 11A of Chapter 11.
- Terms used in this chapter and throughout this text are defined in Appendix A to the text.
- Presentation slides for this chapter and other supporting material are available at the URL listed in the Preface of the textbook.

The Business Environment (1)

- Organizations exist to:
 - provide products, goods, and services to customers
 - to provide jobs for employees and associated organizations
 - to create wealth for stockholders
- Organizations exist in a web of cultural, social, political, and moral environments
- Organizations must confront the following issues:
 - cultural, social, political, and moral norms
 - competitors, technology, user needs, customer expectations that change over time
 - development and nurturing of corporate assets

The Business Environment (2)

- Non-profit organizations exist to:
 - provide services to constituencies
 - e.g., Red Cross, political think tanks, AARP
- Governmental organizations exist to provide for the welfare of citizens
 - e.g., infrastructure, safety, security, privacy, well-being

The Business Environment (3)

- To survive and prosper, organizations must:
 - nurture their intellectual capital by treating people as assets rather than costs
 - assets are to be nurtured
 - costs are to be controlled
 - communicate and coordinate with customers and users
 - benchmark products and performance against other organizations for:
 - innovation, quality, customer service
 - constantly review and renew strategic plans and tactical maneuvers

Organizational Concerns

- The corporate culture must be established,
- Strategic goals must be determined and pursued,
- Intellectual assets must be nurtured,
- Software development processes must be established, and
- Technical infrastructure, methods, tools, and techniques must be provided.

Corporate Culture

- Corporate culture is comprised of the psychological, social, and political environment in an organization
 - the culture of an organization determines “what it feels like” to work in the organization
- Cultural attitudes are promulgated throughout an organization from the top down

Elements of Corporate Culture

- dress code
- degree of formality
- working hours
- cooperation vs. competition
- reward structure
- conflict resolution
- disciplinary policies
- career progression
- attitudes about quality
- customer relations
- ethical behavior
- a mission statement
- a vision statement

Mission Statements and Vision Statements

- Successful organizations
 - are guided by their mission statements,
 - set goals based on their visions,
 - and work toward goals that fulfill their mission
- Strategic directions, regard for customers, attitudes toward quality, and ethical behavior are (or should be) instilled by the mission and vision statements of an organization

Mission and vision statements serve distinct purposes and should be clearly differentiated

Mission Statements (1)

- A mission statement defines the purpose of an organization. For example:
“We provide information systems of highest quality to customers who value quality.”

Organizational values and ethical behavior must be aligned with the mission statement

Visions Statements (1)

- A vision statement has specific objectives and a time frame for achieving them
- An example of a vision statement:
“We will be one of the top three providers of information systems for critical-patient care in the United States by 2010.”

A mission statement and a vision statement, taken together, provide the basis for strategic planning and behavioral norms of an organization.

An Educational Mission Statement

- Mission statement for an educational institution:

The mission of XXX University, an institution of higher learning, is to provide career-oriented education by teaching applied, real-world, industry-current programs in selected areas, serving the needs of students for employment and career advancement and the needs of industry for highly qualified professionals at the associate's, bachelor's, master's and doctorate levels.

a mission statement provides guidance when making strategic decisions

An Educational Vision Statement

- The XXX University vision statement:

XXX University will be recognized nationally and internationally as the University of Choice and the University of Choices by 2010. We will achieve this by continued focus on quality curriculum, on innovative, diverse, and effective delivery, and on excellent customer service for an increasing number of learners.

Mission and Vision

- o Members of organizations, from CEO to janitor, should constantly live by their organization's mission statement and vision statement
 - mission: what is our purpose?
 - vision: what are our goals?

Organizational Risk: An Analogy

- An organization without a mission statement is like a ship without a rudder
 - it doesn't know which course to steer
- An organization without a vision statement is like a ship without navigation aids
 - it doesn't know the best heading toward its destination
 - and so the crew has no sense of purpose or direction

Intellectual Capital

Corporate Assets vs Corporate Costs

- Question 1: does your organization regard people as assets or costs?
 - assets are to be nurtured and developed
 - costs are to be controlled and minimized
- Question 2: what are the first things that many organizations cut back when the organization has financial difficulties?

Measures for Assessing Intellectual Capital*

- Measure innovation
 - percent of sales attributable to new products or services
- Measure employee attitudes
 - on a scale of 1 to 10, how happy are you with your job?
 - compared to a year ago, are you happier, about the same, or less happy at work?
 - do you understand how your job is of benefit to customers (not at all, a little, somewhat, ...)

**Intellectual Capital* by Thomas Stewart;
Doubleday Publishing, 1997

Measures for Assessing Intellectual Capital (2)

- Measure experience, turnover, tenure, and learning
 - average number of years experience
 - turnover among experts (those who contribute directly to customer sales)
 - expert ratio: percent of employees whose expertise is essential to the business of the company
 - rookie ratio: percent of employees with less than two years experience
 - courses taken, degrees earned per employee
- Other measures
 - revenue generated per employee and per expert
 - percent of customers who challenge us

Other Measures for Assessing Intellectual Capital

- Which skills in your company are most important for satisfying customer needs?
- Which skills are most admired by other employees?
- What accounts for any differences between what customers value and what employees value?
- What emerging technologies or skills could undermine the value of your special knowledge and skills?
- What are the most desired assignments by high-potential managers and workers? Where do they least want to work? What explains the differences?

More Measures

- What percent of *all* employees' time is spent in activities of low value to your customer base?
- What percent of *expert* employees' time is spent in activities of low value to your customer base?
- What is the reputation of your company among experts in your field?
- Why do people leave your company to accept jobs elsewhere?

Key Personnel Roles (1)

- Key personnel for software organizations include:
 - project managers
 - requirements engineers
 - software architects
 - team leaders
 - software developers
 - support personnel
 - CM, PPQA, V&V

Key Personnel Roles (2)

- Key personnel roles must be identified
- Job qualifications must be determined
- Roles and responsibilities must be documented
- Career ladders must be established
- Hiring practices, mentoring, and training must be provided

Duties of a Project Manager

- Prepare and update estimates and plans
- Measure status of the work processes and the work products
- Initiate and oversees corrective actions
- Communicates and leads; and
- Coordinates risk management activities

Duties of a Requirements Engineer

- Works with stakeholders to develop and prioritize operational requirements
 - initially and on-going
- Verifies operational requirements for correctness, completeness, and consistency
- Translates operational requirements into technical specifications
- Categorizes and prioritizes technical specifications
- Provides on-going requirements management during a project

Duties of a Software Architect

- Interacts with requirements engineering personnel
- Develops design options and presents the tradeoffs among them to decision makers
- Leads the design team
- Leads and coordinates the implementation team leaders
- Keeps the product vision
- Coordinates technical activities with other design teams, other disciplines, and other organizations

Duties of a Team Leader

- Supervises personal and team processes
- Assures personal and team product quality
- Mentors and coaches team members
- Maintains team morale, energy, and drive
- Keeps management informed of progress and problems
- Resolves problems and issues within his or her control
- Elevates problems and issues beyond his or her control
- Coordinates work activities with other teams and groups

15 Guidelines for Organizing and Leading Software Engineering Teams (1)

1. Hire the best people you can find.
2. Treat people as assets rather than costs.
3. Provide a balance between job specialization and job variety.
4. Keep team members together.
5. Limit team size.
6. Differentiate the role of team leader.
7. Make the team leader the team's quality control agent.
8. Decompose tasks into manageable units of work.

15 Guidelines for Organizing and Leading Software Engineering Teams (2)

9. Use an augmented rolling-wave approach to planning.
10. Adopt a negotiated contractual model for task assignments.
11. Set performance goals for the team and for each team member.
12. Ensure daily contact among team members.
13. Conduct weekly status review meetings.
14. Structure large projects as collections of highly cohesive, loosely coupled small projects.
15. Remember that organizations are nothing more than individuals and collections of individuals.

The Main Points of Chapter 11 (1)

- Corporate culture is comprised of the beliefs, values, and behavior patterns that exist within an organization.
- A mission statement defines the purpose and goals of an organization.
- A vision statement has specific objectives and a time frame for achieving them.
- The primary assets of a software organization are the skills and abilities of the project managers, requirements engineers, software architects, team leaders, software developers, and other software personnel.

The Main Points of Chapter 11 (2)

- The first rule of business is to manage corporate assets to maximize return on investment in those assets; the second rule is to control costs.
 - Unfortunately, many software organizations confuse the second rule with the first one and treat their software engineers as costs rather than assets.
- Responsibilities are (or should be) documented in job descriptions. Authority is the power to make the decisions that must be made in fulfilling one's responsibilities, and the power to implement those decisions.
 - Authority can be delegated; responsibility cannot.

The Main Points of Chapter 11 (3)

- The 15 guidelines for organizing and leading software engineering teams are by no means complete or comprehensive, nor are they foolproof.
 - There are no physical laws or mathematical theories for building and maintaining cohesive software engineering teams.
 - However, the 15 guidelines, when applied with common sense and within a supportive organization, can produce gratifying results.