Chapter 11
Project Management

Managing and Using Information Systems: A Strategic Approach

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Introduction

- What are the elements of a good project?
- Why do so many IT projects fail to meet their targeted goals?
- What is the relationship between time, scope, and cost of a project?
- Why are Gantt charts so popular for planning schedules?
- What is RAD? How does it compare to the SDLC?
- When is it time to pull the plug on a project?

Real World Examples

- The State of Florida auditor's report about HomeSafenet was blistering.
- The system was designed to keep track of the more than 40,000 children considered to be abused or neglected.
- Started in 1994 not fully implemented until 2005.
- More than five times the original cost estimate.
- Development plagued by poor project management.

WHAT DEFINES A PROJECT

Project Definition

"[A] project is a temporary endeavor undertaken to create a unique product or service. Temporary means that every project has a definite beginning and a definite end. Unique means that the product or service is different in some distinguishing way from all similar products or services."

-Project Management Institute (1996)

Projects

- Companies use projects and operations to generate revenue.
- Projects are temporary endeavors that have a fixed start and stop date and time.
- Operations are ongoing, repetitive tasks that are performed until they are changed or replaced.
- Project managers may break projects into sub-projects depending upon the work.
- Figure 11.1 show the differences between operational and project based work.

Characteristics	Operations	Projects
Labor skills	Low	High
Training time	Low	High
Worker autonomy	Low	High
Compensation system	Hourly or weekly wage	Lump sum for project
Material input requirements	High certainty	Uncertain
Suppler ties	Longer duration	Shorter duration
	More formal	Less formal
Raw Materials inventory	Large	Small
Scheduling complexity	Lower	Higher
Quality control	Formal	Informal
Information flows	Less important	Very important
Worker-mgmt communication	Less important	Very important
Duration	On-going	Temporary
Product or service	Repetitive	Unique

Fig. 11.1 Characteristics of operational and project work

WHAT IS PROJECT MANAGEMENT

Project Management

- Project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectation from a project.
- Involves continual trade-offs
- Manager's job to manage these trade-offs.

Typical Project Management trade-offs

- Scope vs. Time
  - Product and project scope.
  - Scope creep can occur.
- Cost vs. Quality
  - The quality of a system will normally impact its cost.
- Identified requirements vs. Unidentified requirements
- User needs vs. User expectations
- Differing needs and expectations vs. diverse stakeholders
- Figure 11.2 shows the three sides of the project triangle.

Figure 11.2 Project Triangle

Project Management Activities

- The project manager will typically be involved in:
  - Ensuring progress of the project according to defined metrics..
  - Identifying risks.
  - Ensuring progress toward deliverables within time and resource constraints.
  - Running coordination meetings.
  - Negotiating for resources on behalf of the project.

PROJECT MEASUREMENT

Project Measurement

- Some metrics used for IS projects are the same as those used for all business projects
- Projects are measured against budgets of cost, schedules of deliverables, and the amount of functionality in the system scope
- IT projects are difficult to estimate and most fail to meet their schedules and budgets
- Software systems often involve highly interactive, complex sets of tasks that rely on each other to make a completed system.
- Most projects cannot be made more efficient simply by adding labor

Business vs. System Functionality

- Metrics for functionality are typically divided along lines of business functionality and system functionality
- The first set of measures are those derived specifically from the requirements and business needs that generated the project
- The second are related to the system itself such as how well the individual using the system can and does use it, or system reliability

PROJECT ELEMENTS

Essential Components

- There are four components essential for any project. These elements are necessary to assure that the project will have a high probability of success.
  - Common Project Vocabulary: so all team members can communicate effectively (since many are new this is very important).
  - Teamwork: to insure all parts of the project come together effectively and correctly (make sure to clearly define the teams objectives).
  - Project cycle plan: method and schedule to execute the project (Gantt charts, CPM, and PERT diagrams).
  - Management of the project is needed so that it is coordinated and executed appropriately

Project Cycle Plan

- The project cycle plan organizes discrete project activities, sequencing them into steps along a time line.
- Identifies critical beginning and ending dates and breaks the work spanning these dates into phases
- The three most common approaches are:
  - Project Evaluation and Review Technique (PERT) (Figure 11.3)
  - Critical Path Method
  - Gantt chart (Figure 11.4)
- Figure 11.5 provides detail on the project cycle template.

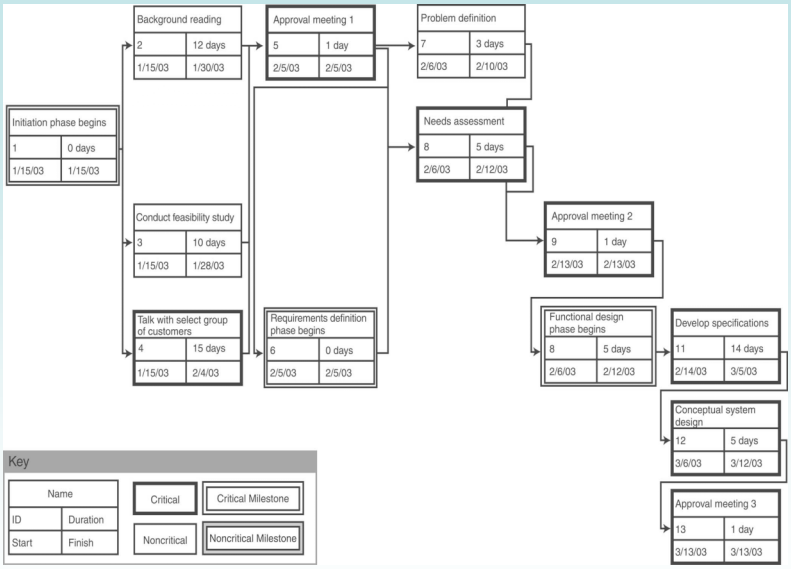

Figure 11.3 PERT Chart

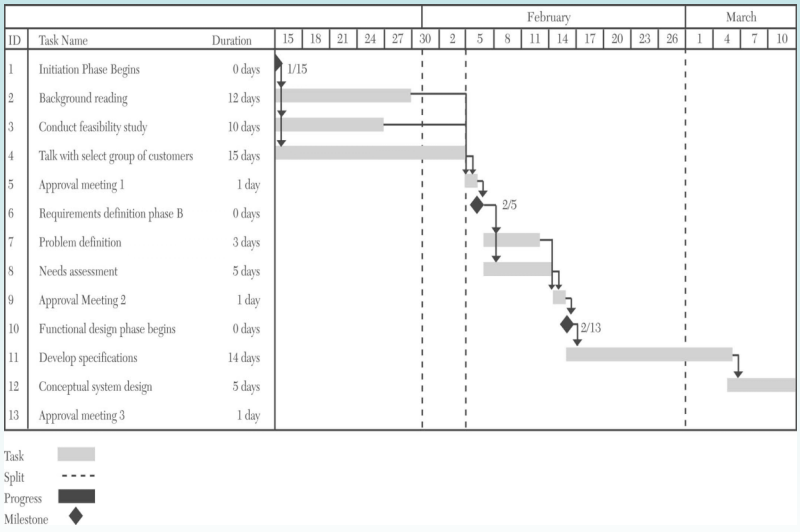

Figure 11.4 GANTT Chart

Requirements Definition period			Production Period			Deployment/ Dissemination Period	
Investigation Task Force							
User requirement definition	Research concept definition	Information use specification	Collection planning phase	Collection and analysis phase	Draft report phase	Publication phase	Distribution phase
Typical High Tech Commercial Business							
Product requirement phase	Product definition phase	Product proposal phase	Product develop-ment phase	Engineer model phase	Internal test phase	Production phase	Manufactur-ing, sales & support phase
Generic Project Cycle Template							
User require-ment definition phase.	Concept definition phase	System specificatio n phase	Acquisition planning phase	Source selection phase	Develo pment phase	Verification phase	Deployment or production phase Deactivate phase

Figure 11.5 Project cycle template

Aspects of Project Cycle Work.

- The manager must attend to the following aspects of the work throughout the project cycle:
  - **Technical** - includes all activities related to satisfying the technical and quality requirements.
  - **Budget** - describes all activities related to the appropriation of project funds by executive management and the securing and accounting of funds by the project manager.
  - **Business** - encompasses all activities related to the management of the project and any associated contracts.

Elements of Project Management

- The following elements can be considered as managerial skills that influence a project's chance for success.
  - Identification of requirements
  - Organizational integration
  - Team management
  - Project planning
  - Risk and Opportunity management
  - Project control
  - Project visibility
  - Project status
  - Corrective action
  - Project leadership
- See figure 11.6 in the text for a description of each element

Organizational Integration

- The project manager should, ideally, start with a structure similar to the organization supporting the project.
- Different structures are ideal for different projects.
- For example a Pure Functional structure works best for a single project that operates with relative independence.
- The following figures (11.7 – 11.10) show the general layout of these structures.

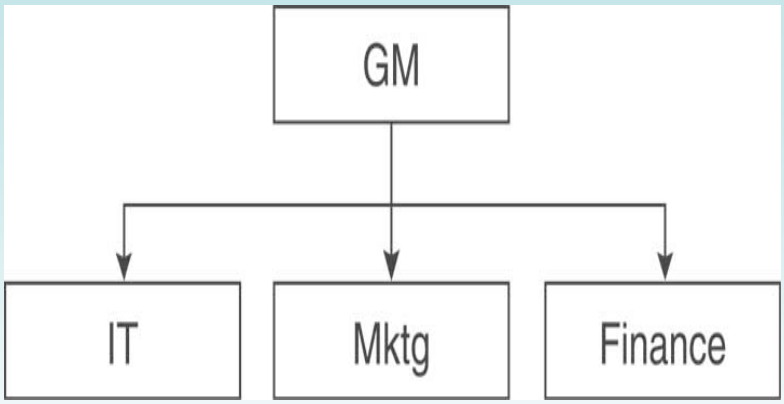

Figure 11.7 Pure functional structure

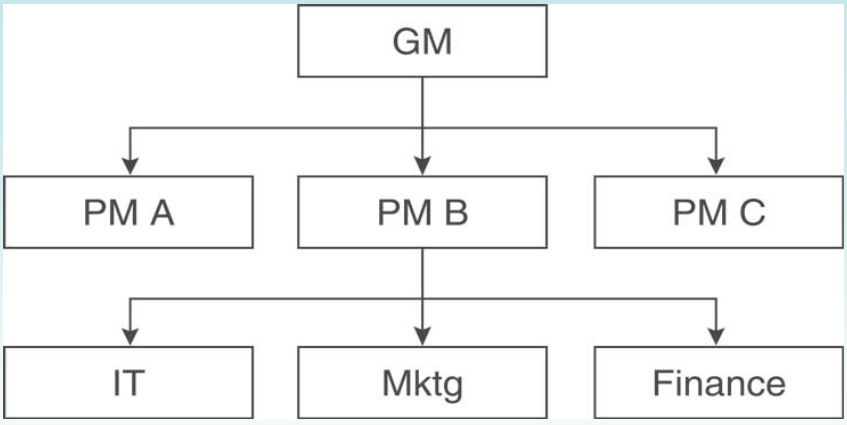

Figure 11.8 Pure purpose (project) structure

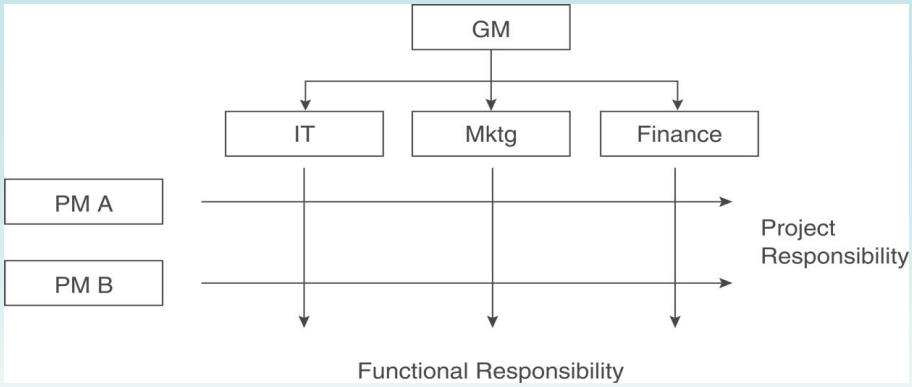

Figure 11.9 Conventional matrix structure

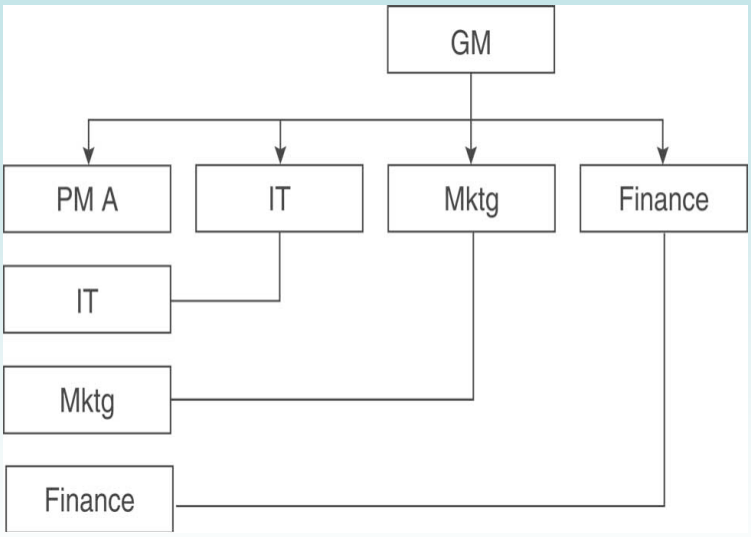

Figure 11.10 Co-located matrix structure

Team Management

- Project manager acquires and manages required human resources.
- Assessments of professional competencies and skills.
- Also personal traits and behaviors can help the project manager select team members with specific roles in mind
- As a project progresses through its life cycle, the number of people assigned typically increases.

Risk and Opportunity Management

- Critical task of the team is to manage risks and opportunities.
- Steps include:
  - Identification and assessment
  - Outcome predictions
  - Development of strategies
- By comparing costs and benefits of various courses of action, the team can select which sequence of actions to take and obtain agreement from necessary parties

Project Control

- Effective project management requires the exercise of control.
- Must be sufficient to minimize risks while maximizing the likelihood of meeting or exceeding requirements.
- Effective project control involves five variables:
  - The nature and number of entities that require control
  - Control standards
  - Control authority
  - Control mechanisms
  - Variance detection

Project Visibility

- Communication management among team members and between the team and any project stakeholders is essential.
- Techniques range from the old-fashioned approach sometimes called “managing by walking around” to the more technological approaches of video conferencing, e-mail and voice mail.
- One effective technique to raise visibility uses a project information center comprised of physical displays in a central location

Project Status

- Status checks measure the project's performance against the plan to alert everyone to any needed adjustments to budget, schedule, or other business or technical aspects of the project.
- The status of these elements should be evaluated in a combined format, since they interrelate.

Corrective Action

- Corrective techniques can place the project back on track after a variation from the plan is detected
- Examples of these reactive techniques include adding work shifts, lengthening work hours, and changing leadership

Project Leadership

- Strong project leaders skillfully manage team composition, reward systems, and other techniques to focus, align, and motivate team members
- In organizations that have developed strong processes for project management and professionals trained for this activity, the need for aggressive project leadership is reduced
- Strong project leaders are needed to help the organization develop project competency to begin with (see Figure 11.11).

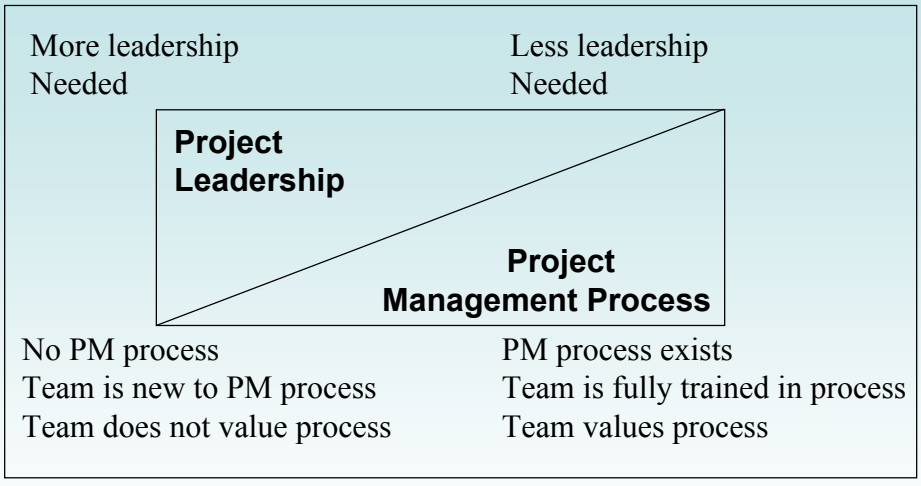

Figure 11.11 Project leadership vs. project management process

IT PROJECT DEVELOPMENT METHODOLOGIES

Project Development Methodologies

- The choice of development methodologies and managerial influences distinguish IT projects from other projects.
- There are four main methodologies IT professionals use to manage the technology projects:
  - Systems Development Life Cycle (SDLC)
  - Prototyping
  - Rapid applications development (RAD)
  - Joint applications development (JAD)

Systems Development Life Cycle

SDLC typically consists of seven phases

1. Initiation of the project
2. The requirements definition phase
3. The functional design phase
4. The system is actually built
5. Verification phase
6. The “cut over” where the new system is put in operation and all links are established
7. The maintenance and review phase

Limitations of SDLC

- Traditional SDLC methodology for current IT projects are not always appropriate:
  - Many systems projects fail to meet objectives because of the difficulty in estimating costs and each project is often so unique that previous experience may not provide the necessary skills
  - Objectives may reflect a scope that is too broad or two narrow so that the problem the system was designed to solve may still exist, or the opportunity that it was to capitalize upon may not be appropriately leveraged.
  - If the business environment is very dynamic, there may not be enough time to adequately do each step of the SDLC for each IT project

Prototyping

- SDLC may not work for all situations, requires a lot of planning and is difficult to implement quickly.
- Prototyping is a type of evolutionary development.
- Builds a fast, high-level version of the system at the beginning of the project.
- Advantages include:
  - User involvement and comment early on and throughout the development process.
- Disadvantages include:
  - Documentation may be difficult to write.
  - Users may not understand the realistic scope of the system.

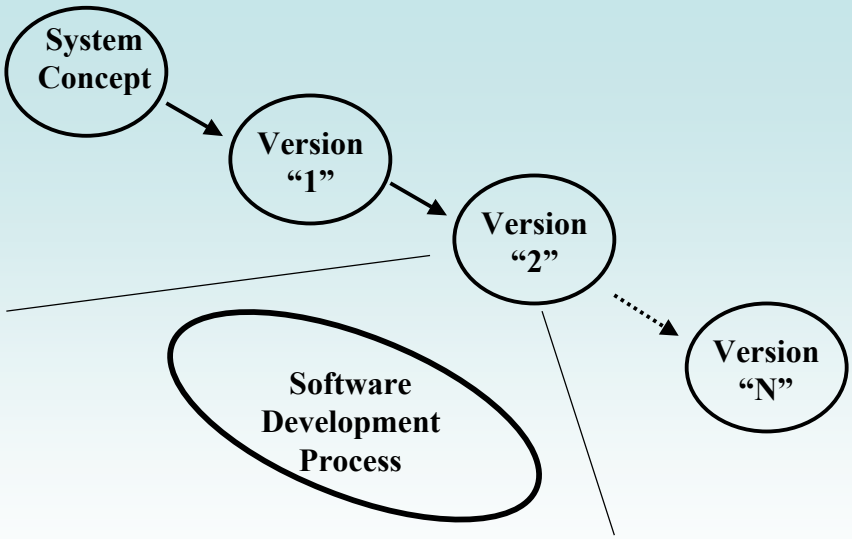

Figure 11.13 Iterative approach to systems development

RAD and JAD

- RAD (Rapid Application Development) is similar to the SDLC but it substantially reduces the time through reduction in steps (4 instead of 7).
- RAD, like prototyping, uses iterative development tools to speed up development:
  - GUI, reusable code, code generation, and programming, language testing and debugging
- Goal is to build the system in a much short time frame than normal.
- JAD (Joint Application Development) is a technique developed by IBM where users are more integrally involved throughout the development process.

Other Development Methodologies

- Agile development methodologies are being developed for those situations where a predictable development process cannot be followed.
- Examples include:
  - XP (Extreme Programming), Crystal, Scrum, Feature-Driven Development and Dynamic System Development (DSDM).
- Tend to be people rather than process oriented.
- DSDM is an extension of RAD used in the UK.
- Object Oriented (OO) development is becoming increasingly popular.

MANAGERIAL INFLUENCES

Technical Influences

- General managers face a broad range of influences during the development of projects.
- Four software tools are available to aid in managing the technical issues:
  - Computer-Aided Software Engineering (CASE) suite of tools
  - Software development library
  - Automated audit trail
  - Software metrics

Key Terms

- Below is a list of key terms that a general manager is likely to encounter:
  - **Source lines of code** (SLOC) is the number of lines of code in the source file of the software product.
  - **Source statement** is the number of statements in the source file
  - **Function points** describe the functional requirements of the software product and can be estimated earlier than total lines of code
  - **Inheritance depth** is the number of levels through which values must be remembered in a software object
  - **Schedule slip** is the current scheduled time divided by the original scheduled time
  - **Percentage complete** measures the progress of a software product in terms of days or effort

Managing Organizational and Socioeconomic Influences

- Balance goals of stakeholders
  - project manager
  - customer
  - end-user (there's a difference)
  - sponsor
- Sustain commitment
  - project
  - psychological (personal responsibility, biases)
  - social (rivalry, norms for consistency)
  - organizational (political support, culture)

MANAGING PROJECT RISK

Complexity

Factors influencing a project's complexity include:

1. How many products will this website sell?
2. Will this site support global, national, regional, or local sales?
3. How will this sales process interface with the existing customer fulfillment process?
4. Does the company possess the technical expertise in-house to build the site?
5. What other corporate systems and processes does this project impact?
6. How and when will these other systems be coordinated?

Clarity

- Clarity is concerned with the ability to define the requirements of the system.
- A project has low clarity if the users cannot easily state their needs or define what they want from the system.
- A project with high clarity is one in which the systems requirements can be easily documented and which do not change

Size

- Plays a big role in project risk
- A project can be considered big if it has:
  - A big budget relative to other budgets in the organization
  - A large number of team members (= number of man months)
  - A large number of organizational units involved in the project
  - A large number of programs/components
  - A large number of function points or lines of code

High Risk Level

- Large, highly complex projects that are usually low in clarity are very risky
- Small projects that are low in complexity and high in clarity are usually low risk
- Everything else is somewhere in between
- The level of risk determines how formal the project management system and detailed the planning should be
- When it is hard to estimate how long or how much a project will cost because it is so complex/clarity is so low, formal management practices or planning may be inappropriate

Managing the Complexity Aspects of Project Risk

Strategies that may be adopted in dealing with complexity are:

- **Leveraging the Technical Skills of the Team** such as having a leader or team members who have had significant work experience
- **Relying on Consultants and Vendors** – as their work is primarily project based, they usually possess the crucial IT knowledge and skills
- **Integrating Within the Organization** such as having frequent team meetings, documenting, critical project decisions and holding regular technical status reviews

Managing Clarity Aspects of Project Risk

- When a project has low clarity, project managers need to rely more heavily upon the users to define system requirements
  - **Managing stakeholders** – managers must balance the goals of the various stakeholders, such as customers, performing organizations and sponsors, to achieve desired project outcomes
  - **Sustaining Project Commitment –** there are four primary types of determinants of commitment to projects

Pulling the Plug

- Often projects in trouble persist long after they should have been abandoned
- The amount of money already spent on a project biases managers towards continuing to fund the project even if its prospects for success are questionable
- When the penalties for failure within an organization are also high, project teams are often willing to go to great lengths to insure that their project persists
- Or if there is an emotional attachment to the project by powerful individuals within the organization

Measuring Success

- At the start of the project, the general manager should consider several aspects based on achieving the business goals.
- Care is needed to prevent a too narrow or too broad set of goals.
- It is important that the goals be measurable so that they can be used throughout the project to provide the project manager with feedback.

Four dimensions of success

- According to Shenhar, Dvir and Levy (1998) there a four dimensions of success:
  - **Resource constraints**: does the project meet the time and budget criteria?
  - **Impact on customers**: how much benefit does the customer receive from the project?
  - **Business success**: how high and long are the profits produced by the project?
  - **Prepare the future**: has the project altered the infrastructure of the org. so future business success and customer impact are more likely?
- See Figure 11.16 in the text.

FOOD FOR THOUGHT: OPEN SOURCING

Open Sourcing

- Linux, a version of Unix created by Linus Torvalds, is a world-class OS.
- Linux was built using the open-source model.
- Open-source software is really free software that can be modified by anyone since the source code is free.
- It is premised upon open and unfettered access to the code to modify, update, etc.

Open sourcing = Free Software

Offers four kinds of freedom for the software users:

1. The freedom to run the program, for any purpose
2. The freedom to study how the program works, and adapt it to your needs. Access to the source code is a precondition for this
3. The freedom to distribute copies so that you can help your neighbor
4. The freedom to improve and release your improvements to the public, so that the whole community benefits. Access to source code is a precondition for this

Managerial Issues associated with Open Sourcing

- ***Preservation of intellectual property*** – As its use cannot be restricted how are the contributions of individuals recognized?
- ***Updating and maintaining open source code*** – Because it is “open”, difficult to achieve these
- ***Competitive advantage*** – Since the code is available to all, hard to achieve competitive this
- ***Tech support*** – The code may be free, but technical support usually isn’t
- ***Standards*** – As standards are open, open sourcing may be unable to charter a viable strategy for selecting and using standards

Summary

- Plan Well.
- Use the tools that fit.
- Set realistic goals and expectations for the project and continuously reevaluate.
- Communicate, communicate, communicate!
- Organizational structure can provide insight.
- Be aware of the advantages and disadvantages of using open-source software.

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