

Management Issues in Systems Development

Chapter 10

Outline

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Introduction

- Companies are in three businesses:
 - ◆ Infrastructure management
 - ◆ Customer relationship
 - ◆ Product innovation
- Traditionally companies have bundled the three businesses, which leads to compromises because they have conflicting agendas

Context of Project Management

- IS departments can be viewed as being in the same three businesses, and need to be managed differently:
 - ◆ Operations are **Infrastructure Management**
 - ◆ The help desk is the **Customer Relationship** business
 - ◆ System development is **Product Innovation**

Infrastructure Management

- The goal is to reduce costs
 - ◆ Providing infrastructure involves high fixed costs, so the goal is build scale
- Management focus on efficiency and standards
 - ◆ Company outsource their network management and data centers to large external service providers

Customer Relationship

- The goal is service
- PC support & help desks often outsourced
 - ◆ Especially in Europe & Asia (multilingual needs)
- Outsourcing offshore is increasing dramatically

Product Innovation

- The goal is speed because it provides nimbleness
- Key to success is talent
 - ◆ In IT, developers are king so they are given the coolest tools
- There are a number of management issues surrounding system development:
 - ◆ Project management
 - ◆ Legacy system improvement
 - ◆ System benefits measurement

What is Project Management?

- A **Project** is an endeavor to achieve a particular aim and to which project management can be applied, regardless of the project's size, budget, or timeline.
- **Project Management** means applying the knowledge, skills, tools, and techniques to project activities to meet the requirements.
 - ◆ Project management involves nine areas: Integration, Scope, Time, Cost, Quality, Human Resources, Communication, Risk, and Procurement.

The Job of a Project Manager

- Project managers basically have six jobs:
 - ◆ Set up the project
 - ◆ Manage the schedule
 - ◆ Manage the finances
 - ◆ Manage the benefits
 - ◆ Manage the risks, opportunities and issues
 - ◆ Solicit independent reviews

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Setting up the Project

Why?	<ul style="list-style-type: none"> ■ A brief background of the project ■ The business objectives to be achieved
What?	<ul style="list-style-type: none"> ■ Key outputs to be produced ■ Benefits
When?	<ul style="list-style-type: none"> ■ List of milestones and expected timing ■ High level project plan
Who?	<ul style="list-style-type: none"> ■ Project team ■ Stakeholders and their expectations
How?	<ul style="list-style-type: none"> ■ Definition of the work that needs to be undertaken ■ Scope ■ Specific exclusions

Managing the Schedule

- Schedule for the project plan is heart of the project and main communication tool
- High level first, then break down as you proceed
- Baseline and track
- Use automated tools
- Recommendations:
 - ◆ Focus on the date that tasks will be completed rather than on the % of overall project completed
 - ◆ Review progress at least monthly, preferably more often
 - ◆ Focus on tasks to be completed vs. those finished
 - ◆ Reforecast when new evidence comes to light

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Managing the Finances

- Financial plan, who is accountable, benefits etc.
- Baseline costs and track
- Need to know how much has been spent and how much money is left

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Managing the Benefits

- Difficult to estimate but must try
- Base on same assumptions as costs
- Look at timings
- Track
- Evaluate “Why are we doing this?” and “Should we still be doing it?”

Managing Risks, Opportunities and Threats

- Every project encounters the following
 - ◆ Risk: A potential threat that may prevent the project from achieving its business benefit.
 - ◆ Opportunity: A project going better than planned
 - ◆ Issue: Something that threatens the success of the project
- Solution
 - ◆ Risk mitigation and risk management
 - ◆ Risk logs
 - ◆ Issue management

Soliciting Independent Reviews

- Health checks (of the project)
 - ◆ By someone independent (could be internal or external)

Change Management

- IS often assume a technically elegant system is a successful system
 - ◆ Many technically sound systems have turned into implementation failures
- System is only a success if it meets the users' requirements and they are happy with it and with using it
 - ◆ Focusing only on the technical aspects is only half the job
 - ◆ The other job is change management

Change Management

- Changing management process assisting people to make change in their working environment
 - ◆ The change is caused by the introduction of a new computer system
- People resist change, especially technological change, when they view it as a crisis. 'Resistance' includes:
 - ◆ Deny the change
 - ◆ Distort information they hear about the change
 - ◆ Convince themselves and others the new system will not change status quo

ODR's Methodology

- ODR (Change Management firm in Atlanta, Georgia) offers a methodology to help companies manage technological change
- They use specific terms from the field of organizational development to describe the types of people involved in a change project:
 - ◆ **Sponsor:** the person or group that legitimizes the change
 - ◆ **Change Agent:** the person or group who causes the change to happen
 - ◆ **Target:** the person or group who is being expected to change and at whom the change is aimed

ODR's Methodology

- Conduct surveys with all three groups to determine:
 - ◆ Whether the scope of the project is do-able, or whether the organization is trying to change too much at one time
 - ◆ Whether the sponsors are committed enough to push the change through, or whether they are sitting back expecting the organization to change on its own
 - ◆ Whether the change agents have the skills to implement the change, or whether e.g. they are not adept at rallying support
 - ◆ Which groups are receptive to the change and which are resistant

Technical Risk and Business Risk

- Technical Risks
 - ◆ Sub-performance, scope creep making it too complex
 - ◆ Can't always be predicted but they can be contained
- Business Risks
 - ◆ Business does not change properly to use the new systems
 - ◆ Are not as easily righted

30-70% IT-based projects fail, especially the really large ones
e.g. ERP, CRM

Risk Management

- To ascertain which project management approach is most likely to yield the needed business changes, Gigson proposes using a three-step process whenever the main risks in a project changes:
 - ◆ Access the Risks
 - ◆ Mitigate the Risk
 - ◆ Adjust the Project Management Approach

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Step 1: Assess the Risk

- Three predominant risk factors:
 - ◆ Leadership of the business change
 - ◆ Employees' perspective of the change
 - ◆ Scope and urgency of the change

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Step 1: Assess the Risk Risk Management Decision Tree

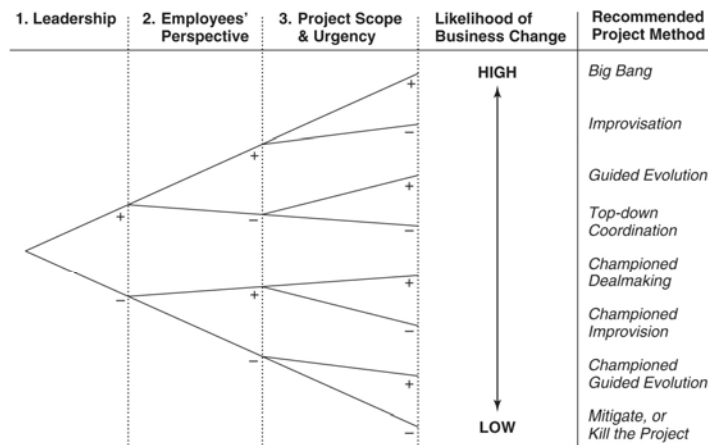


FIGURE 10-1 Risk Management Decision Tree

Source: C. Gibson, "IT-Enabled Business Change: An Approach to Understanding and Managing Risk," *MIS Quarterly Executive*, Vol. 2, No. 2, September 2003, pp. 104-115. Used with permission.

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Step 1: Assess the Risk Project Leader

- Project leader (executive) responsible for the change
 - ◆ It is the business, not IT that is required to change
- Ask 6 questions for contributors to success/failure
 - ◆ Are they committed to the business case?
 - ◆ Do they understand the extent of change in work behaviour required for the project to succeed?
 - ◆ Are they formally motivated to pull off the change?
 - ◆ Are they at the appropriate organization level with the formal power?
 - ◆ Do they have experience with a project of similar scope, urgency and people impact?
 - ◆ Do they have informal power, such as credibility and respect?

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Step 2: Mitigate the Risks

- Mitigation means “thoughtful management action based on anticipation of high change risk”

Step 3: Adjust the Project Management Approach

- Project management styles
 - ◆ Authoritative vs. Participative
- Project’s budget and timeframe
 - ◆ Rigid vs. Adjustable

	<i>Management Style</i>	
<i>Project Budget and Deadlines</i>	Authoritative	Participative
Fixed	Big Bang	Guided Evolution
Adjustable	Top-down Coordination	Improvisation

FIGURE 10-2 Four Approaches to Project Management

Source: C. Gibson, “IT-Enabled Business Change: An Approach to Understanding and Managing Risk,” *MIS Quarterly Executive*, Vol. 2, No. 2, September 2003, pp. 104–115. Used with permission.

Four Approaches to Project Management

Big Bang	Only appropriate when all 3 factors is positive
Improvisation	Leadership and employee are positive, but scope or urgency place the project at risk Committed workforce can adapt etc.
Guided Evolution	Used when only the employee perception is negative Can be overcome by involving them
Top-down Coordination	Only works when the leadership factor supports the business change and when the leadership is respected, full-time and highly experienced in leading business change

Tips for Good IT Project Management

- Establish the Ground Rules
- Foster Discipline, Planning, Documentation and Management
- Obtain and Document the Final User Requirements
- Obtain Tenders from All Appropriate Potential Vendors
- Include Suppliers in Decision Making
- Convert Existing Data
- Follow Through After Implementation

Tips for Good IT Project Management

- Establish the Ground Rules
 - ◆ Define the technical and architectural specification for the systems following four guidelines
 - ◆ Adhere to industry standards
 - ◆ Use an open architecture
 - ◆ Web-enable the system
 - ◆ Power with subsystem

Tips for Good IT Project Management

- Foster Discipline, Planning, Documentation and Management
 - ◆ If the process is not controlled properly, anything can happen or, more realistically, potentially nothing will happen

Tips for Good IT Project Management

- Obtain and Document the Final User Requirements
 - ◆ Don't get too technical

Tips for Good IT Project Management

- Obtain Tenders from all Appropriate Potential Vendors
 - ◆ Company that do not have expertise in the area under consideration might want to call in consultants to make recommendation

Tips for Good IT Project Management

- Include Suppliers in Decision Making
 - ◆ The supplier will undoubtedly appoint their own project managers for their respective assignments.

Tips for Good IT Project Management

- Convert Existing Data
 - ◆ Task might appear quite simple but often causes the biggest headaches

Tips for Good IT Project Management

- Follow Through after Implementation
 - ◆ Finish and complete all documentation, future maintenance processes etc.

Reasons for Success

- Proper Planning
- Appropriate User Involvement
- Strong Visible Management Support
- Project Manager with Power and Time
- Good Change Management
- Working As A Team
- Proper Project Monitoring and Control
- Proper Project Closure

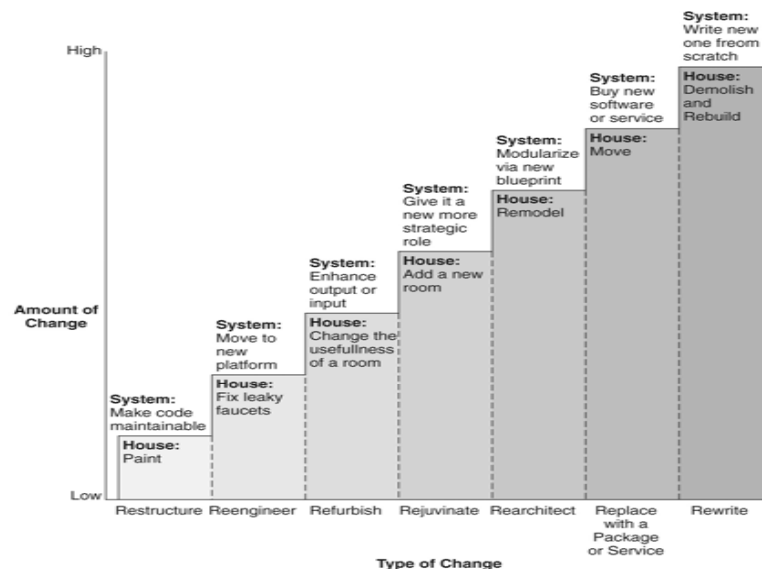
Improving Legacy Systems

- Most information systems executives feel trapped by the past.
 - ◆ They have thousands of old legacy programs and data files they would love to replace.
 - ◆ Replacement is not the only option, though, and in many cases it is not the wisest course of action.
 - ◆ Replacing a legacy system can be compared to fixing up a house.

To Replace or Not to Replace?

- One study found that upgrading (rather than replacing) made more sense in most cases, even if it was difficult and not as exciting as a totally new system
- When a systems technology is so obsolete that it does not exist in many places, then replacement is probably the only choice. Otherwise perform 3 analyses:
 - ◆ Rigorous analysis of the costs and benefits the new system
 - ◆ Determine how specialized the new system really is
 - ◆ Sometimes think you need ‘made to order’ when purchased would do just fine
 - ◆ Assess the IS staff’s capabilities honestly
 - ◆ Can they do the job?

Options for Improving a Legacy System



Options for Improving a Legacy System

- Restructure the system
- Reengineer the system
- Refurbish the system
- Rejuvenate the system
- Rearchitect the System
- Replace with a Package or Service
- Rewrite the System

Restructure the System

- If the system is running but fragile, restructure the code, using automated tools, to make the system more maintainable.
 - ◆ This is akin to updating the look of a room in a house, perhaps by painting.

Seven Steps in Restructuring

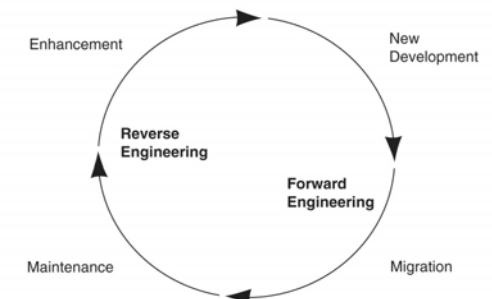
1. Evaluate the amount of structure in the current system, include the number of layers of nesting, degree of complexity, etc.
2. Compile the program, to be sure it is in working order
3. Run the program through a structuring engine, which cleans up and restructures the code, following structured programming concepts
4. Reformat the listing to make it easier for programmers to understand
5. Ensure that the old and new versions produce the same output
6. Minimize overhead introduced by restructuring (optimizer package)
7. Rationalize the data by giving all uses of the same data one data name

Reengineer the System

- Extract the data elements from the existing file and the business logic from the existing program and move them to new hardware platforms, using automated tools.
 - ◆ This is akin to fixing things in a house that are not working, like leaky faucets

The Reengineering System Development Life Cycle

- **Reverse Engineering:** existing programs, along with their files and database descriptions, are converted from their implementation level description to their equivalent design level components
- **Forward Engineering:** from requirements level to operational systems



Refurbish the System

- Old but maintainable systems that are causing no major problems may just need some extensions to be more useful.
 - ◆ This is akin to enhancing the usefulness of a house, perhaps by replacing the furniture in a room.
- Companies are leaving existing systems in place but adding an Internet front end.
- Potential extensions:
 - ◆ Supply input in a new manner
 - ◆ Make new uses of input, or
 - ◆ Allow the programs to deal more comprehensively with the data

Rejuvenate the System

- Rejuvenating adds enough new functions to a system to make it more valuable to the firm.
 - ◆ This is akin to adding to functions to a house, such as a porch or a new room.

Phases of Rejuvenation Process

1. Recognize a system's potential
 - ◆ First clean up existing system using code restructuring tools and then building from there
2. Clean up the system
 - ◆ Transform the poorly structured COBOL code into more structured, maintainable code
3. Make the system more efficient
 - ◆ System can be converted to a new operating environment and a new file structure, together with manual tuning and enhancements to reduce system processing time
4. Give the system a strategic role
 - ◆ E.g. allowing it to feed a data warehouse

Rearchitect the System

- This option involves having a to-be architecture for new systems, then using that architecture to upgrade legacy systems.
 - ◆ This is akin to rethinking the use of space in a house by perhaps knocking out some walls to create a combined kitchen and family room.

Replace with a Package or Service

- Many old systems built in-house have been replaced by a package developed by a third party.
- This alternative has become the norm; another option, one being touted as “the future,” is to replace a system with a service delivered over the Internet.
 - ◆ This is akin to moving from one house to another.

Rewrite the System

- In some cases, a legacy system is too far gone to rescue.
- Few companies write new applications from scratch, though, since it is so time consuming and expensive; rewriting now means **System Integration** — finding packages that do pieces of the work, then using middleware tools to link them together.
 - ◆ This is akin to realizing the location of a house is perfect, but the house is not, so it is torn down and rebuilt.

Measuring the Benefits of Systems

- Measuring the value of Information Systems seems to be a continuing request
 - ◆ Never mind that the Internet has changed the world or that e-commerce and e-business are impossible without computers
- Executives want specific links between new systems and corporate financial measures
 - ◆ E.g. Increase in earnings, Shareholder value, Revenue

Measuring the Benefits of Systems

- Achieving this is very difficult because IT is only one of many factors contributing to the successful use of systems
 - ◆ E.g. the value of decision support systems and data warehouses are difficult to measure because they are intended to change such un-measurable actions as:
 - ◆ Improved decisions
 - ◆ Better identification of opportunities
 - ◆ More thorough analysis
 - ◆ Enhanced communication among people

Measuring the Benefits of Systems

- E-commerce systems, which aim to improve a firm's competitive edge or protect its market share, also elude measurement
- Infrastructure investments (upon which future applications will be built) often cannot be justified on ROI because they have none
- Three suggestions on how to deal with these measurement dilemmas:
 - ◆ Distinguish between the different roles of systems
 - ◆ Measure what is important to management
 - ◆ Assess investments across organizational levels

Distinguish Between the Different Roles of Systems

- Information systems can play three roles in a company:
 - ◆ For systems that help other departments do their job better, measure how they improve organizational efficiency.
 - ◆ For systems that carry out a business strategy, measure them by their contribution to the success or failure of that plan.
 - ◆ For systems that are sold as a product or service, measure them by their performance in the market.

Distinguish Between the Different Roles of Systems

- Measuring Organizational Performance
- Measuring Business Value
- Measuring a Product or Service



Distinguish Between the Different Roles of Systems

- Measuring Organizational Performance:
 - ◆ Meeting deadlines and milestones
 - ◆ Operating within budget
 - ◆ Doing quality work – performance measures internal efficiency of operations

Distinguish Between the Different Roles of Systems

- Measuring Business Value:
 - ◆ Deals with marketplace goals – they must have a direct impact on the company’s relationships with customers, clients, or suppliers; e.g. sales/customer

Distinguish Between the Different Roles of Systems

- Measuring a Product or Service:
 - ◆ An IS offered as a product or service to produce revenue, measured as any other business venture such as ROI

Measure What is Important to Management

- Besides financial benefits, relate proposed benefits to certain indicators can make it easier to “sell” the system to management, at both the individual and aggregate levels.
- Concentrating only on cost and monetary measures may be shortsighted; other measures can be even more important.
- Measure in terms like:
 - ◆ Customer relations and satisfaction
 - ◆ Employee morale
 - ◆ Cycle time
 - ◆ How long to accomplish a complete assignment; fast cycle time might mean higher-quality products, beating competitors to the market, winning a bid, etc.

Assess Investments Across Organizational Levels

- The Value Assessment Framework measures benefits at three organizational levels
 - ◆ Individual
 - ◆ Division
 - ◆ Corporation
- Impact focus of an IT investment extends to
 - ◆ Economic performance payoffs – market measures of performance
 - ◆ Organizational process impacts – process change
 - ◆ Technology impacts – key functionality
- Used by a trucking firm who uncovered benefits that otherwise would have gone unrealized

Do Investors Value IT Investments?

- An even more intriguing question than how business executives value IT investments is how investors value IT investments
- A study found that every \$1 invested in computers yielded up to \$17 in stock market value and no less than \$5
 - ◆ Whereas, \$1 invested in property, plant, and equipment (book value) only yielded \$1 in stock market value; and
 - ◆ \$1 investment in other assets (inventory, liquid assts, and accounts receivables) yielded only 70 cents

Do Investors Value IT Investments?

- The researchers reason that investors value \$1 spent on computers more than the other investments because it leads to organizational changes that create \$16 worth of “intangible assets” – know-how, skills, organizational structures, and such
- Investments in “organizational capital” generally lead to adopting decentralized work practices:
 - ◆ Using teams more often
 - ◆ Giving employees broader decision-making authority, and
 - ◆ Offering more employee training
- Firms with these three decentralized work practices had a market value of 8 percent higher than the mean