Learning Objectives

• Understand the major elements of information technology provisioning in organizations today.

Information System Provisioning

• systems provisioning refers to the set of processes used by IT managers in order to fulfill an organisation’s IT requirements
  – identification of an applications requirement
  – definition of the problem
  – selection of the appropriate approach to providing a solution
  – completion of the selected processes
  – installation of the solution as operational software

Systems Provisioning

• we use the term “provisioning” because systems may be provided in a range of different ways - not just as new developments
  • systems development remains a major focus but it is important to remember that development is just one alternative way to obtain a new system
  • IS skills have been defined and developed in the context of new systems development, but note that:
    > systems development skills are relevant in all cases
    > systems analysis skills are particularly important

Provisioning Methods

• Systems Development
  > Traditional approach (formal SDLC)
  > Rapid systems development
  > RAD (JAD)
  > Prototyping
  > End user systems development
• Systems Purchase
  > Purchase of a packaged solution
  > ERP a special case
  > Purchase and customization

Historic function-based systems structure

eg - invoicing, eg - credit checking
Traditional Developments

- the traditional approach was to build a system to meet specific user requirements.
- advantages included:
  - installation of “purpose-built” solutions which were specific to organizational requirements
  - being able to utilize and retain organizational knowledge
- risks with traditional developments - they can:
  - be expensive, time-consuming and quite risky to build and install
  - suffer from “scope creep”
  - require skills in short supply
  - require high levels of maintenance

Systems Development

- “software development remains an individual craft lacking in solid measurement systems, and based on weak theoretical foundations” method cannot ensure success
- “it is humanly impossible to control large projects” the more complex the project the less easy it is to keep to schedule/ budget
- these comments are from practice-oriented guidelines and indicate the extent to which IT project management remains a discipline heavily reliant on “gut feel” and experience

Information Systems Integration

- a key question in IS is that of “integrated systems”
- an integrated systems structure works off:
  - standard data structures
  - standard data definitions
  - standard process definitions
  - standard business rules
- many theorists misunderstand the complexities involved and dramatically underestimate the complexity of these issues

Benefits of Systems Integration

- standardized work practices/processes:
  - simplified training requirements
  - easier introduction of new staff to the organization
  - interchangeable staff
  - standard customer interface
  - simplified management processes
  - simplified change management
  - reduced system redundancy
  - economies of scale

Redesigned Process Structures
(with integrated systems support)

- shared automated business functions
- integrated corporate databases (common definitions)
- integrated technology infrastructure

Benefits of Systems Integration

- standardized data structures and definitions:
  - reliable data
  - consistent management information
  - consistent reporting formats and processes
  - “single-point” system changes
  - improved communications
Integrated Information Systems

- “note that there are no ‘disadvantages’ to integrated functional systems. It’s amazing that more companies didn’t have the foresight to design integrated systems”

  – (Mike Rewald - quoted Turban, McLean & Wetherbe p371)

Systems Integration

- there has been no really definitive research into systems integration, but a large company could have ~ 200 data entities and 5-6 major processes (plus many sub-processes) to consider when planning a systems integration activity

- change is the biggest enemy of large-scale systems planning - organizational data and process requirements reflect changes in the business environment and are therefore not stable

System Provisioning:
1. Project Management - Development

- good IT management consists in being aware of the critical issues and focusing on managing them well

Methodologies

- what is a methodology?
  - an organized collection of methods and techniques comprising a way to deliver a required output

- why is a methodology?
  - the provision of an expert “shell” to guide actions

- does a methodology impact on the need for experience and/or specialised skills?

SDLC (Waterfall)

Rational Unified Process

- in an iteration, you walk through all workflows
a Good Systems Development Methodology

- provides a checklist of required actions
- identifies appropriate sequences of actions
- is more like a set of heuristics (rules-of-thumb) than a set of laws
- focuses on deliverables as much as processes (some new methodologies emphasise deliverables more than processes)

Systems Development

- during the life of a development project, managers should visit (revisit) the following issues at all critical review points (review points may be at the start or finish of methodology stages, or accompany the production of specific major deliverables)
  - economic justification
  - resource allocation
  - the adequacy of the quality control processes in place (quality reviews and walkthroughs)
  - risk assessment
  - progress reviews

Managing Systems Development

- the following is a brief overview of the pragmatics of managing systems development
  - managers have to deal with complex, partially abstract products
  - reliable precedents to provide the basis for estimating are hard to find
  - the problems stem from a form of "combinatorial explosion"
- the three easy variables of project management......

The Three Key Variables

- functionality
  - effectiveness of new system: what it can do
- resources
  - money, people, machinery expended in development
- time
  - hours spent

Managing the three variables

- ideally a project manager will retain a substantial degree of project freedom
- "fixing" time, resources and functionality is a management recipe for disaster
- effective project management requires the ability to allow at least one of the key variables to vary

Systems Development - Resources

- managing resources
  - software products including languages, development aids, DBMS
  - hardware including processing platforms and networks
  - money
  - people including developers, user analysts and support staff
Systems Development - Time

- managing time
  - usually significantly constrained in practice
  - the 95% complete syndrome has to be accommodated
  - 1 year is usually the maximum length of time for which reasonably reliable estimates can be made in practice (in many cases, forecasts are accurate for a lot shorter period)
  - despite that, IS managers must have forecasts which are as accurate as possible
  - milestones etc. must be set to pace progress

- when the timeframe doesn’t fit the time required
  - one view is that if the timeframe won’t shift, something else has to give
  - a contrasting view is that there is a general tendency to fit the work to the timeframe rather than the reverse
    > Parkinson’s Law: “work expands to fit the time available to do it”
    > Gersick’s Law: “there is a transition point where having lots of time becomes being short of time”
    > Human propensity for “muddling through” despite normal predictions
  - the only solution is high-quality estimating plus tight management

Systems Development - Functionality

- managing functionality
  - functionality is the area of greatest uncertainty in any development project
  - functionality must be accurately documented and agreed
  - differences in understanding can surface quite late - one of the strengths of the formal SDLC is the emphasis on user agreement
  - the later the problems surface, the more expensive they are to fix (“bandaid” solutions are why there are problem areas in most completed applications)
  - reducing functionality is the basic IT management contingency strategy...

Some Notorious IS Problems

- controlling scope creep
- documentation
- estimating
- risk management

“Scope Creep”

- the tendency for the scope to increase because
  - some requirements were overlooked during the early stages
  - new possibilities are revealed as the project progresses and the role of technology becomes clearer
  - the processes of analysis and design help users to “frame” the problem better
  - problems of mutual understanding surface and have to be resolved

Documentation

- a lack of adequate documentation is a frequent issue with information systems
- the major problems with documentation are
  - maintaining its accuracy and currency when system changes are being made is difficult (unlike other engineering disciplines, many changes are made directly to the system rather than first documented)
  - much documentation is meaningful only to the original system developers, and as staff changes occur the motivation to update the documentation weakens
- time pressure
Estimating

- perhaps the most problematic area in IT management
  - experience is vital but relevant experience takes time to acquire
  - estimates need to be revisited as frequently as possible: the key to reliable estimates is constant revision
  - estimates should be prepared on a staged basis (ie first up to system requirements, then for delivery)
  - the relationship between people and progress is not linear
    > the “mythical man-month”
- formal estimating methods
  - LOC estimating
  - function point estimating (ASMA)
- “defensive” (contingency-oriented) estimating is good practice

Risk Management

- managing risk
  - the objective is to understand and manage the key risk factors
  - progress is measured according to whether the total level of risk is falling
- major risk areas
  - clients
  - management skills
  - technical skills
  - application characteristics
  - hardware requirements
  - system software requirements
  - project importance
  - quality processes are discarded as timeframes contract

Managing Systems Development

- IS project management remains an art rather than a science
- automated aids
  - can be very useful for keeping track of progress
  - can assist with estimates and timetabling
  - are not a substitute for common-sense and attention to detail
    > ie many automatically generated timetables and project charts have a very bad signal-to-noise ratio
  - “sanity” checks are critical

System Provisioning

2. Purchasing systems

The Argument for Purchase:

- IT is not a “core” organizational competence
  - which means that?
- if an organization is not an IT company, why should it build or even manage its own applications?
- but even when purchasing software, it is arguable that full-scale systems analysis should be conducted within the purchasing organization anyway

Purchasing Systems

- we are living in an increasingly automated and systematized world
- this is even more true of the business world than the world in general
- virtually all business processes are highly automated
- relatively standard “solutions” now exist for many business processes including
  - general ledger
  - financial accounting
  - personnel systems
  - materials supply and inventory management
  - telemarketing

Purchase versus Build?

- in simple terms, the question is whether to change the system or the organization
- BUT using systems to drive major organizational changes is a risky proposition
Managing Vendor Interactions

- Criteria for evaluating a candidate software package include those relating to the vendor:
  - Reputation
  - Organizational size and market presence
  - Support
  - Expertise
  - Comparison sites
  - Guarantees
  - Upgrades
  - Customization support policy

Customization

- This is where a company buys a packaged solution but wishes to make changes and retain some of the organization’s own “flavor.”
  - Customization requires the establishment of a systems development project
  - >10% change is usually high-risk and very difficult to manage in practice
  - The calculation is difficult because it is usually very difficult to tell what else will be affected once you start making changes
  - Scope-creep is very important here because of the tendency for users to prefer their own way of doing things

Controlling Customization

- It is extremely hard to control the effects of customization, irrespective of scope creep
- It is difficult to see the full ramifications of making a change to the visible outputs of a package
- For instance, changes to data items can impact on database design, and lead to radical changes in data structures and definitions (e.g., the customer file/entity)
- Once work on customization has commenced, developers frequently find that one thing is connected to another (hip-bone connected to the thigh-bone) and that change begets change
  - Changes amounting to more than 100% of the original code have been recorded

Risks of Customization

- Many of the greatest benefits of buying packages are lost
  - Support arrangements
  - Package-related technology upgrades
  - Software enhancements
  - Reliability and performance guarantees

Assignment 1

- Focus
- Research and preparation
- Organizing
- Writing
- Citations and references
- Individual topics

Assignment Focus

- Facts are only meaningful from some point of view
  - i.e.: there is no point to the mere recitation of events despite the way I was taught history
  - This is true of “real” science as much as the social sciences (e.g., the splitting of the atom)
Assignment Focus

- the first step in an assignment of this type is to decide the approach you wish to take to the topic
  - analytic
  - polemical
  - theoretical
  - look at one case or several
  - review and summary of literature
  - do not worry about disagreeing with authorities (even the lecturer)

Research and Preparation

- literature search
  - library
  - specialised indexes (academic periodicals)
  - popular press (newspapers, magazines)
  - internet
  - NB - record all sources found for the bibliography (reference list)
- personal experience may be relevant in some cases

Research and Preparation

- from your chosen perspective (see previous overhead) review and analyse the material you find
- summarise your findings so you are clear on the general direction your assignment will take

Organizing the Assignment

- all assignment submissions benefit from careful organization

Organizing the Assignment

- develop a structure in outline before commencing (eg)
  - Introduction and overview
  - explanation of your perspective/orientation/aims/objectives
  - detailed discussion of topic (including theory where relevant)
  - supporting and conflicting opinions
  - clear statement of your position (opinions) on the topic
  - conclusion (summary)

Writing

- be clear about what you are trying to present
- be concise (don’t waffle to make up the word-count)
- avoid too much repetition in the body of the text
- use short sentences for the most part
- NB – it is clear in many assignments that the student has never got round to clarifying his/her own goals - the reader reaches the end of the assignment without knowing what was intended to be the point
Citations and References (1)
- citations in the body of your submission should be made as follows
  (for books or articles)
  - (author year, page)
  - (Gould 1999, 24)
- book references
- article references

Citations and References (2)
- the same model can be used for website references if there is an author and a title
- if there is no author or title listed then for the reference list have
  - www.whatever. 2001. website name, date and time accessed.
  - in the body of the text the citation should be in the form (website-name, 2001).

Citations and References (3)
- when to cite
  - if you are stating something and want to say that it is supported by a particular authority - eg
    > the theory of punctuated equilibrium is now widely accepted by evolutionary theorists (Gould 1999)
  - if you quote something directly
    > “a yearning for the good old days infects us all, even though such times never existed outside our reveries” (Gould 1999, 339).
  - if you paraphrase something
    > Gould suggests that everybody may hanker after past pleasures (Gould 1999).

Assignment Topic – System Failure