**CHAPTER SIX: REDESIGNING THE ORGANIZATION WITH INFORMATION SYSTEMS**

After completing this chapter, you will be able to:

* Demonstrate how building new systems can produce organizational change.
* Explain how the organization can develop information systems that fit its businesses plan.
* Identify the core activities in the systems development process.
* Analyze the organizational change requirements for building successful systems.
* Describe models for determining the business value of information systems.
* Describe the different approaches to systems-building.

**6.1 Systems as Planned Organizational Change**

The introduction of new information system involves much more than new hardware and software. It also includes changes in jobs, skills, management and organization. In the concept of socio-technical, one cannot install new technology without considering the people who must work with it. When we design a new information system, we are redesigning the organization.

One of the most important things to know about building a new information system is that this process is one kind of planned organizational change. Systems builders must understand how a system will affect the organization as whole, focusing particularly on organizational conflict and changes in the locus of decision making. Builders must also consider how the nature of work groups will change under the impact of the new system.

Systems can be technical successes but organizational failures because of a failure in the social and political process of building the systems. Analysts and designers are responsible for ensuring that key members of the organization participate in the design process and are permitted to influence the ultimate shape of the system.

**6.1.1 Establishing Organizational Information Requirements**

In order to develop an effective information systems plan, the organization must have a clear understanding of both its long- and short-term information requirements. Two principal methodologies for establishing the essentials information requirements of the organization as a whole are enterprise analysis and critical success factors.

Enterprise Analysis (Business Systems Planning) is an analysis of organization-wide information requirements by looking at the entire organization in terms of organizational units, functions, processes and data elements. It helps to identify the key entities in the organization’s data. This method starts with the notion that the information requirements of a firm or a division can be specified only with a thorough understanding of the entire organization. The central method used in the enterprise analysis approach is to take a large sample of managers and ask them how they use information, where they get the information, what environments are like, what their objectives are, how they make decisions and what their data needs are. The results of this large survey of managers are aggregated into subunits, functions, processes and data metrics. Data elements are organized into logical application groups and these results will be display out in the form of chart for easier interpretation and decision making based on the survey. The weakness for this method is that is produces an enormous amount of data that is expensive to collect and difficult to analyze. Most of the interviews are conducted with senior or middle managers with little effort to collect information from clerical workers and supervisory managers. Moreover, the questions frequently focus not on the critical objectives of management and where information is needed, but rather on what existing information is used. The following table shows the topics that should be included in an information system plan.

|  |  |
| --- | --- |
| **Stages** | **Activities** |
| 1. Purpose of the Plan | * Overview of plan contents * Changes in firm’s current situation * Firm’s strategic plan * Current business organization * Key business processes * Management strategy |
| 2. Strategic Business Plan | * Current situation * Current business organization * Changing environments * Major goals of business plan |
| 3. Current Systems | * Major systems supporting business functions and processes * Major current capabilities   + Hardware   + Software   + Database   + Telecommunications * Difficulties meeting business requirements * Anticipated future demands |
| 4. New development | * New system projects   + Project descriptions   + Business rationale * New capabilities required   + Hardware   + Software   + Database   + Telecommunication and Internet |
| 5. Management Strategy | * Acquisition plans * Milestones and timing * Organizational realignment * Internal reorganization * Management controls * Major training initiatives * Personnel strategy |
| 6. Implementation plan | * Detailed implementation plan * Anticipated difficulties in implementation * Progress reports |
| 7. Budget requirements | * Requirements * Potential savings * Financing * Acquisition cycle |

Strategic Analysis or Critical Success Factor (CSF) approach argue that the information requirements of an organization are determined by a small number of easily identified operational goals shaped by the industry, the firm, the manager and the broader environment that are believed to assure the success of an organization. An important premise of the strategic analysis approach is that there are a small number of objectives that managers can easily identify and information systems can focus on. The principal method used in CFS analysis is personal interviews- three to four –with a number of top managers to identify their goals and the resulting CSFs. The strength of CSF method is that it produces a smaller data set to analyze than does enterprise analysis and will produce systems that are more custom-tailored to an organization. Another strength of CSF method is that it takes into account the changing environment with which organizations and managers must deal. Unlike enterprise analysis, the CSF method focuses organizational attention on how information should be handled. The primary weakness of this method is that the aggregation process and the analysis of the data are art forms where there is no particular rigorous way in which individual CSFs can be aggregated into a clear company pattern. Another weakness of this method is that this method is clearly biased toward top managers as their will be the ones being interviewed. Lastly, this method does not necessarily overcome the impact of a changing environment or changed in managers.

**6.1.2 Systems Development and Organizational Change**

New information systems can promote various degree of organizational change, enabling organizations to redesign their structure, scope, power relations, workflows, products and services. The following table describes how information technology is being used to transform organizations.

|  |  |
| --- | --- |
| Information Technology | Organizational Change |
| Global networks | International division of labor:   * The operations of a firm are no longer determined by location * The global reach of firms is extended * Costs of global coordination decline * Transaction costs decline |
| Enterprise networks | Collaborative work and teamwork:   * The organization of work can now be coordinated across divisional boundaries * A customer and product orientation emerges * Widely dispersed task forces become dominant work group * The costs of management (agency costs) declined * Business processes are changed |
| Distributed networks | Empowerment:   * Individuals and work groups now have the information and knowledge to act * Business processes are redesigned, streamlined * Management costs decline * Hierarchical and centralization decline |
| Portable networks | Virtual organization:   * Work is no longer tied to geographic location * Knowledge and information can be delivered anywhere they are needed, anytime * Work becomes portable * Organizational costs decline as real estate is less essential for business |
| Graphical user interfaces | Accessibility:   * Everyone on the organization – even senior executives – can access information and knowledge * Work-flows can be automated, contributed to by all from remote locations * Organizational costs decline as work-flows move from paper to digital image, documents and voice |

**6.1.3 The Spectrum of Organizational Change**

Information technology can promote various degrees of organizational change, ranging from incremental to far-reaching. There are four kinds of structural organizational change that are enabled by information technology:

* Automation involves assisting employees to perform their tasks more efficiently and effectively or in another word, using the computer to speed up the performance of existing tasks.
* Rationalization of procedures is a deeper form of organizational change that streamlines the standard operation procedures, eliminating obvious bottlenecks, so that automation makes operating procedures more efficient.
* Business process reengineering (BPR) is the radical redesign of business processes, combining steps to cut waste and eliminating repetitive, paper-intensive tasks in order to improve cost, quality and service, and to maximize the benefits of information technology. The process of streamlining business procedures so that documents can be moved easily and efficiently is called work-flow management.
* Paradigm shift is a radical re-conceptualization of the nature of the business and the nature of the organization.

The most common forms of organizational change are automation and rationalization. These relatively slow-moving and slow-changing strategies present modest return but little risk. Faster and more comprehensive change like reengineering and paradigm shift carry high rewards but offers a substantial chance of failure. BPR and paradigm shift often fail because extensive organizational change is so difficult to orchestrate.

**6.2 System Development Process**

System development refers to all the activities that go into producing an information systems solution to an organizational problem or opportunity. System development is a structured kind of problem solving with distinct activities. The core activities in system development will be described briefly in the following table.

|  |  |
| --- | --- |
| **Process** | **Activities** |
| Systems analysis | * Is the analysis of the program that the organization will try to solve with an information system * Consists of defining the problem, identifying its causes, specifying the solution and identifying the information requirements that must be met by a system solution * Produces feasibility report which addresses three major area – technical, economic and operational |
| Systems design | * Is the details how a systems will meet the information requirements as determined by the systems analysis * Can be broken into logical and physical design * Logical design lays out the components of the information system and their relationship to each other as they would appear to us * Physical design is the process of translating the abstract logical model into the specific technical design for the new system |
| Programming | * Is the process of translating the system specifications prepared during the design stage into program code |
| Testing | * Is the exhaustive and thorough process that determines whether the system produces the desired results under known conditions * Can be broken into unit (program), system and acceptance testing * Unit testing (program testing) is the process of testing each program separately in the system * System testing tests the functioning of the information systems as a whole in order to determine if discrete modules will function together as planned * Acceptance testing provides the final certification that the system is ready to be used in a production setting |
| Conversion | * Is the process of changing from the old system and the new system * Four main conversions involved – parallel, direct, phased and pilot * Detailed documentation will be produced |
| Production | * Is the stage after the new system is installed and the conversion is completed * During this time, the system is reviewed by users and technical specialists to determine how well it has met its original goal |
| Maintenance | * Are the changes in hardware, software, documentation or procedures to a production system to correct errors, meet new requirements or improve processing efficiency |

Each of the core system development activities entails interaction with the organization.

**6.3 Building successful systems**

From an organizational and behavior point of view, the major causes of information systems failure are:

* Insufficient or improper user participation in the systems development process.
* Lack of management support.
* Poor management of the implementation process.
* High level of complexity and risk in the systems development projects.

Implementation is the entire process of organizational change surrounding the new information system. Different patterns of the implementation should be analyzed in order to understand system’s success or failure. Relationship between participants (system designers and end users) is practically important in the whole process of implementation. Besides that, the support and control from management of the implementation process are an essential part as it acts as the mechanisms for dealing with the level of risks (determined by project size, structure and experience with technology) in each new system.

The business value of information systems can be determined using the following models:

* Capital budgeting like cost/benefit ratio, net present value and return on investments (ROI).
* Portfolio analysis and scoring analysis includes non-financial considerations and can be used to evaluate alternative information systems projects. Figure 6.2 below shows a system portfolio where companies should examine their portfolio of projects in terms of potential benefits and likely risks. Certain kinds of projects should be avoided altogether and others developed rapidly. There is no ideal mix and companies in different industries have different profiles.

Cautiously examine

Identify and develop

Routine projects

Project risk

High

Low

Low

High

Potential benefits to firm

*Figure 6.2*

Avoid

**6.4 Approaches to Systems-Building**

Different approaches are being used in building a system. The advantages and disadvantages of these approached will be as follow:

|  |  |  |
| --- | --- | --- |
| Approach | Advantages | Disadvantages |
| Traditional systems lifecycle   * Project definition * System study * Design * Programming * Installation * Post-implementation | * Useful for large projects that need formal specifications and tight management control over each stage of systems-building | * Rigid and costly * Not-well suited for unstructured, decision oriented applications |
| Prototyping   * Builds an experimental system rapidly and inexpensive for end users to interact with and evaluate | * Encourages end-user involvement in system development and iteration of system until specifications are captured accurately | * Rapid creation of prototype can results in systems that have not been completely tested or documented |
| Application software | * Eliminates the need for writing software programs * Cuts down on the amount of design, testing, installation and maintenance work | * To meet organization requirements, packages may require extensive modifications that can raise development costs * Cannot provide customized solution * Cannot adopt to changes easily |
| End-user development | * Improved requirements determination * Reduced application backlog * Increased end-user participation and control of systems development process | * Propagates information systems and data sources that do not necessarily meet quality assurance standard and not easily controlled |
| Outsourcing | * Save application development costs * Allow firm to develop applications without an internal information systems staff | * Firms lose control over their information systems * Too dependent on external vendors |