
UNIT 1 PORTFOLIO MANAGEMENT AND IT APPLICATIONS

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1.0 INTRODUCTION

A process can be used gainfully only when it is understood well, in this unit you will be made familiar with the objectives, steps, methods and gains of the portfolio management. This unit takes you through the first, and ultimately the most empowering, phase in portfolio management implementation. You will learn why establishing a portfolio management team with well-defined roles and responsibilities is critical. You will also gain an understanding of why it is crucial to carefully define the portfolio management process and choreograph its interrelationship with the budgeting process, the project proposal process, and other existing business processes.

You will learn how to apply these concepts in an operational organisation. This unit provides an understanding of the value of a portfolio management solution and offers insight into the types of functionality that must be inherent in such an application.

The world is getting increasingly interconnected and information is now centralised and we see businesses being pushed to the edge of the networks. In order to race to the market, security, and controls over such critical information tend to get overlooked.

This translates into issues related to confidentiality, integrity and availability of information — key controls in the information economy. Effective information risk management therefore assumes critical importance. Not only risk needs to be minimized but there is strong need for readiness for the disaster recovery. In this unit you will gain an insight for meeting these challenges.

1.1 OBJECTIVES

After going through this unit, you should be able to:

- define the portfolio management;
- explain the portfolio management methods and implement it;
- define the risk management and will be able to plan to alleviate it;
- explain disasters management;
- appreciate the challenges and issues of the portfolio management;
- select the tools of the portfolio management suiting the requirement, and
- Appreciate the emerging technologies.



1.2 WHAT IS PORTFOLIO MANAGEMENT

Portfolio Management is a process which facilitates determining the right (project) investments mix, i.e., deploying limited resources to maximize business performance, which is a key management challenge. Most capital investment activities take the form of projects that need to be managed as part of a portfolio. Project portfolio management entails balancing resources, business needs, business risks and changing parameters, while at the same time maximizing the return on (project) investment.

Portfolio Management was originally coined in the financial and investment community, and the term was used for the process of managing the assets of a mutual fund; including choosing and monitoring appropriate investments and allocating funds accordingly.

The adoption of the terminology into other industries such as real estate resulted in a modification of the term to reflect industry specific purposes. Similarly, within the technology sector, the term now applies to a set of projects or programs grouped collectively and monitored. We can define portfolio management as the expression of the alignment of the corporate and IT strategic plans, viewing the portfolio as a suite of complementary investments that collectively provide the best possible allocation of resources to meet the business needs of the corporation.

Portfolio Management (PM) applications integrate all project-related informations within a single, web-based enterprise solution. Organisations use PM solutions to better align and manage their projects, people, and partners so that they can achieve greater return on their portfolio of investments.

Basically, Portfolio Management is a discipline used to ensure that a correct mix of investment activity is initiated, grouped, funded and managed. Technology assets are categorised as an investment portfolio allowing for:

- Investment bundling
- Prioritisation
- Evaluation
- Decision insight and support
- Balance between timing, current needs, and future requirements

Considering the complexities, the problem of managing the technology portfolio is broken into set of smaller problems to facilitate analysis. Among the issues to be considered when discussing the technology portfolio are:

- Technology / business alignment
- Investment balance
- Resource management
- Negotiation between competing projects or goals
- Risk mitigation and management
- Technology performance and reporting

Considered as part of the whole, each contributes to the overall portfolio. Considered independently, each is both a manageable problem and a powerful tool.

Portfolio Management Objectives allow the organisation to be focused, fast, and agile. Achieving these high level objectives necessitates a variety of inter-related steps. These include the following:

- **Grouping:** Synergies between technology spending plans with business strategy;



- **Investment Focus:** Viewing expenditures (human, asset, capital) as investments. This also includes a process to track performance;
- **Governance:** Process for making IT investment decisions;
- **Cost Control:** Understanding the main drivers of IT costs for restraint purposes, and
- **Efficiency:** Use of financial resources efficiently, leveraging wherever possible.

Various methods are used to create and balance the portfolio, ranging from highly strategic to tactical:

Financial portfolio analysis: Balance and risk mitigation is achieved by spreading investments over a number of different initiatives. Projects are balanced across a number of categories that can include strategic or business objectives, compliance or required maintenance and research and development. Depending on the organisation's objectives, this allows steering committees to incur the least risk and take advantage of market dynamics.

Top down / bottom up: Companies either apply the big picture of top-down thinking that looks at growth, or how dual projects or business unit objectives provide benefits in bottom-up planning. Both exercises are popular with immature project organisations. However, if conducted separately in a vacuum, it provides a restricted view of the inter-relationships of projects to the organisation. A combined top down/bottom-up approach is the desired solution for such an endeavor.

A variety of **Portfolio Management Benefits** are possible for the organisation successfully executing a PM initiative. Chief among these is the expression of value in business terms.

Other key benefits include:

- Insight into schedule / budget variance
- Return on investment calculations
- Increased resource utilisation and reduced headcount
- Extrapolating financial benefits of a project
- Project interventions and results
- Discontinued projects or corrective measures as necessary

Ultimately, a portfolio management for technology organisations will offer IT management and a sense of symmetry with business objectives; like, a project selection approach based on hard data and the metrics, costs, budgets, and other objective criterias.

It should be noted, however, that as long as IT continues to plan at the individual initiative level, the tactical and reactive nature of most IT organisations would remain. Effective portfolio planning and management bridges the gap towards flexibility and risk mitigation.

There are five primary **value addition** propositions that can be achieved with the implementation of a PM solution. These include:

- **Align Business Strategy and Execution:** Integrate executive guidance (portfolio and financial plans), line sponsorship and project-level execution so that you do the right work;
- **Plan and Execute effectively and efficiently:** Standardise workflows and automate business processes so that you can do the right work faster;



- **Leverage Resources (People, Partners, Money and Assets):** Manage resources across the enterprise and around the world so that you use the right resources;
- **Make global teams more productive:** Share and reuse information, work products and templates so that you do the work right, and
- **Improve visibility and control:** Gain organisational transparency so that you can identify and solve problems early.

The market for Portfolio Management solutions is full of competitive offerings. It is important that PM software evaluations base evaluation criteria on value versus just features and functions. Traditional feature / function evaluation approaches can mislead an organisation to select an application that does not deliver a return on investment, or worse yet, provide a stopgap solution to only part of the problem.

Portfolio Management Requirements that must be available in the offered / selected PM solution can be judged based on recognising the importance of achieving value and measurable return on investment and variety of features and functions which must be present in the PM solution.

These can be broadly categorized into four functional areas:

- Budget and Financial Management;
- Business Planning and Portfolio Management;
- Project and Resource Management;
- Collaboration and Knowledge Management.

The **budget and financial management** functionality of a PM solution should integrate with existing financial and Enterprise Resource Planning (ERP) applications to provide the organisation with real-time project-based budget and financial management capabilities. Easy access to accurate project-based financial information is mandatory so that the organisation can make better and faster business decisions and invest money for maximum return. Functionality should also be provided to automate traditionally manual processes so that resources previously wasted on redundant data entry, manual analysis of project cost estimates, actual time and expenses can be redeployed.

Benefits that should be enabled by the application include the ability to:

- Align spend with projects of greatest return;
- Utilise project-based budgets to make better decisions;
- Manage project budgets against financial objectives, and
- Make project budgets transparent to sponsor organisations.

Functionality required while delivering the above value and benefits include:

- Project and Resource-driven Budget and Approval Process;
- Budget by project, initiative and organisation;
- Budget billable and non-billable projects;
- Budget revenue and expense;
- Configure budget rules;



- Define multi-year and rolling budgets;
 - **Comprehensive Rate Management:**
 - Define flexible rates for budget;
 - Establish multiple rate hierarchies;
 - Use the same or different rates for actual;
 - **Integration:**
 - Integrate with third-party general ledger systems, including providing and sponsoring cost center transactions;
 - Perform prior period adjustments;
 - Align budget management with project management;
 - **Chargeback:**
 - Budget project chargeback to sponsoring organisations;
 - Incurred vs. budgeted cost chargeback;
 - **OLAP Reports:**
 - General ledger cost analysis;
 - Actual vs. total budget;
 - Project detail cost analysis;
 - **Additional Financial Management Functionality:**
 - Inclusion of capital expenditures in non-labour expenses;
 - Incremental project funding;
 - Major expenditure requests;
 - Real-time data vs. historical data views;
 - View-based (resource, cost center, or organisation) breakdown of labour components salary, fringe, etc.

As an example, budgeting is a relatively mature process within the majority of organisations. However, the corporate requirement to ensure alignment with changing business and economic condition necessitates a continuous re-budgeting in order to remain competitive. As a result, thousands of hours of time, effort and paper are required to keep budget data current and aligned.

In the ‘bottom-up’ and ‘top-down’ budgeting method, an easy way to understand look and feel can be provided. Top-down budget amounts are provided by the sponsoring organisation, and subsequently, the budget layers are built up project-by-project, program-by-program. It is vital to note that budgeting is conducted at the work level, not the cost-center level, thereby ensuring accuracy. The system also feeds the corporate budgeting system, thus allowing management of both the provider side and the consumer side.

Another critical feature facing the financial severity is funding. This notion provides the benefit of releasing the total money associated with a project. Thus, a project with a large budget may only receive a portion of the allocated funding in the initial stages, with the balance released upon completion of defined milestones. This allows project sponsors to effectively govern the distribution of funds and re-allocate funds midstream if necessary. Funds can be allocated in stages and even from other projects.

The **business planning and portfolio management** aspects of a PM application should enable the organisation to define, evaluate, and monitor their portfolio of projects for maximum return on investment. Organisations should be able to use this functionality to establish the definition, scope, risks and expected return for their portfolio of projects. In addition, they should be able to model new and existing projects to determine the optimum portfolio mix that maximizes their investment return.



Once portfolios are defined and prioritised against corporate objectives, organisations should be able to monitor project portfolios through customisable views. With real-time access into performed project work and planned project resources, organisations should be able to use the PM application to ensure their portfolio of projects, remains aligned with corporate objectives, identify and resolve project risks and resource bottlenecks, and proactively make decisions to maximise return on investment and minimize time to market.

Benefits that should be enabled by the application include the ability to:

- Select the most important projects;
- Establish the right definitions of project success;
- Monitor project performance against objectives;
- Re-align projects when market conditions change, and
- Cancel low priority and failing projects quickly.

Functionality required delivering the above value and benefits include:

- **“What if” scenario modeling / Sensitivity Analysis:**
 - Compare portfolio plans against current operating plans
 - Analyse the impact of new projects on the portfolio
 - Drag and drop schedules
 - Create multiple versions of project portfolio to compare against supply
- **User-defined views:**
 - By project (past, in progress, or planned)
 - By resources (staff, skills or budget)
 - By schedule (past, current, or projected)
- **Multiple criteria based views:**
 - Actual vs. planned
 - Actual vs. budget
 - Actual vs. schedule
- **OLAP Reporting:**
 - Project work by project type
 - Planned vs. actual work
 - Project work by project priority
 - Track initiative status
 - View initiative projects at a glance
 - View initiatives in Gantt charts
- **Simulating projects:**

The **project and resource management** component of a PM application should provide a single record of all project-related activity so that project stakeholders at all levels are equipped with relevant and actionable information to make better and faster decisions throughout the project management lifecycle. It should enable an organisation to build project plan with speed and precision while utilizing fewer and lower cost resources.

Benefits that should be enabled by the application include the ability to:

- Manage project plans to objectives;
- Communicate and monitor work for better results;
- Identify and resolve problems early;



- Manage dependences across projects;
- Assign the right people to the right projects;
- Fully utilize FTEs and reduce contractor costs;
- Leverage resource talent across your global enterprise, and
- Take advantage of resources in lower cost geographies.

Functionality required delivering the above value and benefits include:

- **Initiative Management:**
 - Set up unlimited hierarchical relationships initiatives, programs and projects
 - Monitor initiative home pages and configurable dashboards
 - Define initiative charters and goals
 - Track initiative risks and issues
 - Run initiative reports
 - Track initiative status
 - View initiative projects at a glance
 - View initiatives in Gantt charts
- **Project Management:**
 - Establish customizable project home pages
 - Define project charters and goals
 - Define project team members and stakeholders
 - Plan, assign and monitor tasks, deliverables, and milestones
 - Plan and monitor dependencies within and across projects
 - Define project impacts and drivers
- **Risk and Issue Management:**
 - Define and monitor risks and issues
 - Assign issue and risk actions
 - Status issues and risks
 - Identify common risk and issues across projects
- **Resource Management:**
 - Define hierarchical skills profiles for resources
 - Request and allocate resources
 - Allocate resources based on weighted proficiencies
- **Time and Expense:**
 - Record time and expenses for project tasks
 - Route time and expense approvals
 - Lock approved timesheet data
 - Capture and report non-billable time and expenses
 - Establish user-defined billable hour maximums
 - Report on missing timesheets
 - Configure alerts for timesheets that are overdue or await
 - Define timesheet periods
 - Billable vs. non-billable time tracking
- **Microsoft Project and Project Server Integration:**
 - Synchronized project, task and resource management
 - Integrated OLAP reporting
 - Shared configuration and security administration
 - Configurable field mapping.

Collaboration and Knowledge Management capabilities that span the processes of portfolio, budget, project, resource, and external relationship management must be available in the Portfolio Management Software selected. A Web-based user interface



is necessary to enable organisations to seamlessly collaborate and share project-related information across internal and external project teams.

Benefits that should be enabled by the application include the ability to:

- Establish a single source for all project-related information,
- Empower project teams with relevant and actionable information,
- Collaborate seamlessly across geographies and business partners.

Functionality required to deliver the above value and benefits include:

- **Customized Home Pages:**
 - Organisational, initiative, project, and individual views
- **Knowledge Sharing across the Extended Enterprise:**
 - Document management including check-in/check-out and version history
 - Templates of standard documents, plans, and budgets
 - Forums for threaded discussions
 - User-configurable views
 - Email documents
- **Role-based User Support:**
 - IT, R&D, financial and line of business executives
 - Project managers
 - Global project team members
 - Customers
 - Partners
 - Contractors and service providers
- **Comprehensive Reporting:**
 - OLAP reports
 - Standard reports
 - Crystal reports
 - Adhoc reports
 - PowerPoint charts
- **Security Administration:**
 - Password composition and frequency restrictions
 - Exportable login audit log

The Role of Services is critical in the successful implementation of a PM solution. Issues including integration with ERP applications, backend databases, as well as the skill and expertise required to deliver the above, are crucial aspects of a PM vendor's strength.

Each step in the implementation process must be designed to deliver incremental benefits, even those before the sales commitment. This allows for the enterprise to achieve more value sooner, however a traditional "big bang" that takes longer to implement, reduces total value, and has a higher risk.

The software must provide tools to enable services team to develop and provide detailed work plans, monitoring progress via weekly status reports, maintaining logs of issues and risks, and ensuring oversight of bug and enhancement requests. As part of the transition management strategy, the team should conduct extensive executive workshops and interviews, executes upon a comprehensive communications plan, and delivers upon a value assessment.



Another key ingredient in any successful software implementation is end user acceptance and usage. In a nutshell, **Transition Management** is the process of deliberately influencing the human, organisational and workflow aspects associated with a change or introduction of technology to achieve the desired results. This notion must be integrated into the overall implementation process. By ensuring that the enterprise quickly and effectively adopts its new technology, productivity as an organisation and more competitiveness in their industry is within reach.

Enterprises should look to realize the following benefits from a transition management effort:

- Broadened ownership of implementation success across organisations by creating goal alignment through early, end-user involvement;
- Minimized organisational barriers to success by identifying and mitigating organisational issues that will either lengthen the implementation or jeopardize its success;
- Improved organisational knowledge and skills for the new environment, as well as increased organisational effectiveness during implementation;
- Accelerated attainment of projected benefits by focusing on post-implementation issues like user acceptance, productivity, and human performance support, and
- Pass on ownership feeling to the end-user at the early stage of the project.

1.3 DESIGN AND IMPLEMENTATION OF PORTFOLIO MANAGEMENT

Before we get into the Design and Implementation of Portfolio Management, let us look once again at the benefits expected from the implementation of the Portfolio Management. These are:

- Maximize value of IT investments while minimizing the risk;
- Improve communication and alignment between Information System group and business leaders;
- Encourage business leaders to think “team,” not “me,” and to take responsibility for projects;
- Allow planners to schedule resources more efficiently;
- Reduce the number of redundant projects.

There’s no single right way to do IT portfolio management. Vendors, consulting companies and academics offer many models, and often companies develop their own methodologies. Off-the-shelf software is available from a variety of vendors but there are plenty of hurdles to doing it well. There are, however, best practices and key logical steps that can be learned from the organisations which have integrated portfolio management into the fabric of IT management.

Here are the key steps in creating and managing the IT investment portfolio based on the experience of gained from several companies.

Step 1 Assemble: Project Inventory

Portfolio management begins with gathering a detailed inventory of all the projects in the company, ideally in a single database, including name, length, estimated cost,



business objective, ROI and business benefits. There are MNC's who maintain a global database of all its IT projects using software from established IT vendors.

In addition to project plan information, all company users—which may be in thousands from various regions and countries—will have to add weekly updates on how much time they spend working on projects. This is used to gather information on resources.

Creating a project portfolio inventory can be painstaking but is well worth the effort. For many companies, it may be their first holistic view of the entire IT portfolio and any redundancies. A good inventory is the foundation for developing the projects that best meet strategic objectives.

Step 2 Evaluate: Identify Projects that Match Strategic Objectives

A logical starting point creates a product strategy — markets, customers, products, strategy approach, competitive emphasis, etc

The next step involves establishing a portfolio process. The heads of business units, in conjunction with the senior IT leaders in each of those units, compile a list of projects during the annual planning cycle and support them with good business cases that show estimated costs, ROI, business benefit and risk assessment. The leadership team vets those projects and shifts out the ones with questionable business value.

Next, a senior-level IT steering committee made up of business unit heads, IT leaders and perhaps other senior executives meets to review the project proposals; a good governance structure is central to make this work. Portfolio management without governance is an empty concept conversely; putting portfolio management in place can force companies with weak governance structures to improve them.

One of the core criterion for which projects get funded is how closely a project meets a company's strategic objectives for the upcoming year. For this purpose an executive leadership team, which may include the CEO, may create strategic initiatives, such as CRM or organisational excellence. The IT governance council, made up of business leaders and senior IT leaders, then may evaluate projects based on how well they map against those initiatives. It is worthwhile to assess risk from a technology point of view, a change-management point of view, the number of people that a project will impact and whether it will involve huge reengineering. Using methodology borrowed from the product development group (modified for IS, but keeping terminology that business executives are familiar with), projects are may be placed “above the line”—those that should be funded, or “below the line”— those that shouldn't.

A project portfolio review board (comprising of senior officers / departmental heads) may further evaluate the project opportunity assessment for every proposal.

A good evaluation process can help companies detect overlapping project proposals up front, cut off projects with poor business cases earlier, and strengthen alignment between IS and business executives.

Step 3 Prioritize: Score and Categorise Projects

After evaluating projects, most companies will still have more than they can actually fund. The beauty of portfolio management is that ultimately, the prioritisation process will allow you to fund the projects that most closely align with your company's strategic objectives.

Next, the projects are required to be placed into portfolios—multiple portfolios may be a good idea in many companies because they allow alike projects to be pooled together.



In case of the large technology portfolio, its management team—made up of project sponsors, function managers (for example, representatives from engineering, financial services and operations, and CEO himself) and product portfolio managers (people with long-term project leadership responsibilities in areas such as services or data management)—may vet projects and come up with a list for the portfolio team to score.

They then prioritised them using a model that has four key tenets:

- a) **Identify four to seven strategies:** For example, limiting technology risk and increasing the reliability of the infrastructure.
- b) **Decide on one criterion per strategy:** For example, the team decided the criterion for limiting technology risk would be whether the technology had been implemented in a comparable organisation and the benefits could be translated to the company easily.
- c) **Weigh the criteria:** Allocate the weight to each criteria.
- d) **Keep the scoring scale simple:** Many companies use a scale of one to five. For the technology risk strategy, five might mean that it has been used in a comparable organisation and the benefits could be transferred easily; three could mean it's hard to do because it would require changing processes; one might mean they haven't seen it work anywhere else.

Following the scoring, the team may draw a line based on how many projects it could do with existing resources. In the case of the large technology portfolio, the line may be calculated where demand (the list of projects) meet supply (resources—in this case, the cumulative money value of available application engineers plus overhead); the line may be a little less than halfway down the list. Those projects above the line could be taken up immediately.

There is no one method to categorise IT investment portfolio. One approach is to categorise it as you would do with your own financial portfolio, balancing riskier, higher reward strategic investments with safer categories, such as infrastructure. Some companies recommend a portfolio divided into three investment categories: running (keeping the lights on), growing (supporting organic growth) and transforming the business (finding new ways of doing business using technology). Those categories can then be cross-tabulated with four to five value-focused categories, such as how those investments support revenue growth, reduce costs or grow market share.

In another model, based on their the previous experience, companies view their IT portfolios on multiple levels and at different stages, by visualising their investments in aggregate and placing them in four categories, with the per cent of IT expenditures apportioned across each. For example they may have 5 per cent [of the projects] in strategic areas, 15 per cent to 20 per cent in the informational category, and the remaining percentage split between the infrastructure and transaction modules,

The payoffs that come from a thorough evaluation and prioritisation process is the primary reason portfolio management is so effective. Firstly communication between IS and business leaders improves, and portfolio management gives business leaders a valuable, newfound skill—the ability to understand how IT initiatives impact their companies.

Secondly, business leaders think “team,” not “me,” and take responsibility for projects. One tried-and-true method for how a business leader got money for his unit's projects was to scream louder than everyone else. Portfolio management throws that practice out the corner office window; decisions are made based on the best interests of the company.



Thirdly, portfolio management gives business leaders responsibility for IT projects. No longer the IT persons had to sell these IT projects to the business. For example a project for marketing, it's the marketing executive who has to sell the project to the rest of the team. In the changed scenario, (instead of the technology people who were earlier proposing the projects) now the businesspeople propose the projects and [take responsibility] for risk profiling, ongoing operational costs and timeliness of delivery.

Finally, everybody knows where the money is flowing and why, which is especially important to CEOs and CFOs who are increasingly demanding that technology investments deliver value and support strategic objectives.

Step 4 Review: Actively Manage the Portfolio

A top-notch evaluation and prioritisation process is ineffectual rather quickly if the portfolio is not actively managed following approval of the project list. Doing that involves monitoring projects at frequent intervals, at least quarterly (preferably it should be monthly), the project management office is required to get financial and work progress perspective updated from project leaders. This information is required to go into a database, from where the project inventory and its status is circulated to all concerned. Some of the companies assign project status—green (good), yellow (caution) or red (help!)—and include an explanation of the key driver causing a yellow or red condition. The IT steering committee meets once a month to make decisions to continue or stop initiatives, assess funding levels and resolve resource issues.

Monitoring project portfolios regularly also means projects that have run off the rails can be killed more easily. “People have an aversion to stopping projects, but the majority of projects which are canceled are done because there's a change in company strategy—a change in priority or direction. For example, if there's a strategy decision to focus on SAP, then it makes sense to cancel a new system that interfaces with PeopleSoft.

Portfolio management is a good thing. But getting to nirvana requires a serious commitment from both the business and IS sides, as well as a whole lot of sweat equity. Here are some of the pitfalls and ways to overcome them.

- **Democracy is not easy:** Taking power away from business leaders accustomed to calling the shots will not always go smoothly.
- **Group decision:** Business leaders who didn't have decisions scrutinized previously now are [having] decisions decided by group consensus, people realize it does work and that group of people can make better decisions than one or two making unilateral decisions.
- **There's no single software that does everything:** “There are really good budget packages, resource management packages and fairly good portfolio management packages, but no package that ties it all together.”
- **Getting good information isn't easy:** Take, for example, the transparency of the cost structure. There has to be good information around all technology costs and investments
- In addition, **database must be updated regularly**, so that there continuous flow of status of each project to the concerned persons to enable them to react quickly to market changes.
- **It's still hard to make tough decisions on whether to undertake—or cancel—projects:** as an organisation has a tendency to say, we shall figure out a way to make those work.”
- **It's an additional time constraint on busy executives:** Good portfolio management means good IT governance means regular IT governance committee meetings. Just about every company today has its people stretched.



1.4 PORTFOLIO MANAGEMENT METHODS

We have gone through the implementation of portfolio management at Para 5.3 above. The basic steps for implementation are:

- 1) Collect / identify all ongoing and proposed projects / opportunities.
- 2) Out of the list compiled at a) above, identify/evaluate projects/opportunities which meet strategic requirement of the company.
- 3) Prioritize as per the score & categorize these projects/opportunities.
- 4) Review the projects/opportunities for adoption plan and monitor their implementation.

Each of the above steps can be carried out by different methods. In fact Portfolio Management vendors, not only present their own variant of methods in their packages, but these packages have some minor variations in sequence of these steps also. We will be discussing some of the common methods for each of these steps.

Step 1: Collect information on all projects (on-going and planned): In this step goal is to collect all relevant information on the projects like, status of the project, resources used and required for completion of the project, project schedule and the risk factor involved. Methods used for this are:

- **Central repository** based present day systems which collect data in formats generated (based on initial key information / data entered) by the system and stored in the data base.
- **Conventional procedures** of project management, wherein data is entered for each project and stored in a common database.

Step 2: Evaluate for Strategic Compliance: A logical starting point for this step is to create a product strategy — markets, customers, products, strategy approach, competitive emphasis etc. Some companies define these strategies in terms of Key Performance Indicators (KPIs). Once strategy is defined then each identified project / opportunity is evaluated against strategy to determine if those opportunities are in line with the corporate strategic direction. In a sense, this may be the identification and initial screening of projects before more in-depth analysis is conducted. The questions asked are: What is the project? Does the project fit within the focus of the organisation and the business strategy and goals? This evaluation is done in two manners: (a) Tactical Evaluation, and (b) Financial Evaluation.

a) Tactical Evaluation

- **Top-down, strategic buckets:** Begin at the top with your business's strategy and from that, the *product innovation strategy* for your business – its goals, and where and how to focus your new project efforts. Next, make splits in resources: 'given your strategy, where should you spend your money?'. These splits can be by project types, product lines, markets or industry sectors, and so on. Thus, you establish *strategic buckets* or envelopes of resources. Then, within each bucket or envelope, list all the projects – active, on-hold and new – and rank these until you run out of resources in that bucket. The result is multiple portfolios, one portfolio per bucket. Another result is that your spending at year-end will truly reflect the strategic priorities of your business.
- **Top-down, product roadmap:** Once again, begin at the top, namely with your business and product innovation strategy. But here the question is: 'given that you have selected several areas of strategic focus – markets, technologies or product types – what major initiatives must you undertake in



order to be successful here?'. It's analogous to the military general asking: given that I wish to succeed in this strategic arena, what major initiatives and assaults must I undertake in order to win here? The end result is a mapping of these major initiatives along a timeline – the project roadmap. The selected projects are 100% strategically driven.

- **Bottom-up:** “Make good decisions on individual projects, and the portfolio will take care of itself” is a commonly accepted philosophy. That is, make sure that your project gating system is working well – that gates are accepting good projects, and killing the poor ones – and the resulting portfolio will be a solid one. Even better, to ensure strategic alignment, use a scoring model at your project reviews and gates, and include a number of strategic questions in this model. Strategic alignment is all but assured: your portfolio will indeed consist of all “on strategy” projects (although spending splits may not coincide with strategic priorities).

b) Financial Evaluation

It is to further define the project (if needed) and to analyze the details surrounding its utility. The utility of a project captures the usefulness of the project, its value, and is typically defined by costs, benefits, and associated risks. The questions to ask are: Why should this project be pursued? What is the usefulness and value of the project? Several things are to be considered. Establish criteria and develop a model to support decision making; Make sure accurate data is available to make decisions. Establish a process to analyze the project information; uniformly apply the methodology across the organisation. The different methods for valuation are:

- **Net Present Value (NPV):** In this method for each project NPV is determined which is divided by the key or constraining resource. For example for the Project A NPV will be divided by X where X is costs still left to be spent on the project A.; that is, Portfolio Index of this project will be NPV/X . Some of the companies multiply this factor by probability (say P) of completion of the project. Then Portfolio Index will be $NPV * P / X$. Projects are rank-ordered according to this index until out of resources, thus maximizing the value of the portfolio (the sum of the NPVs across all projects) for a given or limited resource expenditure.
- **ECV:** The Expected Commercial Value method uses decision-tree analysis, breaking the project into decision stages – e.g., Development and Commercialisation (*Figure 1*), define the various possible outcomes of the project along with probabilities of each occurring (for example probabilities of technical and commercial success). The resulting ECV is then divided by the constraining resource (as in the NPV method), and projects are rank-ordered according to this index in order to maximize the portfolio index. The method also approximates *real options theory*, and thus is appropriate for handling higher risk projects.

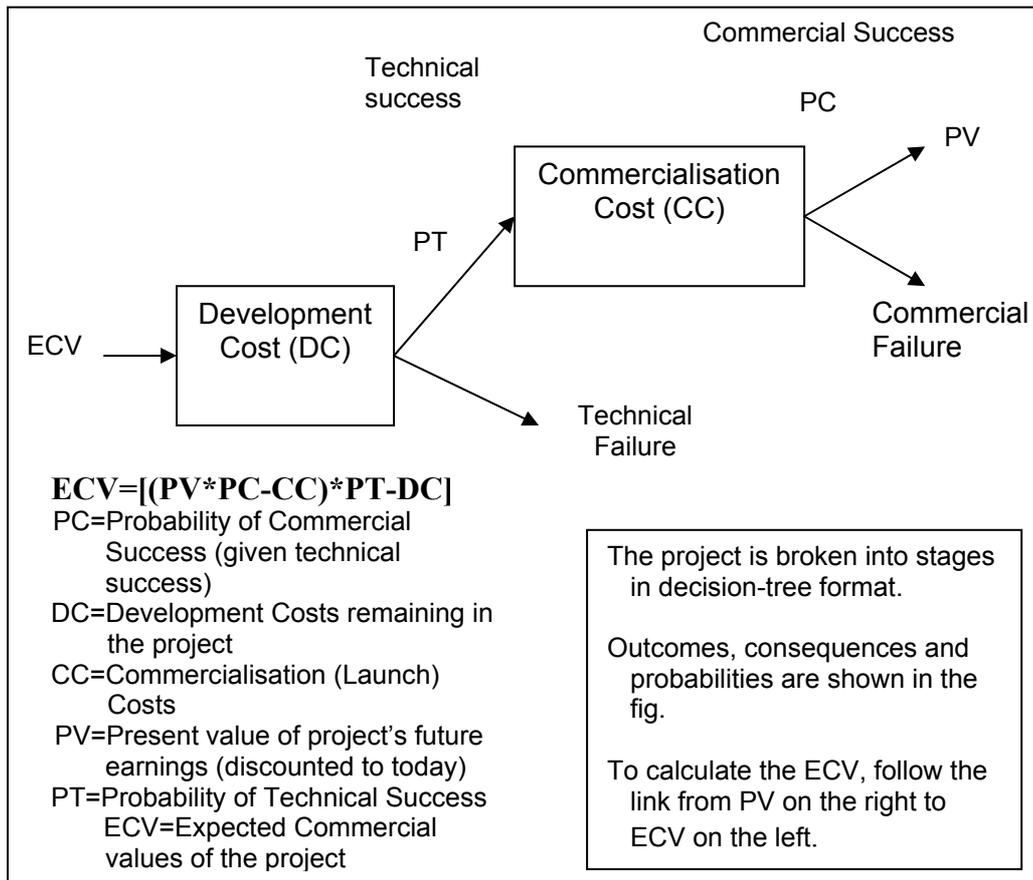


Figure 1: Calculation of expected commercial value of project

Step 3. Prioritizing and Balancing: The third major area of portfolio management is the development and selection of the project portfolio. The questions to ask are: Which projects should be selected? How does the project relate to the entire portfolio, and how can the project mix be optimized? Several things need to be considered: Establish a process that will help optimize the portfolio not just the individual projects. Establish portfolio decision meetings to make decisions.

Seek Balance in Your Portfolio: Here, the goal is to achieve a desired balance of projects in terms of a number of parameters; for example, long term projects versus short ones; or high risk versus lower risk projects; and across various markets, technologies, product categories, and project types (e.g., new products, improvements, cost reductions, maintenance and fixes, and fundamental research). Pictures portray balance much better than do numbers and lists, and so the techniques used here are largely graphical in nature. These include:

- *Scoring model:* Decision-makers rate projects on a number of questions that distinguish superior projects, typically on 1-5 or 0-10 scales. Add up these ratings to yield a quantified project usefulness score, which must clear a minimum hurdle. This Score is a proxy for the “value of the project” but incorporates strategic, leverage and other considerations beyond just financial measures. Projects are then rank-ordered according to this score until resources run out. A typical scoring scheme is shown in *Figure 2*.



Criteria	Scores	weight	Partition	Rapid part	Growth	Sequence	Average Score	Weight	Weight age
Strategic alignment									
Production business limit	7		8	6	8	8	7.5	5%	12.4
Product manufacturing	7		9	7	6	7	7.6	6%	5.6
Product support	7		8	6	7	6	7.3	7%	6.3
Product Knowledge									
Customer needs	8		7	7	5	7	7.6	12%	5.6
Product preparation	8		7	8	5	5	7.4	8%	5.3
Market Effectiveness									
Market criteria	9		8	8	4	8	7.6	7%	3.7
Market policy	8		6	6	7	8	7.2	5%	6.2
Risk									
Types of risks	8		8	5	7	8	7.6	6%	9.1
Affect of risk	6		6	4	6	9	7.3	9%	5.8
							Total	100%	75.7

Figure 2: Scoring Table: The worksheet computes the average scores and applies the weighting factors to compute the overall score

- *Bubble diagrams:* Display your projects on a two-dimensional grid as bubbles as in Figure 3. The axes vary but the most popular chart is the risk-reward bubble diagram, where NPV is plotted versus probability of technical success. Then seek an appropriate balance in numbers of projects.

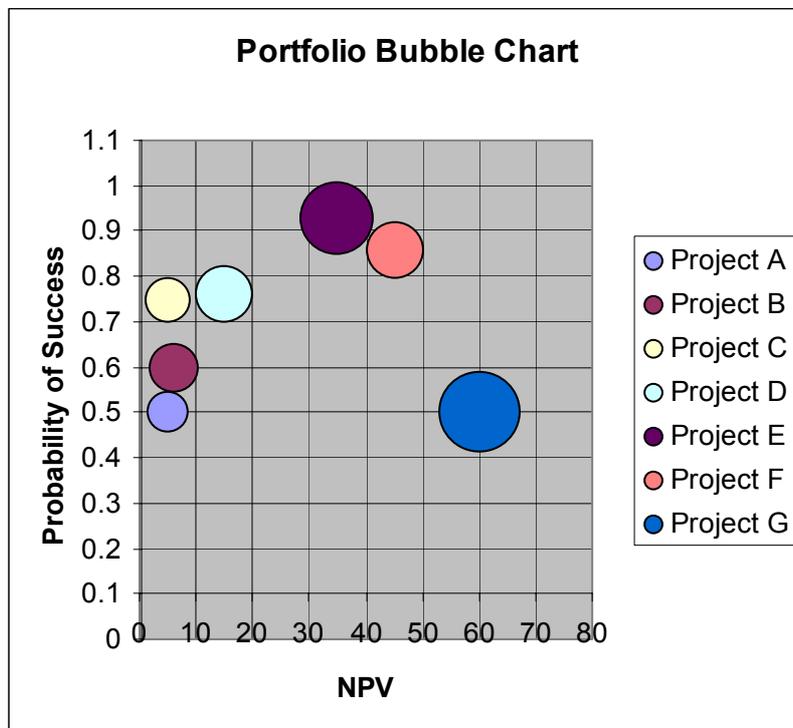


Figure 3: Bubble diagram

The bubble diagram provides a graphical view of the project portfolio risk-reward balance. It is used to assure balance in the portfolio of projects — neither too risky nor conservative and appropriate levels of reward for the risk involved. The horizontal axis is Net Present Value, the vertical axis is Probability of Success. The size of the bubble



is proportional to the total revenue generated over the lifetime sales of the product (for working out cost impact, the size of the bubble is made proportional to the cost of the project).

- **Pie charts:** Figure 4 shows spending breakdowns as slices of pies in a pie chart. Popular pie charts include a breakdown by project types, by market or segment, and by product line or product category.

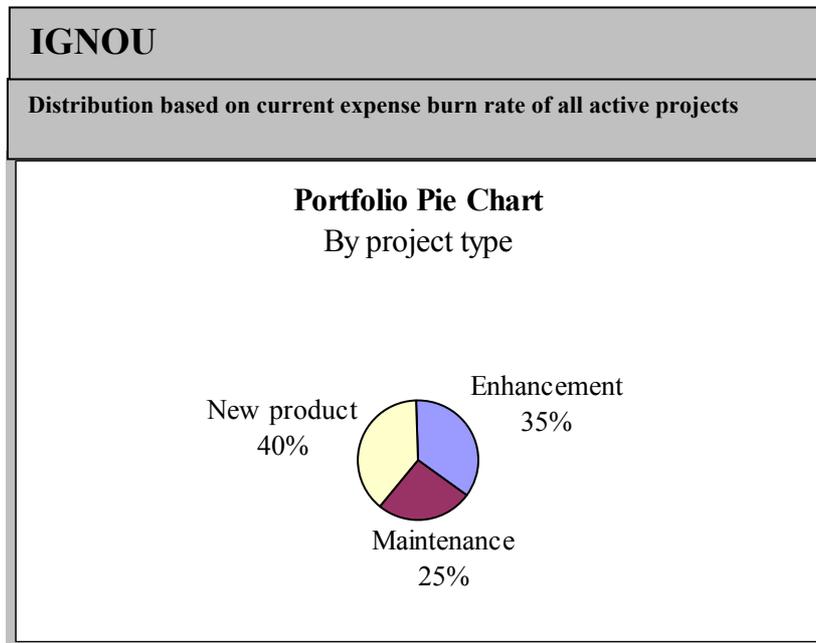


Figure 4: Pie chart for spending breakup

While this visual presentation is useful, it can't prioritize projects. Therefore, some mix of these techniques like, bubble chart along with pie chart etc. is appropriate to support the Portfolio Management Process. This mix is often dependent upon the priority of the goals.

Both bubble diagrams and pie charts, unlike the maximisation tools outlined above, are not decision-models, but rather *information display*: they depict the current portfolio and where the resources are going – the 'what is'. These charts provide a useful beginning for the discussion of 'what should be' – how should your resources be allocated.

A final check is to analyse product and technology roadmaps for project relationships. For example, if a lower priority platform project was omitted from the portfolio priority list, the subsequent higher priority projects that depend on that platform or platform technology would be impossible to execute unless that platform project were included in the portfolio priority list.

Balancing

It is very important that the Right Number of Projects are picked. Most companies have too many projects underway for the limited resources available. The result is pipeline gridlock: projects end up in a queue, they take too long to reach the market, and key activities – for example, doing the up-front homework – are omitted because of a lack of people and time. Thus, an over-riding goal is to ensure a balance between resources required for the active projects and resources available. Here are the ways:

- **Resource limits:** The value maximization methods build in a resource limitation – rank your projects until out of resources. The same is true of bubble diagrams the



sum of the areas of the bubbles – the resources devoted to each project – should be a constant, and adding one more project to the diagram requires that another be deleted.

- Resource capacity analysis:** Determine your resource demand, prioritise your projects (best to worst) and add up the resources required by department for all active projects (usually expressed in person-days per month). Project management software, such as MS-Project, enables this roll-up of resource requirements. Then determine the available resources (the supply) per department – how much time people have to work on these projects. A department-by-department and month-by-month assessment usually reveals that there are too many projects; it suggests a project limit (the point beyond which projects in the prioritized list should be put on hold); and it identifies which departments are the bottlenecks.

Decision Gates Process

Right from the first stage, the elimination of projects which do not meet the requirements of that step are required to be eliminated. This process of removal or delaying of projects is carried out by decision gates (Figure 5). The process chain for decision-based monitoring and reporting includes the following **decision points or gateways**, each of which requires associated reports.

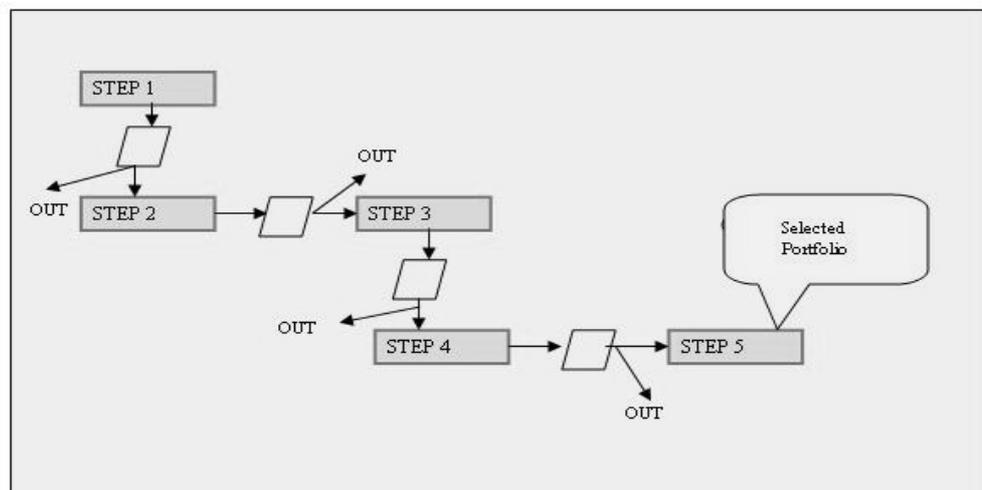


Figure 5: Decision step gates

- At the Data Gathering stage:** After **pre-screening** has taken place, project ideas are subjected to a selection process designed to filter out ideas with little potential. The remaining project ideas are only then evaluated as to their cost-effectiveness and classified as must-do or can-do projects. In the next step, high-potential ideas are developed into business cases and fleshed out. Ideas that seem unattractive at this point fail to pass the gateway and are rejected. The project ideas are presented in an overview showing how they fulfill the above criteria; this helps decide which ideas pass the gateway and which should be rejected.
- At the Evaluation stage: Project dependencies** must be evaluated to pinpoint dependencies within and between strategic buckets. (Defined top-down, strategic buckets represent areas of strategic focus and spending splits, and each project is assigned to just one bucket). This helps to pinpoint potential synergy. Any redundancies must then be eliminated by reconfiguring projects and by creating programs of projects. For this purpose, dependencies must be evaluated and presented in visual form to assist with decision-making.



- 3) Company-internal billing is based on rates set by the organisational units involved. Due to differing cost structures and fluctuating demand, **internal billing rates** must be reviewed regularly. Once capital constraints have been determined, supply and demand for specific resources must also be determined. Internal billing rates between organisational units can be recalculated on the basis of actual resource costs. This requires information on resource supply and demand as well as the underlying costs of the resources.
- 4) **Prioritisation:** Projects should be assigned priorities based on their perceived value, and a project ranking system must be developed. Project value can be either quantitative such as net present value, expected commercial value, return on investment, etc or qualitative such as strategic contribution, operational urgency, strategic alignment, risk, etc. Project value information is presented in the form of a score table or graphical chart, enabling decision-makers to evaluate the project portfolio using a wide variety of criteria. This leads to a more balanced assessment.
- 5) **At the Approval stage:** Following prioritization, the **project portfolio** is finalized. Based on the comparison and evaluation of quantitative and qualitative criteria relating to strategic importance, value and risk, a concrete scenario is selected for implementation. Decisions must be made as to which projects to execute, continue or cancel. To this end, alternative scenarios are compared using the above criteria. A change list must also be drafted, stating which projects are to be started, continued, postponed, brought forward, or abandoned.
- 6) Once a portfolio has been selected for implementation, the **allocation of resources** must be determined. The selected scenario dictates how resources need to be allocated to organisational units, and determines whether and what additional capacity (in-house and external) is required. An evaluation of how the selected portfolio affects resource availability and allocation is provided as decision-support.
- 7) The project portfolio selected also drives the **allocation of capital**. The scenario selected determines the investment required and the capital allocated to each organisational unit in the form of funding for in-house effort, outsourced effort, and investment. In addition, the budgets of the strategic buckets are reviewed and adjusted, providing baseline information for subsequent investment control/monitoring. An analysis of capital distribution is used as decision-support for approving the allocation of funds.
- 8) **At the Control stage: Analysis of deviations** is performed regularly while the projects in the portfolio are underway. Deviations are identified by comparing target and actual values; this method also provides information on their scale and severity. The project portfolio may require adjustment as a result. Decision-making on corrective action is facilitated by reports showing qualitative and quantitative parameters for the entire portfolio, and highlighting the impact of serious deviations from plans or targets.

Step 4 ‘WHAT IF’ analysis and project adoption: Once the organisation has its prioritised list of projects, it then needs to determine where the cutoff is based on the business plan and the planned level of investment of the resources available. This subset of the high priority projects then needs to be further analyzed and checked. The first step is to check that the prioritized list reflects the planned breakdown of projects based on the strategic allocation of the business plan.

The *Figure 6* shows the portfolio adopter designed to let executives or project managers conduct ‘what if’ scenario modeling and analysis. This view shows a portfolio of projects (top left) and the dates the projects are scheduled to start and end



(top right). The bottom half of the screen shows the impact on overall capacity of the firm to do them (bottom right). Users can adjust any portion to show the impact of delaying or canceling projects in the portfolio on capacity, money, marketing value.

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Projects			Portfolio			Period			Data			Units			Spread	
□□□			□□□□			□□□			□□□□□			□□□			□	
	A	B	C	Project Name	Project ID	Description	Manager	3Q	FY	99	1Q	EY	00	4Q	FY	
1				Database Update	A/P Screen Add											
2				Development	Gen Mod Bill Info											
3				E-Commerce	Gen Mod Market											
4		√		Online Trading	GL Field Addition											
5	√	√		Bank Card Program	Marketing Info											
6				CRM Roll Out	LAN Install											

Figure 6: Portfolio adopter

The selected portfolio projects are taken up for implementation / continuation. However, the monitoring process has to continue. For this purpose most of the vendors are offering a dashboard as part of their software package. This dashboard presents an overall view as shown in *Figure 7*.

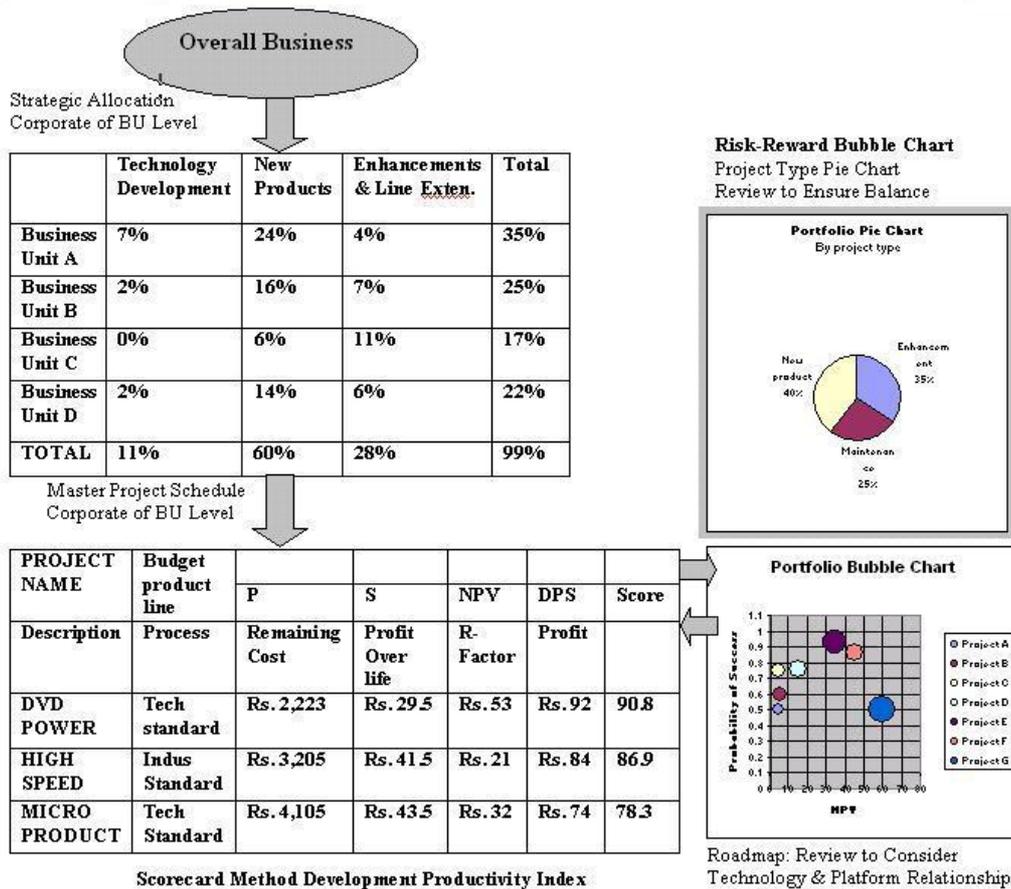


Figure 7: Overall view of portfolio management process

Check Your Progress 1

1) State True or False:

- a) The portfolio management process eliminates need for Investment bundling, Prioritization, Evaluation and Decision insight and support. True False
- b) The portfolio management makes possible, grouping of technology, Investment Focus and cost control. True False
- c) $ECV = [(PV * PC - CC) * PT - DC]$
Where PC = Probability of Commercial Success,
DC = Direct Cost, CC = Commercialization (Launch) Costs,
PV = Present Value of project's future earnings (discounted to today),
PT = Probability of Technical Success and ECV = Expected Commercial Value of the project. True False
- d) Scoring Tables are used for prioritizing the portfolios. True False
- e) Bubble diagrams are used for prioritizing the portfolios. True False

2) Answer the Following Questions:

i) What are the key functional requirements which must be available in the Portfolio Management Solution?

.....

ii) What are the steps for portfolio management implementation?

.....



1.5 RISK MANAGEMENT

With the Information Technology, although management needs to be aware of all potential risks, *operational risk* is the primary risk associated with it. Operational risk (also referred to as transaction risk) is the risk of loss resulting from inadequate or failed processes, people, or systems. The root cause can be either internal or external events. Operational risk is present across all business lines.

Operational risk may arise from fraud or error. Management's inability to maintain a competitive position, to manage information, or to deliver products and services can also create and compound operational risk. Weak operational risk management can result in substantial losses from a number of IT threats including business disruptions or improper business practices.

All organisations should properly identify, measure, monitor, and control operational risk. Management should distinguish the operational risk component from other risks to enable a stronger focus on operational risk mitigation. The board should ensure that a program exists to manage and monitor this risk. The program should address the institution's tolerance for risk, the effectiveness of internal controls, management's accountability in regards to risk mitigation, and the processes needed to manage IT effectively.

Operational risk includes not only back office operations and transaction processing, but also areas such as customer service, systems development and support, internal controls and processes, and capacity planning. Operational risk from IT also affects credit, compliance, strategic, reputation, and market risks. Management should be aware of the implications of operational risk including:

- **Liquidity, interest, and price risks:** Credit and market risks can materialize from external changes in markets, industries, or specific customers. Internal controls that rely heavily on the availability and performance of technology create additional operational risk exposure. For example, a failure to properly implement changes to underwriting, account management, or collection systems can lead to significant losses, and higher loan servicing and collection costs
- **Reputation risk:** Reputation risk stems from errors, delays, or omissions in information technology that become public knowledge or directly affect business partners, customers and consumers resulting in a loss of confidential information and potential customer withdrawal of funds. Two activities that can lead to reputation risk are the unauthorised disclosure of confidential customer information and the hacking/modifying of an institution's website
- **Strategic risk:** Strategic risk can stem from inaccurate information or analysis that causes management to make poor strategic decisions. For example, IT management could decide to save money by delaying an infrastructure upgrade to increase network bandwidth, which could result in a business line losing market share due to an inability to compete.
- **Compliance (legal) risk:** Compliance risk results from the institution's inability to meet the regulatory and legal requirements associated with its IT products and services. Legal risk may lead to civil or criminal liability if, for example, an institution discloses confidential information or provides inaccurate or untimely consumer compliance disclosures.

IT management should have a corporate-wide view of technology. It should maintain an active role in corporate strategic planning to align technology with established business goals and strategies. It also should ensure effective technology controls exist throughout the organisation either through direct oversight or by holding business



lines accountable for IT-related controls. From a control standpoint, management should assess risks and determine how to control and mitigate the risks. Management should continually compare its risk exposure to the value of its business activities to determine acceptable risk levels.

IT Risk Management Process

IT controls result from an effective risk assessment process. Therefore, the ability to mitigate IT risks is dependent upon risk assessments. Senior management should identify, measure, control, and monitor technology to avoid risks that threaten the safety and soundness of an institution. The institution should

- 1) *plan* for use of technology,
- 2) *assess* the risk associated with technology,
- 3) decide how to *implement* the technology, and
- 4) establish a process to *measure and monitor* risk that is taken on. All organisations should have:
 - An effective planning process that aligns IT and business objectives;
 - An ongoing risk assessment process that evaluates the environment and potential changes;
 - Technology implementation procedures that include appropriate controls, and
 - Measurement and monitoring efforts that effectively identify ways to manage risk exposure.

This process will typically require a higher level of formality in more complex institutions with major technology-related initiatives.

The risk identification and management process for technology-related risks is not complete without consideration of the overall IT environment in which the technology resides. Management may need to consider risks associated with IT environments from two different perspectives:

- If the IT function is decentralized, and business units manage the risk, then management should coordinate risk management efforts through common organisation-wide expectations.
- If the IT department is a centralised function that supports business lines across shared infrastructure, management should centralize their IT risk management efforts.

Planning IT Operations and Investment

Planning involves preparing for future activities by defining goals and the strategies used to achieve them. Information technology is an integral part of large number of companies like financial institution operations. Therefore, such companies like, financial institutions should integrate IT resources and investments into the overall business planning process. Major investments in IT resources have long-term implications on both the delivery and performance of the institution's products and services.

Plans may vary significantly depending on the size and structure of the organisation. Every organisation should strive to achieve a planning process that constantly adjusts for new risks or opportunities and maximizes the value of IT to the organisation. Management should always document plans; however a written plan does not guarantee an effective planning process. Management should measure specific plans by whether they meet the organisation's business needs. For all plans, the examiner should evaluate the process as well as the written product. A sound plan requires the board of directors, senior management, and user involvement in the planning process.



The board of directors should review and approve the plan. Senior management participates in formulating and implementing the plan. The individual departments and functional areas identify specific business needs and, ultimately, implement the plans.

Risk Identification and Assessment

Operational IT planning should identify and assess risk exposure to ensure policies, procedures, and controls to remain effective. Information security risk assessments are essential. The assessments should identify the location of all confidential customers and corporate information, any foreseeable internal and external threats to the information, the likelihood of the threats, and the sufficiency of policies and procedures to mitigate the threats. Management needs to consider the results of these assessments when overseeing IT operations.

The risk assessments should cover all IT risk management functions including security, outsourcing, and business continuity. Senior management should ensure IT-related risk identification and assessment efforts at the enterprise-wide level are coordinated and consistent throughout the organisation. A strong, high-level, risk assessment process provides the foundation for more detailed assessments within the functional risk management areas. An effective IT risk assessment process will improve policy and internal controls decisions across the organisation.

Senior management can use risk assessment data to make informed risk management decisions based on a full understanding of the operational risks. Small institutions with less complex systems may have a more simplified risk assessment process. Regardless of the complexity, the process should be formal and should adapt to changes in the IT environment. Examiners should measure the effectiveness of the process by evaluating management's understanding and awareness of risk, the adequacy of formal risk assessments, and the effectiveness of the resulting policies and internal controls.

Ongoing Data Collection

Understanding the institution's environment is the first step in any risk assessment process. Senior management should incorporate information on IT issues such as resource limitations, threats, priorities, and key controls from several sources. In developing a formal risk assessment, management should collect and compile information regarding the organisation's information technology environment from several locations including:

- IT systems inventories are critical to understanding and monitoring the tactical operations of the institution's information technology as well as to identifying the access and storage points for confidential customer and corporate information.
- IT strategic plans provide insight into the organisation's planning process. Review and analysis of the strategic plans as part of the risk assessment process may spotlight developing risk exposures or other deficiencies that limit the institution's ability to implement strategic priorities.
- Business recovery and continuity plans prioritise the availability of various business lines to the institution and often encompass restoration and provision of control, customer service, and support. The plans can offer insight into the organisation's critical operating systems and the control environment.
- Due diligence and monitoring of service providers can present valuable information on the service control environment. The information is necessary for a complete risk assessment of institution's information technology environment.



- Call center issue tracking reports can often indicate potential performance or control issues if the problem reports are aggregated and analysed for repetitive or common issues.
- Department self-assessments on IT-related controls can provide early identification of policy noncompliance or weaknesses in controls.
- IT audit findings provide insight into the veracity and responsiveness of the institution's staff and management, commitment to policy compliance and internal controls.

Risk Analysis

Management should use the data collected on IT assets and risks to analyze the potential impact of the risks on the institution. The analysis should identify various events or threats that could negatively affect the institution strategically or operationally. Management should evaluate the likelihood of various events and rank the possible impact. Some examples of events that could affect the institution include the following:

- **Security breaches:** Security breaches that can affect the institution include external and internal security breaches, programming fraud, computer viruses, or denial of service attacks
- **System failures:** Common causes of system failures include network failure, interdependency risk, interface failure, hardware failure, software failure, or internal telecommunication failure
- **External events:** Institutions are also exposed to external threats including weather-related events, earthquakes, terrorism, cyber attacks, cut utility lines or wide spread power outages that bring about system or facility failures.
- **Technology investment mistakes:** Mistakes in technology investment including strategic platform or supplier risk, inappropriate definition of business requirements, incompatibility with existing systems, or obsolescence of software may constrain profitability or growth.
- **Systems development and implementation problems:** Common system development and implementation problems include inadequate project management, cost/time overruns, programming errors (internal/external), failure to integrate and/or migrate successfully from existing systems, or failure of system to meet business requirements.
- **Capacity shortages:** Shortages in capacity result from lack of adequate capacity planning, including the lack of accurate forecasts of growth.

Once the institution has identified the universe of risks, management should estimate the probability of occurrence as well as the financial, reputation, or other impact to the organisation. Organisational impacts are highly variable and not always easy to quantify, but include such considerations as lost revenue, flawed business decisions, data recovery and reconstruction expense, costs of litigation and potential judgments, loss of market share, and increases to premiums or denials of insurance coverage. Typically, risk analysis ranks the results based on the relationship between cost and probability.

Prioritisation

Once management understands the institution's technology environment and analyzes the risk, it should rank the risks and prioritize its response. The probability of



occurrence and the magnitude of impact provide the foundation for reducing risk exposures or establishing mitigating controls for safe, sound, and efficient IT operations appropriate to the complexity of the organisation. The overall risk assessment results should be a major factor in decision making in most IT management responsibility areas including:

- Technology budgeting, investment, and deployment decisions
- Contingency planning
- Policies and procedures
- Internal controls
- Staffing and expertise
- Insurance
- IT performance benchmarks
- Service levels for internal and outsourced IT services and
- Policy enforcement and compliance

Monitoring

Management and the board should monitor risk mitigation activities to ensure if identified objectives are complete or are in process. Monitoring should be ongoing, and departments should provide progress reports to management on a periodic basis. Ongoing monitoring further ensures that the risk assessment process is continuous instead of a one-time or annual event. Key elements of an effective monitoring program include:

- Mitigation or corrective action plans;
- Clear assignment of responsibilities and accountability, and
- Management report.

IT Controls Implementation

These guidelines are applicable to both in-house and external provider situations.

Policies, Standards, and Procedures

Management should adopt and enforce appropriate policies and procedures to manage technology risk. The effectiveness of these policies and procedures depends largely on whether they are used by internal staff and vendors. Testing compliance with these policies and procedures often helps to identify and correct problems before they become serious. Clearly written and frequently communicated policies can establish clear assignments of duties, help employees to coordinate and perform their tasks effectively and consistently, and aid in the training of new employees. Senior management should ensure that policies, procedures, and systems are current and well documented

Internal Controls

The institution should adopt adequate controls based on the degree of exposure and the potential risk of loss arising from the use of technology. Controls should include clear and measurable performance goals, the allocation of specific responsibilities for key project implementation, and independent mechanisms that will both measure risks and minimize excessive risk-taking. Management should re-evaluate these controls periodically.

Management practices associated with general controls include:

- Reporting effectiveness to the Board of Directors;
- Periodic review and updating of policies, standards, and practices;
- Regular review of internal and third party audit results;
- Review of service level agreements, and



- Review of control metrics including issues and corrective action plans.

Adequate internal controls should be structured to assure senior management that:

- Personnel create, transmit, and store records and transactions in a safe and sound manner;
- Adequate segregation of duties exists;
- MIS data are reliable and the reporting cycle is adequate;
- Necessary Quality Checks have been implemented;
- Operating procedures are efficient and effective;
- Procedures are in effect to assure continuity of business;
- The institution identifies and monitors high-risk conditions, functions, and activities, and
- There is proper adherence to management standards and policies, applicable laws and regulations, regulatory statements of policy, and other guidelines.

Independent audits can verify that these controls exist and are functioning effectively.

Personnel

All organisations should mitigate the risks posed by IT staff by performing appropriate background checks and screening of new employees. In addition to staff, the controls in this section are relevant for vendor personnel, consultants, and temporary staff that support the IT function. Typically, the minimum verification considerations include:

- Character references;
- Background checks including confirmations of prior experience, academic credentials, professional qualifications, or criminal records, and
- Confirmation of identity from government issued identification.

Insurance

In establishing an insurance program, management should recognise its exposure to loss, the extent to which insurance is available to cover potential losses, and the cost of such insurance. Insurance programs should be commensurate with the complexity and risk of each institution. Management should weigh these factors to determine how much risk the organisation will assume directly. In assessing the extent of that risk, institutions should analyse the effect of an uninsured loss on themselves and any affiliates or parent companies. Management should also review a company's financial condition and/or credit rating reviews when deciding on an insurance company. Once management has acquired appropriate insurance coverage, it should establish procedures to review and ensure its adequacy. These procedures should include, at a minimum, an annual program review by the board of directors

1.6 DISASTER MANAGEMENT

A disaster is defined as a sudden misfortune that is ruinous to an undertaking. This means that there is little time to react at the time of the misfortune. Preparations are required to have been made in advance. The focus should, therefore, be on disaster planning.

The first step in disaster planning is to **assess risk**. A computer or network disaster typically involves loss of or damage to data, the inability of programs to function, or the loss of data communication. Risk assessment answers the question, what is the probability a particular disaster to occur and how serious will be the effect likely to be if it does occur. Among the disasters that should be assessed are natural disasters such as floods, fires, and earthquakes and manmade disasters such as air conditioning failures, viruses, hacking, and vandalism. The line between the two is not clear-cut



because a flood can be the result of vandalism to a water pipe and a fire can be deliberately set as an act of vandalism.

A risk assessment matrix should be created, one which puts the probability on one axis and the effect on the other, with the risk factor fixed by the combination of the two factors:

Effect may be classified as Major, Moderate, and Minor. Probability of Risk may be classified as High 5 4 3 Moderate 4 3 2 and Low 3 2 1 on a 5 point scale.

A risk factor of 5 requires much more attention and warrants a much greater outlay of resources than a risk factor of 1.

The risk factor will vary by area of the country, nature of the community, and type of organisation. In much of California, earthquakes would be rated a risk factor of 5; along the flood plains of the Mississippi River flooding would be a risk factor of 5. Viruses, while probable, usually have only a minor effect, therefore, they would have a risk factor of 3. Hacking, this rates highly probably for Fortune 500 companies; rates low for smaller organisations, but may rate a risk factor of 3 because its effect may be major. In many areas floods are likely to be the result of a broken pipe and have a low risk factor of 1 or 2 because their effect tends to be localized and, therefore, minor or moderate.

The second step in disaster planning is **risk reduction**. This is achieved by lowering the risk factor by reducing the probability, reducing the effect, or both. For example, while no disaster plan can reduce the probability of an earthquake, housing the organisation in California that is quake-resistant should reduce the effect of one. Placing a computer room where there are no overhead pipes reduces the probability of flooding; rack-mounting the computer hardware so that it is several inches above the floor reduces the effect. Installing anti-virus software reduces the probability of a disaster; regularly backing up all data reduces the effect.

The third step in disaster planning is to earmark resources. Disaster planning need resources (takes time and expertise), but it is within the means of most organisations. A small task force of staff members, given time to read the literature and contact other organisations that have done disaster planning, can develop a disaster plan in weeks or months. What is difficult for many organisations is finding separate funds to carry out the plan. Retrofitting an old building to withstand earthquakes can cost hundreds-of-thousands or millions of dollars; mirroring a database of a large organisation can cost huge amount of money. Each risk factor must, therefore, have a price tag associated with it. An organisation has to decide whether the risk reduction is worth the price and, if so, seek the funds to pursue the risk reduction.

It may not be realistic to lower the highest risk factors first because the funds may not be available. It may be necessary to focus on lowering risk factors for which the resources are available. Heat/smoke and water detectors are within the means of most organisations and should not be skipped over just because the risk factor is not a 4 or 5.

The fourth step in disaster planning is to identify Common Disaster Plan Elements. Every disaster plan should set forth both preventive measures and remedies in at least the following areas:

Servers

Every organisation with one or more servers should have a server room that is secured with a combination lock such as a Simplex and a reinforced door with a deadbolt at least 1.5 inches long. If the room is not windowless, the windows should be barred. The room should have both fire/heat detection and water detection sensors which set



off a local alarm and send a signal to an off-premises monitoring facility. At a minimum, it should have fire extinguishers suitable for electrical fires. An organisation that has hundreds-of-thousands of dollars in equipment in its server room should consider a built-in fire suppression system.

Excess heat is, by far, the most commonly reported cause of server downtime and damage. An office should, therefore, augment its building air conditioning with a room-size air conditioner that kicks-in only when its thermostat shows that the temperature in the room has risen above a office specified level, typically 68 degrees. An additional safeguard is available, a thermostat inside any cabinet which has a cooling fan. When a fan fails and the temperature rises, an alarm should be triggered.

Water damage is the second-ranking cause of server downtime and damage, although the damage is rarely greater than moderate. There should be no water pipes in the ceiling above the room, or in the walls that enclose it. The server(s) and associated peripheral equipment should be rack-mounted so that up to six inches of standing water will not affect the equipment.

Power irregularities are the third-ranking cause of server downtime and damage. An UPS (uninterruptible power supply) should be used to protect all servers against surges, spikes, brownouts, and blackouts. The UPS should have a rating which is at least twice the total KVA requirements of the devices it protects. KVA (Kilo Volt Amperes) is a rating that is calculated by multiplying the number of volts by the number of amperes and dividing by 1,000. While a office may not want to operate its servers on battery back-up for an extended period, the UPS should provide power long enough for an orderly shutdown of all servers.

The database server should be protected by its own firewall, preferably a proxy-server between it and the Web server on which the patron access catalog is mounted. A proxy server shields the database server from direct access by initiating a separate inquiry, rather than passing the external inquiry through to the database server. The firewall can be on the same hardware platform as the database server. The Web server can support not only the patron access catalog, but also other files and a gateway to electronic resources outside the organisation. It should include remote patron authentication software so that access to other than records the organisation wishes to make available to everyone is limited to those who are authorized users.

Each server should be configured with a logging tape drive--typically a 4mm or 8mm streaming tape drive-- so that all information written to disk is also written to tape. Each evening the logging tape should be removed and stored away from the server room and a new tape mounted for database back-up. Overnight, the content of the disk drives should be written to tape. The next morning, the back-up tape should be removed and stored away from the server room and a new tape mounted for logging that day's transactions. It will then be possible to restore all files using the most recent back and logging tapes. Magnetic media can become unstable with repeated use, therefore, seven logging tapes--one for each day of the week--should be used. Seven back-up tapes should also be used. All of the tapes should be replaced at least every year.

An organisation may choose to do a back-up only once a week. If so, all of the logging tapes for the week should be saved so that they and the previous week's back-up tape can be used to restore the files. The logging tapes and the previous week's back-up tape should be stored away from the server room. In a large facility than may be at the opposite end of the building, but for smaller facilities it should be off-site.

At least once per week, a current back-up tape should be sent to an off-site storage facility to protect against the loss of the on-site back-up tape.

Organisations that can afford RAID (Reduced Array of Inexpensive Disks) should configure their servers with them. RAID technology mirrors everything written to one



disk on another disk. If a disk fails, the mirroring disk provides access to the information without resorting to the rebuilding of files from the combination of back-up and logging tapes.

Network

An organisation can do a great deal to secure a LAN (local area network), but only a limited amount to secure a WAN (wide area network). The former usually is limited to a single building or part of a building; the latter usually ties two or more LANs together using a telco or other common carrier's circuits. The telco or common carrier has the responsibility for its portion of the WAN. Wan should be protected there appropriate firewalls.

The preferred LAN topology is a hybrid star, one that has several central star network points linked in a star. In other words, several desktop clients are connected to a hub, and several hubs are connected to yet another hub. The cabling from the desktop clients to the hubs can be relatively inexpensive Category 5 UTP (unshielded twisted pair); the wiring among hubs should be STP (shielded twisted pair) or fiber optic to dramatically improve performance and security.

Network hardware should be secured in locked data communications closets or cabinets. All data jacks should be capable of being de-activated when no office equipment is connected to them. The practice of distributing a large number of data jacks around a building for use by patrons with laptops should be avoided unless these jacks are on a separate LAN segment that can be isolated from the database server of the automated office system. Patrons need access only to the patron access catalog, and possibly to other servers: Web, Internet, CD-ROM, image, etc.

If a wireless LAN is implemented, it should access only a segment of the office's LAN, one that can be isolated from the database server of the automated office system.

The most vulnerable part of a office's network is the connection to the Internet, both access from the Internet to its servers and from its servers and clients to the Internet. Fortunately, it is cost effective to protect a office's database server with its own firewall so that there is protection against in-office users, as well as external users. More vulnerable are the other servers and the clients or desktop workstations. Most offices seek to protect them only from users outside the office. This can be done by installing a network firewall. The firewall can be configured not only to restrict access to specific categories of users or specific types of queries, but can also be configured to facilitate access to office-selected resources.

Clients

PCs and Macs are the most vulnerable technology in offices because they can be compromised by staff and patrons who behave unwisely by downloading attachments or bringing in software and data disks from outside the office. Viruses are the greatest threat. An Anti-virus software is absolutely essential. Products from companies such as McAfee and Norton detect computer virus signatures and alert the user to them before they enter the client; however, anti- virus products are of little value if they are not regularly updated. Literally hundreds of new viruses are unleashed every week, therefore, anti-virus software should be updated at least weekly by downloading the latest version.

Almost all viruses travel via e-mail attachments or diskettes. Staff should, therefore, be instructed not to open an attachment if the source of the e-mail is not known or the attachment is not expected. They should be particularly suspicious of attachments with strange-sounding titles. When in doubt, the sender should be asked by return e-mail to describe the contents of the attachment. Staff should be instructed not to bring



software from home for loading on office machines, nor to carry diskettes back and forth between home and work machines.

The fifth step in disaster planning is to establish Recovery Procedures. It is important to state in the disaster plan not only what recovery procedures are to be followed if a disaster occurs, but also who has what responsibility. Who calls whom and what information should they be prepared to give? Who performs the needed diagnostics? Who restores the files? What are the instructions for packing and shipping the corrupted files?

Communication is of great importance during a disaster. It should not be assumed that regular telephone service will be available. Key personnel should have cell phones for use when regular telephone service fails or is overloaded. The cell phone in the server room should be stored in a wall-hung watertight cabinet on the wall adjacent to the entrance door. The instructions for dealing with a computer/network disaster should be stored in the same cabinet. All important telephone numbers should be stored in each cell phone. If a disaster affects more than the office, the cellular service may be swamped with calls. It is, therefore, a good idea to instruct the operator in the server room to use the redial and speaker features of the regular telephone while seeking to get through on the cell phone.

A designated operator for each hour the office is open is a good practice. This may be a member of the circulation desk's support staff, the staff which usually is in the office all of the hours the office is open. The designated person would perform the end-of-day swap of the logging and back-up tapes as part of his/her routine duties. Otherwise, s/he would leave her/his regular duties only when there was a problem.

The designated operator on duty at the time of a disaster should have instructions to call the support desks for the servers that have been affected. The numbers should be encoded in both the server room's telephone and the cell phone that has been provided as a back-up.

Each designated operator should participate in an occasional disaster drill that simulates an actual disaster that affects one or more servers.

Designated manager to support the designated operator who may encounter a situation that overwhelms him/he should also be considered. There should always be a designated manager in the office or available by telephone 24 hours per day, seven days per week. While there may rarely be a need to decide about evacuation of the office or another major action, the capacity to do so must be in place.

An external resource is the vendor of an automated office system is an important resource in diagnosing problems that result from a disaster. When drawing the contract, make it clear that the vendor shall be liable not only for the performance of the central site and its client software, but it shall undertake remote diagnostics through the network to the desktop. In other words, it shall pinpoint a problem regardless of where it is. If coverage has not been purchased for 24 hours a day and seven days a week, there should be provision for emergency support at agreed upon hourly rates outside the normal coverage hours.

If the database server for the automated office system is affected by a disaster, the vendor's trouble desk should be called so that remote diagnostics can be performed and guidance can be obtained. If the vendor of the automated office system is not responsible for the management of hardware maintenance, hardware problems should be referred to the manufacturer's support desk.

Sources of support for all other servers should be identified and their telephone numbers must be encoded in the server room's telephone and in the cell phone that have been provided for back-up.



Most offices do not have the luxury of a network specialist. A office should, therefore, rely on the networking staff of a parent organisation or consider contracting with a network support service for remote diagnostics and recovery assistance. While these firms are found in most major cities, a regional or national firm with experience in automated office systems should be considered.

One or more data recovery firms should be identified. These firms recover data from hard drives, diskettes, or any other storage medium that has been damaged by flood, fire, physical impact, or a virus. A large national firm usually is able to accommodate a rush order better than a smaller local one.

Insurance coverage for disaster is part of the insurance plan by larger organisations. The office should carry insurance that includes coverage for its servers, network, and clients. In order to make claims, it is essential to have an absolutely current inventory of all hardware and software, including purchase data and price. A copy of this information should be stored at a remote site.

In case of damage that is visible, photographs should be taken promptly after the disaster to substantiate an insurance claim.

1.7 PORTFOLIO MANAGEMENT ISSUES AND CHALLENGES

In implementation of a portfolio management application, there are many successes associated with it, there are many lessons learned also. Issues and challenges which need to be understood are:

1) **Portfolio Management system acceptance**

Since true success of portfolio management system lies in active involvement of all concerned, it is important that the system's benefit are recognized and appreciated by them. The application champion (business side and application administrator) for this purpose may find themselves constantly 'selling the benefit' of the tool. They may need to become evangelist for portfolio management and have the stick-to-it-ness to weather the storm. Resistance may be strong and critics will most likely outnumber advocates. They will need to continually prove the value of the application and its data. This is not easy, it is not pretty, and it will become frustrating. This may also require doing some behind the scenes magic to prove that the application has value.

There will also be a significant training and learning curve. Even if the organisation is mature in its artifacts, processes, methodology, and terminology, there will be a new means of recording and reporting it.

2) **Real Time Readiness**

In the past, a project manager had control over when information about the project was shared and available for all members of the project team and for executives. The project manager could mask blemishes and possible lapses by controlling when information was shared. For example, if the project manager led a project status call every other Thursday, they could possibly wait until Wednesday night to update their issues report. If an issue was due a week before, the report might not get updated until before the review. Now with a portfolio management system, the day the issue becomes past due it can be flagged in reports. The PM might now have to do daily management of the issues.

3) **Conformity to override Flexibility**



One of the benefits of a portfolio management system is the ability to track information consistently across projects. Latest maturity models call for consistency across the organisation. A portfolio manager enforces conformity and an individual PM will lose some of the flexibility they have in tracking and reporting project status. For example using issues again, a PM might want to have a way to indicate an issue is resolved prior to being closed. This way they could have a report that shows issues 'resolved' and ready to go off the list. Another project manager may be more of the mindset that it goes straight to closed. People can refer to a closed issues report to see what's been closed in the past week. While we can not say which method is better, a portfolio management issues workflow will force the process. If a program manager wants to have consistency in reporting of all projects across the portfolio, an individual will need to sacrifice some of their individual style to conform to the portfolio work flow.

4) **System to be for the Users**

As you take project management from desktop applications and non-integrated artifacts, you have risen to the level of application management. With application management, comes the entire cycle of enhancement requests, workflow requests, and even field names. A PM might not get the feature he/she wants – or may have to compromise.

5) **Requirement of an Application Administrator**

First thing to do when implementing a portfolio management system is to appoint an application administrator and an application change control process. We need to budget a person's time into the care and feeding of this application. There is no rule of thumb regarding how many Full Time Equivalents (FTE's) are required for application administration, but it will have a direct relationship to the organisational maturity, the business process maturity, and the breadth of the audience. In one of the organisations where PM was implemented, workgroups was brought onto the Portfolio Management Application involved new people, new business model, Beta applications, and new customers. This group ended up with an application administration team that looked at the business request and two trained administrators that did the physical administration (defining views, reports, filters, adding users, creating work flows etc.) There were also two team members who looked at templates and business needs and helped set priorities with the application administrators. Application administration is a different responsibility than a system administrator or a data base administration. An application administrator needs a strong skill set balanced between knowledge of project management principles and methodologies, knowledge of the business, and technical knowledge of data bases, SQL, report writing, and trouble shooting. A system administrator focuses on making sure the operating system and the hardware work, the application administrator makes sure the application meets the business need. The organisation may head for failure if it is thought that a system administrator can provide the business needs fulfilled by an application administrator. Finally, there will be changes and churn on the application. It is going to need someone to manage those, train the users on changes, and prioritise the work. We can imagine many organisations underestimate the care and feeding needed to keep an application viable.

6) **Making it business management application requires sincere efforts by all**

Everybody has the best of intentions, but taking care of the low level minutiae that makes up a portfolio management system is cumbersome, time consuming, and some people may see it of little value. A basic premise of a portfolio application is that executive levels of information can flash from multiple projects at one time. However, to get that executive level, the lowest of details must be there and many project managers will not put it in, unless they are hounded to put it in, or they are 'punished' if they don't. Excellence is a mindset and the middle manager must



maintain vigilance to insure compliance. There's an entirely integrated thread with this thought and that involves cross-organisational compliance so the portfolio management tool transcends a project management application and becomes a business management application. The impact, both cultural and technical, aspects of this concept are way to deep to cover in this thinking

7) **Reports grow exponentially if not reasoned out**

Input is one aspect of an application, output is another and there is an exponential demand for output. The main outcome of a well organised report is that there is always tendency to request for a new report or the same report with a 'slight modification'. We feel there is a way to stop this. The requests will continue to flow in and unless and until you reason out the and bring out new report only when there is genuine need for the same. However, it is difficult task to make people agree.

8) **People will Blame the System for their Own Lapses**

It is a rule of human nature. People will blame the system to hide their own insecurities and lack of knowledge. No matter what system is created, it will have its own set of idiosyncrasies and there will be some things the application will require that make no sense at all, but the application requires it. Be thick skinned and prepared for people to blame the system for their problems.

9) **Mental block**

No matter how much you train, hand hold, and evangelize, some people just won't get the idea of project rolling up to program, rolling up to portfolio. You may encounter resistance as to why do I need to do it this way? Portfolio management is a completely different perspective and does require a certain amount of abstract visualizing (is there any other type?) – some people who are Great silo-based project managers, will just not get the inter-dependencies of projects within a portfolio management system. While work with these people, one be careful and understanding, the odds are that they want to do well, and they have a wealth of knowledge and experience, but they have a mental block.

10) **Customisation efforts increase with time**

Every salesman who pushes a portfolio management system touts its flexibility and the capability to customize the system to meet your business need. Most give you the capability to add custom fields and create your own reports, but as stated earlier the demand for various outputs never ceases. In the infancy of the system you will be able to quickly add a custom field to meet a need, but after months of customization here and there, the ripple effect can be enormous.

1.8 TOOLS AND TECHNIQUES

The portfolio management tool market is growing: There are large numbers of vendors who are offering Portfolio Management Tools. Each vendor talks about the salient features of his tools and offers a variant method for the Portfolio. However, each vendor is offering automation of Portfolio process to some degree. Coordinating information across this portfolio management domain itself dictates a number of key product features that one should look for when considering a tool to assist with automating the portfolio management process. Three key requirements include:

- **Common repository.** A single data repository that each group will access for reporting will be a requirement for an organisation moving to full IT portfolio management. Multiple groups, each using separate tools and repositories, will quickly lead to inaccuracy and conflicts as data becomes out of sync.



- **Direct data collection and interchange.** Data should enter the portfolio management tools directly and without manual input. Requiring project managers to enter information for each project will also quickly lead to data corruption or omissions. Resource utilisation and project information should be gathered directly from project management systems and spending data fed into the system directly from financial management tools.
- **Configurable data views and portals:** Each user of the tool will have different requirements. When considering a portfolio tool, make sure that the interface is configurable for each user constituency, centralising common tasks and reports, and allowing for the addition of reports and functions as the portfolio management process grows, matures, and expands.

Given below is a **list of some of the major Commercial Portfolio Management tools** along with their vendor's name. A brief writ-up on the salient features of the tools offered by them is also given.

- **Business Engine Network by Business Engine Corp:** It is strongest in professional services automation, relies heavily on Microsoft Project for project management functions, offers good support for the IT budgeting process across multiple currencies. However, it could do a better job with opportunity management, particularly in the area of time and resource management.
- **The Edge for IT Pacific Edge by Software Inc:** It is strong in cost estimating, portfolio analysis, scenario planning and resource allocation, and has good reporting capabilities with Microsoft Project. It includes its own project and resource management tools. However, weak in terms of mapping internal workflow processes with the software. But the product allows an organisation to modify its work processes as they mature with its internal IT portfolio management methodologies.
- Legadero cadence Portfolios by Legadero Software provides everything you need to get a handle on all of your projects. This includes true Portfolio Management via approval process automation, information collection, metric-building and graphical decision support analyses and dashboards. All solutions are easy to evaluate, implement and learn.
- **MaestroTec (MaestroTec, Inc.):** By Maestro-EPM is a web-based solution that helps you manage project portfolios, resources, assets, work flow, and time and expenses.
- PlanView by PlanView Portfolio Management is a rich, integrated Web-native solution that helps organisations manage portfolios, projects, and resources. It is flexible enough to support the needs of small, medium, and large organisational models.
- **PortfolioDirector by Artemis International Solutions Corp:** Strong integration with Microsoft Project client, it has excellent user interface, and good time tracking and reporting and graph-generation capabilities. However, the standard product doesn't support calculation fields, making it tough to estimate overall resource requirements, such as the people, time and money needed for a project. An optional module adds this function.
- **PMOffice (Systemcorp):** This product is an Enterprise Project Portfolio Management solution that automates all your projects, people and priorities across the entire organisation. Companies can organize all projects into portfolios, and instantly track all project deliverables, budgets, tasks, changes, risks and issues from one central location.



- **Portfolio Management Solutions (Pacific Edge Software):** Pacific Edge solutions focus on three key areas of Enterprise Portfolio Management - IT, NPD, and Business Investment Portfolio Management, and allows for a multitude of investment types to be managed within each of these portfolios, such as: assets/applications, projects, products, and resources.
- **Project Activator:** Project Activator is a completely web based portfolio and project management software solution. It tracks active, pending, on hold and completed projects, completes document management, collaboration, project scheduling, resource allocation, budgeting, time tracking with internal and external customers. It has completely secure, Java and XML architecture. The Catalogue feature allows separation of projects by discipline, division, customer, project type.
- **Project InVision (Project InVision):** Project InVision software automates the essential business processes of portfolio analysis and project management.
- **Project Office:** Pacific Edge Softwares product, Project Office, provides a simple, painless way to manage project and resource information across an organisation and provides seamless integration to Microsoft Project for detailed planning and scheduling.
- **ProSight Portfolios Posited Inc:** Interoperates with other products such as Business Engine and its professional services automation capabilities. However, ProSight is more of a portfolio analysis tool than a portfolio management tool.
- **ProSight:** Only top-down portfolio management can deliver immediate value to your organisation. Using prosight portfolio management software, you can realized rapid buy-in and participation from executives and delivered immediate, tangible results—all without replacing existing software or processes. Best of all, ProSight's unique approach guarantees that any organisation can start managing any portfolio, immediately.
- **StatFrames Software Suite United Management Technologies Corp:** Strong in IT portfolio analysis and program management arenas, UMT is moving into portfolio management. StatFrames can identify internal processes. However, lacks asset management capabilities
- **TeamHeadquarters (Entry Software):** This product is a collaborative, browser-based software application combining project portfolio management (PPM), document management and helpdesk in one seamless application. This combination enables workgroups to manage all planned and unplanned initiatives from one integrated environment.
- **UMT:** Portfolio Management Solutions (UMT)- UMT software and consulting leverage 14 years of portfolio management expertise with Global 500 companies to align IT investments with quantifiable business drivers and justify IT spend. Enterprise solutions incorporate Efficient Frontier modeling to determine the optimal mix of initiatives, budget allocation, and skilled resources, while maximizing value and ensuring IT Portfolios execute business strategy.



1.9 EMERGING TECHNOLOGIES

In the Emerging Technologies three key technology themes (as per Gartner) are expected to be having significant growth and need to be watched: (a) Technologies that will enable the development of Collaboration, (b) Next Generation Architecture, and, (c) Real World Web.

a) Collaboration

A number of key collaboration technologies designed to improve productivity and ultimately transform business practices are:

- **Podcasting:** Podcasting offers a way to 'subscribe' to radio programmes and have them delivered to your PC. It is predicted that podcasting subscriptions will grow increasingly important as the market for content continues to fragment, which will lead to a massive shift in radio, and ultimately TV content delivery. Podcasting is an extremely efficient method for delivering audio and spoken-word content to niche audiences and as such could become an important corporate communications tool.
- **Peer to Peer (P2P) voice over IP (VoIP):** Vendor-proprietary P2P VoIP applications are under development although security concerns still need to be addressed. Services like Skype currently enjoy significant consumer adoption and are beginning to make inroads into the business landscape. It is predicted that the technology will be important for collaborative and multimedia applications as well as low-cost communications.
- **Desktop Search:** Also known as personal knowledge search, this is an individual productivity application, residing on the desktop and using local processing power to provide search-and-retrieve functionality for the desktop resident's local e-mail, data store and documents. Google, Microsoft and Yahoo are competing for customer attention, adding to the hype but customers not exhibiting much interest in buying solutions. However desktop search will become a standard feature in Microsoft Longhorn, currently planned for 2006 and should reduce content recreation, increase content reuse whilst raising productivity.
- **Really Simple Syndication (RSS):** RSS is a simple data format that enables web sites to inform subscribers of new content and distribute content more efficiently by bypassing the browser via RSS reader software. RSS is widely used for syndicating weblog content but its corporate use is only starting to be tapped for activities such as corporate messaging. Its simplicity makes it easy to implement and add to established software systems. It is predicted that RSS will be most useful for content that is 'nice to know' rather than 'need to know'.
- **Corporate Blogging:** This involves the use of online personal journals by corporate employees, either individually or in a group, to further company goals. It reached the peak of hype in 2004 although mainstream firms have not yet got involved. Its impact will be on projecting corporate marketing messages primarily and secondarily in competitive intelligence, customer support and recruiting.
- **Wikis:** A simple, text-based collaborative system for managing hyperlinked collections of web pages; it usually enables users to change pages or comments created by other users. Wikis are becoming available from commercial vendors, in addition to many open-sourced products, but not yet from established enterprise vendors. However, they are widely used as



collaborative, distributed authoring systems for online communities, especially those using open-source projects. It is predicted that Wikis will impact ad hoc collaboration, group authoring, content management, web site management, innovation, project execution and research and development.

b) Next Generation Architecture

Next generation architecture will constitute the third big era in the IT industry's history (the first having been the hardware era and second belonging to software).

These emerging technologies will form key pillars of the new architecture:

- **Service Oriented Architecture (SOA):** SOA uses interactive business components designed to be meaningful, usable and useful across application or enterprise boundaries. Despite the current disillusionment with SOA, it is expected support for SOA to grow and for it to mature as a technology within ten years although many changes in user and vendor organisations and technologies are required before SOA reaches its full potential. However, in the longer term, it is believed that SOA has the potential to be transformational to a business.
- **Web Services-Enabled Business Models:** These productivity-boosting models represent a new approach to doing business among enterprises and consumers that would not have been possible without the benefits of web-services. However enterprises are still wrestling with what web services will do and it is expected that the potentially transformational impact of Web Services-Enabled Business Models will have to wait for more-mature standards and clearer examples.
- **Extensible Business Reporting Language (XBRL):** This is an Extensible-Markup-Language-defined standard for analyzing, exchanging and reporting financial information. XBRL helps organisations meet multiple financial reporting needs through a single instance of financial data. It also improves the timeliness and accuracy of financial and regulatory reporting, validation and distribution. XBRL enables integration, aggregation, validation and comparison of financial data. It also automates sourcing and the review of financial data for activities such as loan acceptances, investment portfolio management and risk reviews. Financial accounting software vendors are already incorporating XBRL while regulatory and transparency pressures increase the significance and likelihood of XBRL adoption. However, there have been setbacks in XBRL adoption in the past year; the most significant have been delays in the FDIC and FSA projects that will mandate XBRL reporting.
- **Business Process Platforms (BPP):** BPP provide business process flexibility and adaptability. They use SOA design principles and are metadata and model driven. It is believed that Business Process Platforms will enable business process fusion and move innovation from business application vendors to BPP ecosystems. Ultimately they will replace customized business applications and custom development by extending core applications platforms with composite applications.

c) Real World Web

It is believed that adding networking, sensing and processing to real-world objects and places is creating a 'Real-World-Web' of information that will enhance business and personal decision-making:

- **Location-aware applications:** These are mobile enterprise applications that exploit the geographical position of a mobile worker or an asset, mainly



through satellite positioning technologies like Global Positioning System (GPS) or through location technologies in the cellular network and mobile devices. Real-world examples include fleet management applications with mapping navigation and routing functionalities, government inspections and integration with geographic information system applications. Mobile workers will use either a PDA or smart phone, connected via Bluetooth to an external GPS receiver, or stand-alone positioning wireless device.

- **Radio Frequency Identification:** Otherwise known as RFID, passive Radio Frequency Identification has been somewhat over hyped in recent years although vehicle-based systems are strong. It involves the tagging of very small chips to arbitrary types of objects. These chips transform the energy of radio signals into electricity then respond by sending back information that is stored on the chip. The most conducive environments for passive RFID are chaotic or unstructured business processes where RFID's ability to read without a direct line of sight gives it the edge over traditional bar-coding methods. These might include such diverse activities as manufacturing, healthcare, logistics, animal tracking and laundry automation.
- **Mesh Networks — Sensor:** Mesh Networks are ad hoc networks formed by dynamic meshes of peer nodes, each of which includes simple networking, computing and sensing capabilities. Potential impact areas include low-cost industrial sensing and networking, low-cost zero management networking, resilient networking, military sensing, product tagging and building automation.

Check Your Progress 2

1) State True or False:

- a) Risk factor is worked out by combination of (a) probability of risk and (b) effect of risk. True False
- b) In disaster recovery plan, communication, designated operator, designated manager and external resources likely to be needed must be listed and kept updated. True False
- c) Portfolio management technique is a tool in which only top management is involved. True False
- d) For automating the portfolio management process, the key tools to be looked for are: Common repository, Direct data collection and interchange and configurable data views and portals. True False
- e) For implementing a portfolio management system appointment of an application administrator does not help if system administrator is already in place. True False

2) Answer the Following Questions:

- a) What are the steps involved in IT Risk Management Process?

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- b) What are the steps involved in planning for Disaster Management?

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1.10 SUMMARY

In this unit, we have discussed practically all aspects of the portfolio management. We have covered starting from what is portfolio management to its techniques, methods, tools, issues relating to it and its implementation procedure. This is one of the most acceptable procedure for evaluation of software projects these days. It is suggested that this study may be further supplemented by completing case studies on this topic.

Another very important area covered in this unit is risk assessment and preparation for the disaster management as well as recovery from the disaster. With the growing dependence on information systems, preparedness for any eventuality is definitely a wise thing. It is a matter of concern that after the tragedy so many people and authorities talk about it but eventually keep on hanging on it till next tragedy happens. So let us look forward not to this mistake and prepare for it.

Emerging technologies discussed in this unit are basically for motivating all students to cultivate the habit of looking around the Internet and other places to keep abreast to the trend.

1.11 SOLUTIONS / ANSWERS

Check Your Progress 1

1) True or False

- (a) False, (b) True, (c) False, (d) True, (e) True.

2) Answers / solutions

- (a) The key functional requirements which must be available in the Portfolio Management Solution are:

Budget and Financial Management:

- i) Business Planning and Portfolio Management,
- ii) Project and Resource Management,
- iii) Collaboration and Knowledge Management.

- (b) The steps for portfolio management implementation are:

- i) Gather all ongoing / planned Projects list with necessary details,
- ii) Evaluate: Identify Projects That Match Strategic Objectives,
- iii) Prioritize and Categorize Projects,
- iv) Review: select the Portfolio and implement it.

Check Your Progress 2

1) True or False

- (a) True, (b) True, (c) False (d) True (e) False.

2) Answers / Solutions.

- (a) The steps involved in IT Risk Management Process are:

- i) *plan* use of technology,
- ii) *assess* the risk associated with the selected technology,
- iii) decide how to *implement* the selected technology, and
- iv) establish a process to *measure and monitor* risk.



- (b) The steps involved in planning for Disaster Management are:
- i) assess risk,
 - ii) find options which have lower risk levels / risk reduction,
 - iii) identify Common Disaster Plan Elements,
 - iv) establish Recovery Procedures.

1.12 FURTHER READINGS/REFERENCES

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UNIT 2 ENTERPRISE RESOURCE PLANNING SYSTEM

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2.0 INTRODUCTION

There is a saying that specialist will be ‘one who knows everything about nothing’ or in a layman language we can say that ‘knowing more and more about less and less’. The development of IT has followed the same pattern, at first we had the study of ‘computers’ then further we studied of hardware and software. Software became further specialised into system software and application software. ERP is a living example of new-fangled application software. Achieving and maintaining competitive advantage is the underlying principle for every business around the world. Companies are struggling nowadays, conversely, with the integration of information from diverse contrasting IT systems and are spending approximately 40% of their IT budgets on maintaining such legacy systems. To meet this challenge, companies are investing considerably in enterprise information system which in general known as Enterprise Resource Planning (ERP) applications. It had been sighted that ERP is a key enabler of business process transformation and IT automation. As a substance of fact, gaining strategic advantage is often cited by enterprises as a key reason for implementing ERP. Over recent years the attainment, accomplishment and exercise of Enterprise Resource Planning (ERP) Systems has turn out to be a standard facet of most of the corporate and institutions. At this juncture most of the literature on ERP implementation has focused on the early stages of the ERP lifecycle: adoption, resolution, acquisition and implementation. This unit tells the fairy-tale of ERP systems as a commercial software package that enables the integration of transaction-oriented data and business processes all the way through an enterprise. ERP systems endow with cross-organization integration through embedded business processes and



are by and large composed of numerous modules including human resources, sales, production, purchase and finance. During the 1990s ERP systems were the de-facto standard for replacement of legacy systems in large companies (Parr and Shanks 2000). This unit will outline three (of the several) enterprise applications and business driver's service providers can use to discriminate themselves. We will examine the concepts & purpose of effective enterprise resource planning (ERP), customer relationship management (CRM), and Supply chain management (SCM). We will also demarcate the major aspects of all, examine the drivers and impacts of each, and reflect on how each relates to the service providers' product sets. If we go into the depth of enterprise resource planning system life cycle or rather ERP System Life cycle, the Figure 1 can furnish an elaborate view as the whole process consists of four steps which starts with *Step-1 Assess*: Provide information about cost, size of the package, when to buy, what to buy, what is right, what is wrong whether to go for in-house ERP or invites ERP vendors. *Step-2 Select*: Once the assessment is done next task is to select the module which is an utmost essential, lets take an example of HLL-A FMCG MNC, in India is a marketing oriented company, is in the process to implement the ERP module then it could be beneficial for the company to select the marketing modules. *Step-3 Implement*: Once the selection process is completed, the implementation starts. It is again a very careful and sensitive stage as implementation is not a one-day job and it takes years to go for final touch. In actuality implementation is a joint effort between internal & external team. At last *Step-4 Support*: the annual maintenance contact, in a layman term. It is significant as two different kinds of mindsets are going to inter-mingle, i.e., vendor side and the customers.

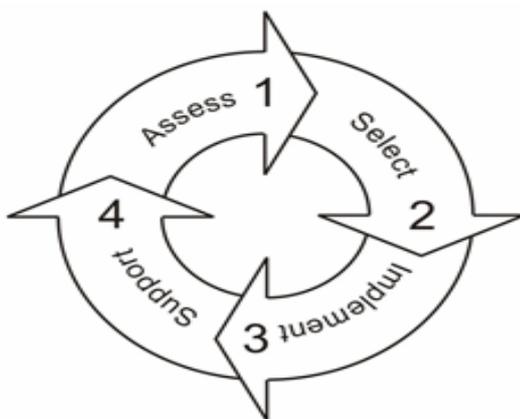


Figure: 1 ERP life cycle

ERP systems can provide the foundation for a wide range of e-commerce-based processes, including web-based ordering and order tracing, inventory management, and built-to-order goods. This unit examines the pros and cons of ERP systems, explains how they work, and highlights their role. We begin by explaining the background of ERP systems and goes on to discuss specific systems, and their capabilities. The unit contains several detailed case studies and will be an invaluable guide to managers and consultants working with ERP systems. It will also be a useful reference for other students taking courses in information systems.

2.1 OBJECTIVES

After reading this unit, you should be able to:

- describe the ERPs evolution and stages through MRP II Roots;
- explain the background of ERP system, and expert systems;
- other ERP Challenges;



- ERP Capabilities;
- explain the efforts made in creation of these systems;
- identify and discuss their advantages in business applications, and
- other ERP Hidden costs.

2.2 ERP-HOW DIFFERENT FROM CONVENTIONAL PACKAGES

Conventional packages are very much confined and restricted. In a general term it is known as legacy system. The features are very less and a slighter possibility to explore. ERP packages are miles away from these petty things. It follows the back-office and front-office concepts. The back-office job is to look after the raw material, financial issues, logistics and in brief internal matters. On the other hand front-office job-profile is to directly interact with customer. CRM is coming up as a front-office package. If we go into the depth of following figure, legacy system are very much condensed and compressed where as ERP system at the same time as compared to it are auto transactional, self helping, and mould itself in different crucial conditions i.e as a generalist and specialist. *Figure 2*, explains the comparison between the legacy and ERP systems.

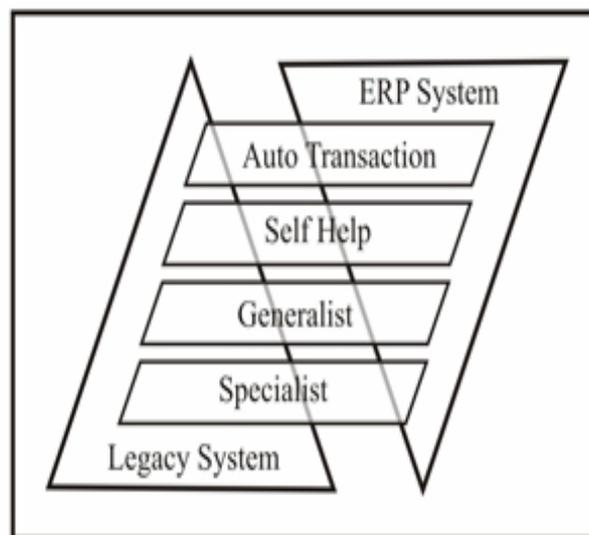
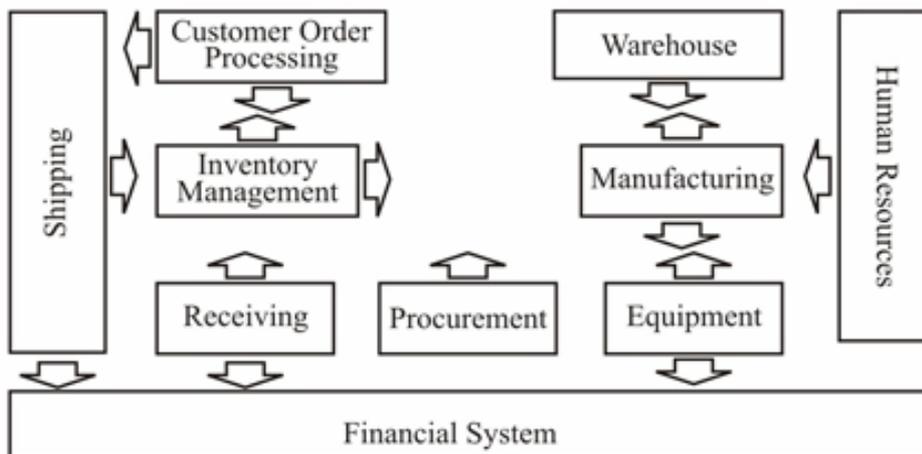


Figure 2: Legacy system and ERP system

2.3 CURTAIN RAISER TO ENTERPRISE RESOURCE PLANNING SYSTEM

ERP is not merely reengineering systems; it is reengineering the manner organisations accomplish business. In a recent CIO Magazine case study, Jeri Dunn, CIO for Nestle USA, said it this way, “If you weren’t concerned with how the business ran, you could probably [install the ERP software] in 18 to 24 months” (**Worthen 2002**). ERP is one of three enterprise-class applications, including Customer Relationship Management (CRM) and Supply Chain Management (SCM) that companies are deploying to automate business processes. ERP is focused on internal back office operation to external front-office such as financial system, human resources, inventory management, shipping, customer order processing and warehouse etc. (see *Figure 3*)



2.4 BRIEF HISTORY OF ERP

More or less any dialogue on enterprise resource planning (ERP) starts with material requirements planning (MRP-I) and Manufacturing Resource Planning (MRP-II) systems of the 1970s and 1980s. In the manufacturing environment of yesteryears, the artistic focus was on the competence to produce the product. This system integrates capacity, design engineering and management, costs, and long range planning of the enterprise into the equation. There are four stages to ERP.

- **MRP-I:** Material requirement planning, which was nothing but a historical background of ERP, the motive, was only to tap inventory i.e. raw materials planning.
- **MRP-II:** Manufacturing resource planning which looks after production related things. The concept of MRP II was to look after shop floor and distribution management activities.
- **ERP:** Enterprise resource planning whose role is very wider and not confined to one department but have a broader purview.
- **ERP-II or MRP-III:** Money resource planning or ERP-II advent can be seen few years after ERP system origination which more emphasize on planning of capital or when surplus money arises.

2.5 FORCES, WHICH MAKES ERP STRONG AND SUCCESSFUL

There are distinguishing forces, which make ERP well built and flourishing. These are not confined to following but changed according to the circumstances.

E-commerce: Without Internet and e-commerce ERP is like, a boat without rudder as there are many locations, which cannot be accessible by road so there is a need of wireless systems, which can efficiently be managed through Internet.

Customer: Customer is vital for every vendor either it is fast moving consumer goods, or service oriented organisation like, insurance sector. Because if there could be no customer there would be no circulation consequently no selling, thus without customer ERP is useless.



Enterprise: It is an appropriate place where it can show its potential.

Financial infrastructure: ERP is not like a windows 98 package, if you won't get the original one you can purchase the pirated from computer shop say in Nehru Place. It requires a planned fiscal setup. *Figure 4* can make the picture clearer.

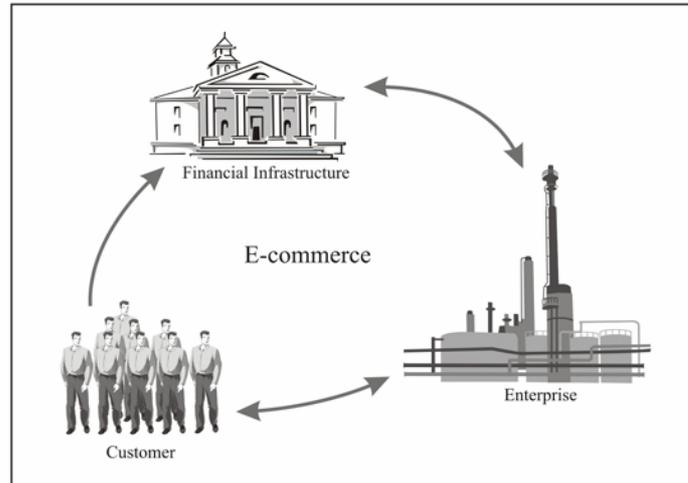


Figure 4: Four Forces, which makes ERP strong and successful

2.6 NEED OF ERP

Conventionally, companies have created islands of automation. A hodge-podge of distinguishes systems that operated or managed a diversity of contradictory business processes. Companies have had analogous complicatedness with each new wave of information technology since the first mainframe systems. It takes years to apprehend some envisioned IT-enabled changes in organisational processes and performance, and there are many ways to fail along the way. An ERP can be defined as a coordination in which various functions of a company (accountancy, marketing, and production) are connected each others by the use of an information system centralized on the basis of a client/server configuration. It is regarding the integrated management system of a company, constructed on an integrated software package undernourished. The need of ERP can be elaborated and explained with the help of following question:

- **Why should we implement an ERP packages.**

Ans: We should implement an ERP package to get an edge over our business rivals.

- **Will it significantly improve our profitability?**

Ans: Have you any doubt about its creditability? It will bring drastic change once you put the flavour of it in your organisation.

- **Will it enhance our customer satisfaction level in terms of cost, delivery time, service & quality in totality?**

Ans: Take an example of pitcher when we go into the market to purchase it and if there could be any hole of very minute size say 0.0005 mm should we purchase it answer is no! So totality is like that, it would not be 99.9 % but absolute 100 %.

- **Will it enable the organisation to reengineer the business process?**

Ans: Yes by changing the approach i.e. mindset of the people and office automation

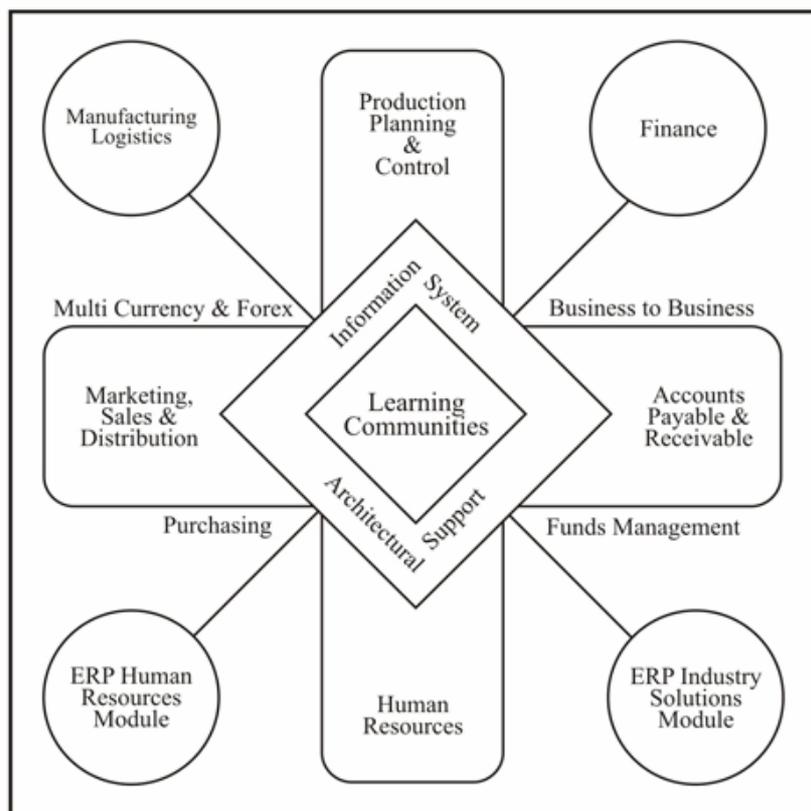
- **Will it permit the organisation to achieve the same business volume with reduced manpower?**

Ans: Yes because ERP is a process by which certain technologies and know-how can be incorporated and put into force, which can reduce and eliminate surplus or unwanted manpower thus results in reduction of cost and increment in profit



2.7 ERP COMPONENTS

If your requirements go ahead of the capabilities of accounting software, and you find the prospect of implementing conventional ERP software overwhelming, you need ERP. All application modules share data through the ERP database, which contains the data for all modules. This is a new implementation of the old key database concept of entering data one time and then using it in all other processing. The world's finest easy-to-use ERP solution is fully web-enabled, seamlessly integrated and can be implemented in weeks. And it can computerize your complete operations globally. ERP can furnish assistance in accomplishing unimaginable efficiency of operations, significant cost savings, and maximize profits. ERP is packed with powerful features, tremendously easy to implement and use, comprehensive in its scope, modular and flexible, fully customizable, totally secure, and incredibly robust. It is the way companies will manage their businesses tomorrow. With ERP, you can assimilate transactions of any pulse of the entire organization, all the time. This drives costs number of your company's branches into one system. ERP can be completely web-enabled and from any type of software on any platform, you can deal with your entire business by exception. ERP modules are a most excellent way to integrate all the departments. It is like a four-wheeler which can not shift single steps without its underneath, for ERP the underneath are its modules which sometimes also known as components. These modules enables all the employees of an enterprise to operate like CEO, giving them the tools, information, and insights they necessitate detecting problems earlier and taking action faster. To facilitate the easy handling of the system the ERP has been divided into the following core subsystems as shown in *Figure 5*.



Source: Adopted from Joseph. G. & George. A 2002

Figure 5: The ERP Learning Community Framework

- a) **Finance:** ERP takes care of complete financial accounting of the enterprise over the web. It maintains all the books and records that are essential for proper bookkeeping and accounting. All transactions affect and update the entire system, and the entire reporting is on the fly, for the most accurate information



at all times. ERP helps you to manage all kinds of taxes, bank reconciliation and everything else that is required for efficient and complete financial accounting. Thus, financials provide real-time visibility into financial results, minute-by-minute control over expenditure, and guidance for better decisions,

- b) **Human Resources:** Handling Software for personnel-related tasks for corporate managers and individual employees of the organisation. Examples: human resources administration, automatic personnel management processes including recruitment, business travel, and vacation allotments, payroll handles accounting and preparation of cheque related to employee salaries, wages, and bonuses. Thus, human resources offers comprehensive HR solutions, from recruitment to compensation to work-force development
- c) **Manufacturing and Logistics:** A group of applications for planning production, taking orders, and delivering products to the customer. Examples: production planning performs capacity planning and creates a daily production schedule for a company's manufacturing plants. Materials management controls purchasing of raw materials needed to build products.
- d) **Purchasing:** Empower the Purchase function just like sales, indents, and orders. ERP covers all aspects of production, including issues quality control, material receipts, purchase invoices and production receipts, multiple bills of material. Thus, purchasing saves the time by simplifying and improving vendor evaluation, performance tracking and quality examination.
- e) **Production, Planning and Control:** ERP enables you to plan for material requirements based on a production planning process. The system reports inventory requirements based on work orders initiated, stocks committed and existing stocks. Thus, PPC provides all possible reports and analysis, which facilitates in managing and keep good control of inventory.
- f) **Multi currency and Forex:** ERP supports accounting for multi-currency operations, with exchange rate tables, transactions in any currency, accounting and reporting in all currencies, and accounting for forex gains and losses.
- g) **Business 2 Business (B2B):** ERP is a virtual portal that can be accessed by customers, distributors, suppliers, and auditors. Anyone with a computer and a modem, and the necessary access permissions, they can place orders and monitor deliveries, and view account statements. To improve your service efficiency you can allow your business associates to manage their own interaction with your enterprise. All reporting can be individual, grouped, or instantly consolidated across the enterprise.
- h) **Funds Management:** ERP enables you to manage funds efficiently. For each wing maintains your complete customer database and does kind of transaction type you may specify its effect on funds flow.
- i) **Marketing, Sales and Distribution:** Helps to optimize all the everyday jobs and activities carried out in sales, delivery and billing. Key elements are: pre-sales support, inquiry processing, quotation processing, sales order processing, delivery processing, and billing and sales information system. This module also includes a Point-of-Sale, which comes under retailing, can optimize the sales figures and also facilitate in having more delighted customers. Billing system with barcode label provides better reading, printing, quick billing and collections.



2.8 DISTINCTIVE WAYS OF IMPLEMENTING AN ERP

A properly implemented ERP system can convey good results & dramatically enhance the aptitude to diminish costs, run leaner, and endow with good customer service. These are distinctive ways of implementing an ERP and following are the implementation approaches:

- **Phased implementation approach:** This implementation approach is also known as Modular Implementation. The system of modular implementation goes after one ERP module at a time. This limits the capacity of implementation usually to one functional department. This approach suits enterprises that do not share many widespread processes across departments or business units. Independent modules of ERP systems are installed in every unit, while integration of ERP modules is taken place at the afterward stage of the project. This has been the most usually used methodology of ERP implementation. Each business unit may have their own 'instances' of ERP and databases. Modular implementation trims down the risk of installation, customisation and operation of ERP systems by reducing the scope of the implementation. The successful implementation of one module can promote the overall success of ERP projects.
- **Big-Bang implementation approach:** This requires simultaneous implementation of numerous modules of an ERP packages. Enterprises outline a grand plan for their ERP implementation. The installation of ERP systems of all modules happens transversely the entire enterprises at once. The big bang approach has the prospective to condense the integration cost if it's executed methodically and cautiously. This method dominated early ERP implementations; it partially contributed to the higher rate of breakdown in ERP implementation. Today, not many companies dare to endeavor it anymore. The hypothesis of this implementation method is treating ERP implementation as the implementation of a big information system, which typically follows SDLC (Systems Development Life Cycle). But ERP is much more than a conventional information system because the implementation of ERP continuously calls for the realignment of business processes. Many parties concerned in ERP software systems are not IT professionals. ERP more than automates existing business processes and alter the business processes.
- **Process-Oriented Implementation:** This method of implementation focus on the support of one or a few critical business processes, which involves a few business units. The initial customization of the ERP system is limited to functionality closely related to the intended business processes. The process-oriented implementation may eventually grow into a full-blown ERP system. This approach is utilized by many small to mid-sized companies whose business processes are not too complex.
- **Vanilla implementation approach:** In another implementation approach that focuses on minimal customisation of the ERP packages.

2.9 GUIDELINES FOR ERP IMPLEMENTATION

- 1) **Understand your corporate needs and culture:** An ERP implementation will bring a change in the roles of different departments and responsibility. In short, it will result in a change in the existing power structure.



- 2) **Complete Business process Change:** ERP can change the whole outlook of business by fully reengineering it and giving it new shape and direction, which could be unimaginable.
- 3) **Provide strong Leadership:** Leaders plays a very vital role in making a destiny of followers, so while selecting a team leader/project leader, this point has to be kept in mind.
- 4) **Choose a balanced team:** The system environment of today's ERP solutions is complex: RDBMS, servers, networking, LAN, WAN, etc. There will be no longer a lot of documentation to specify the requirements. These will be on-line, as an integral part of the package. So the team should be balanced in order to rectify the error.
- 5) **Selecting a good implementation methodology:** It is advisable for the project leaders to set out clear and measurable objectives at the very beginning and review the progress at intervals, as the implementation progresses.
- 6) **Train every one:** Since this ERP package is not confined to specific people but a beneficial to whole organisation so as far as training part is concerned it will be given to all and not restricted to few as it is indirectly going to benefit the organization alone.
- 7) **Commitment to adapt and change:** An ERP implementation should not look upon as a short distance run. It's an on going process. It has wide implications, and will impact the future of the company for many years to come.

2.10 PRACTICALITIES IN AN ERP IMPLEMENTATION

- a) **Inner Practicalities:** The key practicalities in an ERP implementation are the internal preparation. Whether or not a project is successful, depends to a noteworthy extend on an adequate amount of internal preparation.
 - **Be acquainted with your necessities:** Nobody knows your business better than you accomplish. Before calling in vendors, the groundwork within the enterprise is vital. This will not only get geared up to appraise the vendors and applications more effectively, but will also facilitate the enterprise to get better utilisation of any system.
 - **Fundamental Point:** Distinguish all problem areas in the current work process and list transaction that seem to entail special processing from the general process, sales invoices that can not be traced to a sales order, which could pose a trouble in certain types of businesses. Test out the prospect of simplifying procedures and identify areas of duplication of effort. Assemble user complaints of the existing system and categorize them accordingly into sales and purchase. This could be valuable source for evaluating alternative systems. Accumulate information regarding the requirements for reports at various levels of management. If the operations are extend across a region or are global, it has to be considering using one system at all locations, and vendor should have the proficient of supporting the company at all locations. The present hardware infrastructure obtainable has to be checked.
- b) **Outer practicalities:** The new economy and the extended enterprise are the key external factors that have motivated and sometimes pushed some companies to implement an ERP system. A psychological effect also plays an important role on the ERP implementation, where a company takes a decision driven by the phenomena and not necessarily by its own needs.



2.11 OPTIONS FOR IMPLEMENTING AN ERP SYSTEM

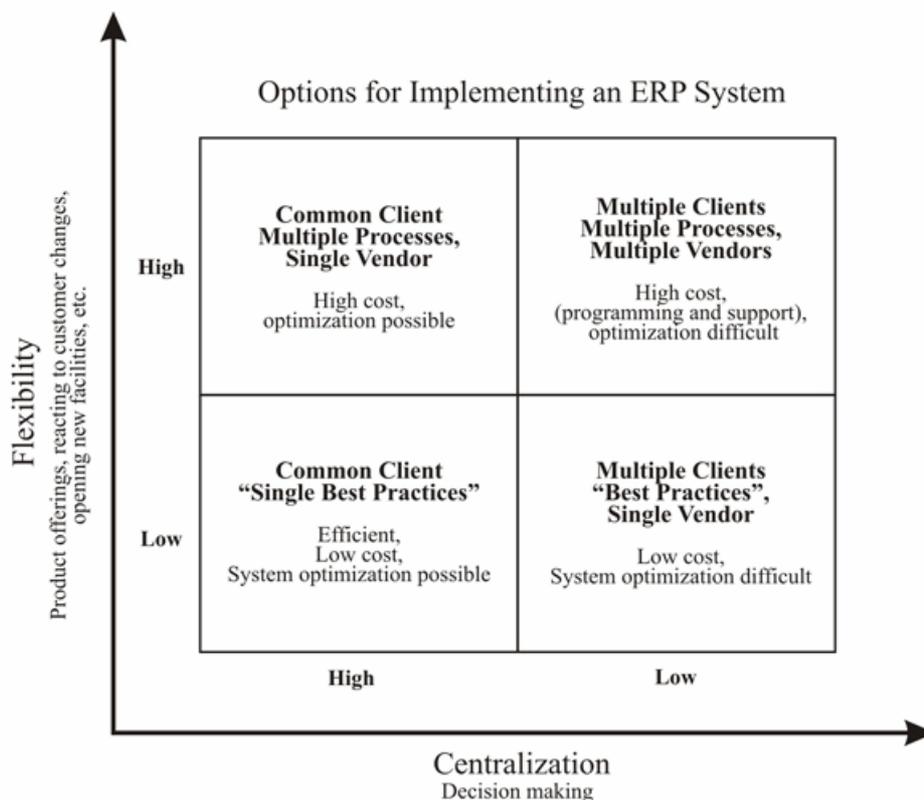
Flexibility means nothing but customisation. Say there is one institution XYZ Management College that is a pioneer name in the field of academics and now it had expanded into the FMCG business and the ERP package implemented is BaaN IV ERP software. At this juncture, flexibility with respect to this is that, it is the single software, which can deal with both the manufacturing organisation and academic institution.

Centralisation: It could be so much centralised that all the departments are streamlined and decisions will be taken from one place.

X- Axis => Centralisation

Y- Axis => Flexibility

Case-1	High Centralisation- Low Flexibility
Case-2	High Centralisation- High Flexibility
Case-3	Low Centralisation- Low Flexibility
Case-4	Low Centralisation- High Flexibility



Source: BaaN IV ERP software

Figure 6: Option for implementing an ERP system

2.12 CONQUERING IMPLEMENTATION OF ERP

Enterprise systems are all about the enterprise and not about systems. Its success greatly depends on the responsibility of top management and active participation of the HR people. The popular notion is that implementation of an ERP is a technology decision. In fact, it is a decision that preferably should be based on business needs and



benefits. The success of an ERP solution depends on how quick the benefits can be reaped from it. This necessitates rapid implementations, which lead to shortened ROI periods. Traditional approach to implementation has been to carry out a Business Process Re-engineering exercise and define a “TO BE” model before the ERP system implementation. This led to mismatches between the proposed model and the ERP functionality, the consequence of which was customisations, extended implementation time frames, higher costs and loss of user confidence.

- **Implementation strategy and approach:** Organisational readiness and preparedness is what makes the key difference between success and failure. Any ERP implementation brings a transformation in varying quantum; hence, senior managements commitment to change management process and piloting the ERP implementation becomes completely necessary. Over a period of time, the additional functionalities that are available in the ERP can be implemented and by that time, the organization would have tasted success of the implementation. The end-user participation and ownership of implementing the ERP is a notable paradigm shift compared to the conventional software development process. Implementation strategy is context dependent. So what is successful in one company may not yield similar results in another organisation. Therefore, the strategy and approach to implementation is a key enabler for successful implementation.
- **Start up education:** The simplest and most cost effective education method is to set up either a 2-day corporate training in the company or at a convenient local venue.
- **Continuous communication:** The success of the ERP initiative, on the softer side, can be accredited to two things, first, in all the communication about the project, a exercise of tying central messages and specific department objectives and needs back to the overall company. Second, a habitual mix of efforts to include everything from conducting workshops, publishing newsletters and holding focus groups to organising lunch time discussions and traveling road shows each designed to suit dissimilar stages across the implementation life cycle.
- **Forming the team:** Selecting the right project leader is as important as selecting the right package. Core team leadership is a full time assignment. Team leaders should know the business well and have cross-functional experience. They should also be politically savvy, have credibility within the organization and be good communicators, and, of course, be from the business side and not the IT management. The team is also as important as its leader. The apex management must make sure that the best and the brightest join the team.
- **Project planning:** An important task is the preparation of detailed plan that covers the total implementation process. Here various project management techniques like PERT charts can be used. The implementation plan should have clear components and should include the time schedule, ownership and responsibility, resource requirements and critical success factors for each phase. The milestones are as follows and thus may be included in project plan that is Training of project team members, Mapping of business onto the software, Function-wise implementation, Customization, Uploading of data, Tests run, Parallel run, Crossover, etc. IT projects are essentially systems integration projects. They are complicated and require attention on issues such as the implication of even the slightest change. The project planning should also lay emphasis for determining the effort (in man-months man-hours) required for carrying out the various activities. It is important to: (a) scope the project, (b) estimate the step-wise and task-wise man-hours required, and (c) preparing a schedule. These all will lead to project plan



2.13 DYNAMICS THAT SHAPE THE PRICE TAG OF ERP

You don't have to be a specialist to be acquainted with that, ERP is one of the most precious technology initiatives that an enterprise can implement. While it is very intricate to endow with global costing guidelines, there are some vital considerations that can smooth the progress of you to guesstimate your total expense for implementing ERP. Here is an overview of four cost dynamics associated with staffing during an ERP implementation. These dynamics will likely weigh into your decision about whether you should purchase a packaged ERP system from a vendor or if you should custom fabricate an ERP solution in-house.

- **Dynamics A- Plan for human costs:** The costs of installation, implementation, and data migration generally run about three to four times the original cost of the packaged ERP software. For example, if your software costs \$2 million, you can expect to pay an additional \$6 million to \$8 million for consulting services to get the system into production, which sometimes considered as hidden costs.
- **Dynamics B- Consider remote consulting:** If your organisation is located in a major metropolitan area, you will likely have lower consulting costs. For example, an ERP project in Jamnagar, Gujarat may cost double the rate of the same system developed in Los Angeles. This factor is here because the rates are more steady and competitive in larger cities. Organisations located in smaller cities may have to compensate their vendor for consulting services at a rate much higher than the market average. If your company is located in a smaller city or rural area, you may want to use off-site consulting and hire consultants who work from home.
- **Dynamics C- Transition your IT staff:** In a recent survey it had been determined that end-user adoption of an ERP package was the greatest anxiety among IT professionals. Analysts authenticate that training end users is a noteworthy expense. In a recent report on SAP end-user training, Gartner suggests that, at a minimum, enterprises should allocate 17 percent of the total cost of an ERP project to training. Gartner research also establish that companies that budget less than 13 percent of their costs for training are three times more likely to see their ERP projects run over time and over budget when compared with companies that spend 17 percent or more on training. But end users aren't the only staff members who should concern you. Staff turnover among developers is common in organisations that are implementing an ERP solution. If you desire to purchase a packaged ERP solution, be prepared for staff turnover. In many cases, programmers will be excited to learn a new technology, while others are reluctant to clinch change. On the average, IT managers can anticipate to lose up to 40 percent of their IT staff, primarily those programmers who are unwilling or powerless to master the new software.
- **Dynamics D: Avoid the illusions of false savings:** Many managers choose to purchase a prewritten ERP solution under the hypothesis that because the software is prewritten, they can rationalise their IT staff. In reality, prewritten packages require IT personnel to locate bugs and apply patches to the packaged software. There are seldom any real human savings associated with adopting a prewritten ERP package. In practice, your IT staff will stay behind about the same size, with your old programmers being replaced with application specialists.



2.14 ERP BENEFITS

The ERP system has an enormous payback and it is 100 times better than a conventional packages. Some advantageous features of ERP system are: Communication with Suppliers/Customers can be automated, efficiency is aided by reduced manual entries, dependency on human resource eliminated, integration of all function already established, readymade solutions for nearly all the problems, supplier and customer can intermingle on-line at any time, reach multiple locations through one system, complete integration of systems across all functions, pace in transmission of information etc. The few other elaborated benefits are:

- **Automatic Updation to new Technology:** ERP systems can automatically update itself according to the new technology.
- **Enhanced flexibility:** ERP is multi-module application software and is very flexible and frequent, e.g., production manager can access ample number of information through his lap-top of marketing department by sitting at his home.
- **Improved customer satisfaction:** with the help of ERP, customer have an individual login name and password and they are able to solve their grievances by Internet alone specifically no need to waste time in visiting personally.
- **Information Technology:** Reduced support costs. Reduced infrastructure costs.
- **Lead-time minimization:** “time gap between ordering the goods and its delivery is known as lead time” so if this could be minimized then there will be reduction in inventory cost burden.
- **Process Improvements:** Eliminate redundant transactions and multiple reconciliations; extra efficient job rotation process; more efficient staff and succession planning.
- **Related initiatives:** Better focus, reduced spending.
- **Strategic Direction:** Improved resource allocation, More flexible organisation, and better future decision making.

Check Your Progress 1

1) “Enterprise systems are all concern with the enterprise and not about systems. Their success to a great extent depends on the responsibility of top management and energetic participation of the HR people. Implementation of an ERP is not a technology decision. In actual fact, it is decision that ideally should be based on business needs and benefits”. Explain and elaborate the above statements in the lights of ERP systems?

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2) What are the strategies used for successful implementation of ERP application?

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3) What are the objectives of implementation of ERP? Explain distinctive ways of implementing an ERP. In short throw some light on the guidelines for ERP implementation and practicalities face during implementation?

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4) How ERP systems have changed the work of IT organisation?

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5) What do you mean by resource and how it had a relation with ERP?

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6) From where ERP had been originated and what are the concepts behind it beginning?

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7) What are three major reasons to undertake ERP?

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8) What do you mean by components of ERP?

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2.15 CUSTOMERS EXPECTATION IN ERP PACKAGES

Expectations in ERP packages are a birth right for customer as they are a going to be the owner of the product. The customers have to be very cautious and imagine a lot while finally locking the product. The expectations they use to have regarding the product is elaborated and explained one-by-one.

- **Financial health of the company:** Implementation of ERP can give an organisation a new shape that is more emphasize on the financial status, so the organisation awakes about that whether they are moving towards southward direction or in a northward direction.
- **How big the company is and whether its main focus is implementation alone?** ERP's user's total strength and size plays a very vital role while considering all the factors as vendor's core benefit is not only to emphasise on implementation and go out, but to build long-term relationship in order to tap more business i.e., after sales service, more implementation at different places.
- **How easy/fast is it to get skills on the package?** Again this is a question, which varies from company to company and also depends on the level of highly skilled and technocrats employed by the organisation thus whole effort is required by user itself.
- **Is implementation of the package easy:** This is something, which can not be answer in one word i.e., yes /no it is amazing which requires cooperation from user as well as vendor? So it will be an easy job if you are serious and toughest when you take it lightly.
- **Is the package compiled:** It covers all areas of the department starts from production then marketing, purchase, research and development and many more, specifically it has to be very exhaustive.
- **Is the package localised:** Now, the million dollar question is about the SAPAG which is a German based company and has a corporate office at that place alone and if somebody keen to purchase a package who resides in India what strategy the SAP is going to follow as far as service part and other up gradation issues are concerned.
- **Is the package too old or too new:** This includes many other things and gives answers to a lot of questions like latest trends, present platform, also its competency like Y2K compliant? VAT ready etc.
- **Number of implementations in the country:** More the implementation more the experienced ERP vendor are, consequently leads to better after sales service and grasp market share. Take an example of Tally or other financial package such as wings, Accpac, etc. when we actually go for purchasing why we give priority to tally answer is only due to its market share and ample number of implementation.
- **Quality of the consultants hired:** Consultant whose role basically is to bridge the gap between the vendor and the user as a liaison, however same time consultant job is also to provide training, giving knowledge to both user and vendor about the latest trend and also guide them about the in-house development of ERP or purchasing from outside.



- **Who is supporting the package:** Under whom banner the package had been explored, are they the brand name or a layman in the field of ERP. If they are new player what USP's they have followed so the user can be extracted like Oracle- master in production module, but the new player come-up with R & D module which no other vendor have.

2.16 STUMBLING BLOCKS

ERP System, though a boon to the corporate world is again not foolproof. However, this system suffers a number of problems including:

- **Confusing and difficult:** ERP Softwares are a gigantic package and consists of numerous modules, so it is very difficult to understand its characteristics but once you understand it becomes easier to work.
- **Customisation is costly:** Customisation is obviously costly, for instance when report is needed to configure, one person expected from the ERP vendor's side has to come and give support. Hence more the customization /configuration greater should be the service cost charged by the vendor.
- **Customisation is time consuming and in many cases impractical:** ERP is not a one or two day job it is a regular process it requires years to complete as many things have to be incorporated into it i.e. mindset, office automation, etc. There is clause of hidden cost, which always pinches the user.
- **Decline of an individual's monopoly over information monopoly:** As information can be put into the server and rights and authority can be given to appropriate people who can access it so that production department data cannot be confined to production department people. It can be shared by marketing department people with the help of login name and password thus cutting short time and reducing paper work.
- **ERP engenders a host of fears:** It engenders a host of fears on some of them are Job Redundancy. There is misconception among the employees that ERP can be a threat as for upcoming employment, this is not absolutely true because the persons who are not working hard have to be more cautious as performance appraisal chart is regularly maintained and monitored. Therefore, for people who take no pain there is no gain.
- **Geographic Restriction:** The ERP packages are readymade packages made by the ERP vendors and can be customized according to the user need, thus sometimes not suits individual persons who are geographically away.
- **Implementation of an ERP project is a long process:** Like customisation implementation is also a long process because there is ample number of departments and ERP can come in full-flow when the entire department should be fully compatible with ERP integration.
- **Platform restriction:** Platform restricts could be the another obstacles upto some extent as they are using different operating systems.

Major stumbling blocks take account of the technical issues around providing adequate and protected access to ERP from heterogeneous locations and platforms.

2.17 ERP SYSTEM ACCOMPLISHMENT

Though ERP systems suffer from certain drawbacks or rather we can say certain obstacles but its merits supercode it demerits. Few accomplishments, which motivate ERP to follow the 24x7 culture. While ERP systems are generally the most expensive institutional information system implemented by most institutions over recent years,



they are not alone. At most Universities there are other information systems filling organizational needs that ERP systems do not address. Course management systems (CMS), such as WebCT and Blackboard, are usually the next most expensive and far-reaching example. Other institutional information systems may include: timetable management software, assignment tracking software, bookshop management software, library catalogue systems and various infrastructure systems such as student and staff authentication. While the label of this paper mentions ERP systems, the basic premise of this paper is that a gap exists between the functionality of all institutional information systems and the needs of the staff and students. The few USP's of ERP systems are:

- 1) **Web-based student records:** Provides staff with access to student records data including course lists, student photos, and student enrolment details.
- 2) **Timetable generator:** A web application that allows a student or staff member to generate a personal timetable.
- 3) **Minimum course presence:** The provision of a consistent minimal web site for every course offered by Infocom independently of academic staff and as early as possible.
- 4) **Informal review of grades (IROG):** Web-based processing of student requests for an informal review of a final grade.

2.18 STEPS FOR AVOIDING PITFALL

An ERP system will perhaps be one of the prime investments you will make, so it's critical to the enterprises to do it accurately. The worst thing you can do is most often by picking the wrong software, make a team to undo the mess, and then relocate for a correct "aim". We have all read the horror stories of enterprises that acquire implementation decision in haste by initially purchasing software before they were ready.

- **Classify the Methodology:** Choose on and stick to a lucid, analytical methodology. The methodology should guide you through each step in the selection process and diminish the emotional proportion in the selection. The processes include distinctive phases for completing a thorough business-process review; evaluating vendors; managing software demonstrations; supporting the eventual decision-making process; and structure the supporting implementation plan, together with costs.
- **Plot to Business Processes:** Don't start with software demos. Begin with your business processes, and then map out your feature/function requirements through a series of business-area reviews, the creation of process maps, an assessment of "to be" process changes, and the development of a requirements matrix with supporting business scenarios.
- **Be conscious of Organisational Chemistry:** Use your instincts when it comes to the organizational chemistry between your enterprises your consultants, and your selected vendor. You want a consulting organization that you sense relaxed with, one that can extract the input it needs from your in-house team members. Be on the watch out for a solution that sounds too trouble-free or will be done in a month. You are making a critical decision this has to be taken into consideration always.
- **Elect to choose a well-built Team:** Set up a steering committee with the president or CEO and heads of sales, finance, and operations, and sanction them to make decisions.
- **Scrutinize Potential Vendors:** Accomplish a rigorous software-selection process, and situate potential vendors under the microscope. Think about more

than just features and functionality a financial stability, technology strategies, long-term support, implementation successes, and corporate culture, are key factors.



- **Appraise Business Processes:** Be equipped to alter some business processes if you want to minimize or eradicate customization. Even the smallest enterprises have to make process compromises in their final solution.
- **Bargain Customisations:** Negotiate all of your customisations before signing a contract. If you do have to customize, you want to be acquainted with up front what it will cost and more important discuss about hidden cost and then incorporate that as part of your contract.
- **Modernize Infrastructure:** Plan for an infrastructure improves to sustain the new system. Some ERP implementations require the redesign of your network; make sure you identify what you require to do and how much it will cost.
- **Predict Elaborately:** Elaborately look after your implementation plan. The goal is to foresee now, to eliminate implementation setbacks in terms of both cost and time. Implementation will always be preferred or rather become mandatory with the Vendor team i.e., make convinced that your software vendor has a role in your implementation. The software vendor has the most vested interests in making clear-cut that you are a pleased customer.

2.19 SUGGESTIONS TO AN ERP VENDOR

Deciding by the vendor to supply ERP software is probably the most complex decisions in the whole ERP Project, so you have to incorporate the following point in mind as ERP Software being so expensive, one cannot manage to pay for to make mistakes and correct it later. They have to be very particular in taking decisions, that is, who are the key man and whose benefits are addressed. No doubt that ERP-software is a foremost requisite for a big corporate explicitly who are going to implement it in a near future. The suggestion to ERP-vendor is that they could bestow much emphasis to make their product qualitative, competitive and price effectual rather than contemplate in selling because automatically the sale would come to them once the product is acceptable. Key suggestions that have to capture into account are:

- **Try to sell products in module wise and according to need:** Specifically, if the concern is marketing oriented then force to sell the marketing module of ERP first, if production oriented then the Inventory Module.
- **MoU (Memorandum of Understanding):** Some MoU or issue base alliance is required between the two or more organizations, in order that in short span of time they can be able to fabricate quality product and attract customer. Like sharing of R&D (Research & Development) lab and many others overlap work so to make the product more competitive and cheaper as well.
- **Try to cut-off the existing price** With the intention that vendor inclination is on selling multiple numbers of copies and attain a market share i.e., they will try to sell more licenses.
- **Installed that portion of module which required utmost:** Generally full fledged installation requires years to complete so it is advisable both to vendor and user to installed that portion of module which required utmost. Like, HLL is a FMCG their core area is marketing and selling so they walk off for sales and marketing module first.
- **Proper implementation of an ERP project:** Proper implementation of an ERP project is the most crucial activity in the life cycle of an enterprise. This requires careful planning and teamwork.



2.20 FAQ- FREQUENTLY ASKED QUESTIONS

FAQ-1: Explain what problem the company will face if they develop ERP package in-house.

Soln: ERP packages are software-integrated packages with ERP concepts. ERP vendors generally develop ERP packages. Developing ERP package in-house will let a company to face major problems of cost and time. Developing in-house ERP packages is very complex, time-consuming and extremely expensive. Developing packages is the headache of the ERP vendors. They are specialised at such works and they have made developing packages their own business. Any organisation should concentrate on its own products and its better quality rather than wasting time and money on developing ERP packages. Developing ERP packages should then be left at the disposal of the ERP vendors. Thus, in house ERP packages require much resources and time and moreover its failure may leave the company out of business. So taking such a big risk must always be avoided because it may create a major problem in the business environment of the company.

FAQ-2: What Makes ERP different?

Soln: Traditional computer information systems used by many businesses today have been developed to accomplish some specific tasks and provide reports and analysis of events that have already taken place. Example is an accounting general ledger system. Occasionally, some systems operate in a 'real-time' mode that is, have up to date information in them and can be used to actually control events. A typical company has many separate systems to manage different processes like production, sales and accounting. Each of these systems has its own databases and seldom passes information to other systems in a timely manner. ERP takes a different approach. All applications access common data. Real events in the business initiate transactions. Accounting is done automatically by events in sales and production. Sales can see when products can be delivered. Production schedules are driven by sales. The whole system is designed to be real-time and not historical. ERP structure embodies what are considered the "best business practices". A company implementing ERP adapts its operations to it to achieve its efficiencies and power. The process of adapting procedures to the ERP model involves "Business Process Re-engineering" which is a logical analysis of the events and relationships that exist in an enterprise's operations.

FAQ-3: What types of people become ERP certified?

Soln: A wide range of people chooses to follow the ERP certification for a variety of different reasons. In short, almost anybody who works in or around the ERP industry may choose to become ERP certified. Some common types of people that choose to become ERP certified include:

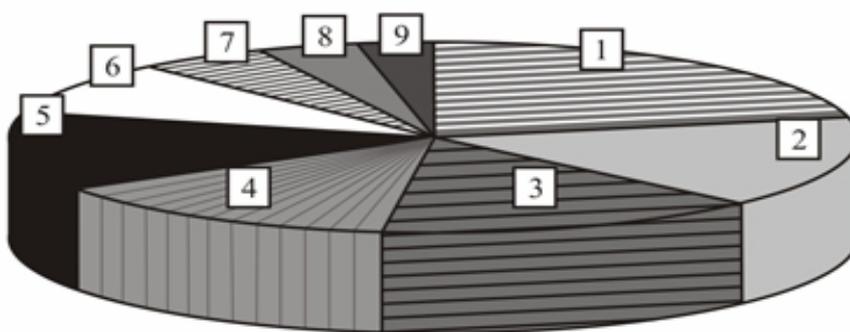
- | | | |
|---------------------------|----------------|-----------------------|
| • Authors and Journalists | • CEOs | • College Teachers |
| • Consultants | • End Users | • ERP Sales Personnel |
| • ERP Team Members | • ERP Trainers | • Functional Managers |
| • Implementers | • Programmers | • Project Managers |
| • Senior Executives | • Students | • Help Desk Support |

2.21 CUSTOMER RELATIONSHIP MANAGEMENT

Preserving existing customers and providing improved services to expand the loyalty is termed as CRM. The rationale that business exists is their customers. Developing rapport with customer and supervising it resourcefully with the intention that it is valuable to both the customer and the business is an imperative goal. CRM facilitates business in accomplishing this goal. In today's marketplace winning and sustaining muscularly built customer relationships can make the



difference between success and a failure. Faced with global competition and short product lifecycles, organisations require making accessible their customers with the topmost possible standard of service to keep hold of business. This means knowing the customer's needs, preferences, buying history and potential future purchases. CRM is software, which facilitates an organisation to oversee its customers healthier. Company might have a database about its customers that make available information about them in great multiplicity. With the assistance of CRM software, sales people and service representatives can access this information and bestow with customers with customised service as per customer needs with sky-scraping attitude to product plans and offerings, jog the customers about service requirements, identify what other products a customer had purchased, and so forth. CRM can also be web enabled thus adding greater value to the entire progression. CRM (Customer Relationship Management) applications smooth the progress of the capture, consolidation, analysis, and enterprise-wide dissemination of data from existing and potential customers. To build up the full benefit of CRM, it must be seen as combination of people, process and systems rather than just IT application. Customer relationship management (CRM) is the most talked about of the three enterprise applications that are the focus of this unit. As the economy remains lethargic and customers remain cautious, the need and aspiration to get closer to customers are the primary means of differentiation in the marketplace.



1. 22% Customer Service Support
2. 15% To increase the effectiveness of direct sales force
3. 15% In support of business - to - business activities
4. 14% In support of business - to - consumer activities
5. 13% Call center management
6. 09% In-bound call center operations
7. 05% Out-bound call center operations
8. 04% Others
9. 03% Full automated operation (i.e. No CRM involvement, "light out")

Figure 7: Objectives for using CRM applications

CRM Classification

CRM application software can be normally alienated into five areas,

- **Customer Decision Support:** Customer decision support tools lend a hand to companies in decision-making. Elegant analytical tools are available, that can process hefty amount of data.
- **Customer Information Management:** Customer information management tools facilitate a single outlook of a customer across multiple channels. Customer information management tools make it achievable for customers, staff and intermediaries like contact center to share the same data about a customer across manifold channels.



- **Customer Interactive Management:** Customer interaction management tools, frequently called operational CRM. These tools facilitate additional effective interaction with the customer.
- **Systems Integration:** Systems integration tools permit companies to join mutually in their dissimilar business applications with CRM.
- **Workflow Management:** Workflow management tools augment the customer service by enabling automatic distribution and prioritization of tasks.

What does CRM Provide?

- a) **Technology enabled selling:** Technology enabled selling helps companies understand how technology can assist sales and improve bottom line. TES integrates customer information and transaction data. Implementing TES requires high level of integration with legacy systems and disparate hardware systems. TES has three sets of component building blocks.
 - a) The first building block customer information. This information is situated in company databases and manipulated either by legacy or ERP systems.
 - b) Companies should have infrastructure of systems like telephones, faxes, personal computers and other devices, in place that would allocate company to communicate and demeanor business with customers.
 - c) Finally the third is a set of advanced applications, often specific to industries.
- b) **Call centers:** Call centers are playing an increasingly significant responsibility. They are emerging as main point of contact, providing service to customers, business partners and employees. Call centers execute the following five functions:
 - a) Engender reports for root cause analysis.
 - b) Formulate recommendations to customers concerned with the product/service which suits the customer needs.
 - c) Make available more information about product and services.
 - d) Obtain calls and monitor progress on customer requests and problems.
 - e) Resolve issues or refer problems to subsequently level of service.

Call centers have the ability to be linked with voice, video and data together. Illustration of Polaroid is exceptionally interesting. Polaroid has an after sales service call center in Scotland. Customers across Europe can call into that call center. The computer identifies the country of incoming call and routes the call to representative who speaks that language.

- c) **Internet telephony protocol:** This allows customers to speak to the customer representative at the call center while browsing the company's web site. The customer can contact the call center simply by clicking a hyper link. At the other end the call center agent can pull information about customer's history, products, previous service calls if any.
- d) **Better Field service:** Companies can make available better field service using call centers. Call centers can forward customer complaints to representatives in the field. Enabled field service sales representative can get up-to-date customer and product information via Internet. Sales representative can get information about product designs and repair manuals. They can ensure outstanding customer queries, service calls, and customer history all while in field. Customers can not only download product documentation but also communicate with other users. It has as database that can provide answers to questions.
- e) **One to one marketing:** One-to-one marketing means that business knows' each customers tastes and preferences allowing companies to customize customer visit.



By providing a personalized experience to customer you can accomplish better customer service, retain customers and develop lasting relationships. Amazon is one such example. Amazon knows its customers reading tastes and suggests books that meet up that interest. CRM software facilitates companies to accumulate, retain, and analyse information about individual customers allowing organisations to accomplish this. Call centers and internet make it easy for companies to correspond with customers. It makes easier for them to track buying behavior and keep hold of customers.

Comparative study between ERP and CRM

Since ERP and CRM both talks about integration and both are enterprise oriented, still there are some discrepancies. The comparative study can make the picture clearer by Comparing ERP with CPM.

ERP: Enterprises conventionally focus on processes and technologies, with purpose of optimizing these processes using MRP and ERP systems. The focus was always inward.

CRM: With Enterprises becoming more customers oriented, they are realizing the benefits of including customers and business partners in the value chain. Enterprises are becoming more externally focused.

ERP: Enterprises use ERP systems to integrate and deal with distinguish operations and process. ERP system integrates functions like Accounting, Human Resources, and Inventory Control to give an integrated enterprise.

CRM: CRM Enterprises have started to realize the 'value of strategic extensions' like Supply chain management and Customer Relationship Management applications. These softwares enable companies to amalgamate.

ERP: Enterprises are replacing materials requirement planning with supply chain planning software as it enables companies to generate optimal plans for producing, delivering goods through collaboration.

CRM: Companies are integrating CRM software and other Internet based applications with ERP packages to create what is being termed as 'Extended enterprise'.

ERP: ERP systems handle core information related to company's business, customers, products, orders and employees and financial data. Extended enterprise allows the company to share this single source of information with all relevant parties. ERP can reach out suppliers and customer by means of Internet.

CRM: Applications like CRM and supply chain planning provide enhanced functionality.

Incorporated ERP & CRM Simultaneously in an Organisation

The major purpose behind jointly going for CRM and ERP is that, customer interacts with companies through variety of channels like phone, fax, mail, email, web sites, and wireless devices. Ensuring quality customer service and providing consistent information is main challenge for business. CRM packages can facilitate companies to consolidate information across dissimilar channel and present consistent information, irrespective of channel. The permutation and combination of ERP and MRP has helped organizations congregate data over years. Data collection isn't enough. It must be properly applied. CRM, Internet and technologies have created endless opportunities for tracking, leveraging this data tied up in ERP systems.

CRM Integration Points: Companies are suitably customer oriented. Providing excellent customer service and timely response is no longer a matter of preference but



a necessity for business. The winning businesses will be those who can delight customers and work together with business partners. CRM solutions assist companies to accomplish these objectives by leveraging the power of Internet, networking and ERP system and building a effortlessly integrated enterprise. The following Figure 8 can give a clear picture. Companies look forward to extend their capabilities by the two approaches:

- **Best-of-Breed Approach:** They can use best-of-breed approach tying CRM, SCM software provided by different vendors to their core ERP systems.
- **Single vendor Approach:** Else, companies can take a single vendor approach, implementing required systems provided by existing ERP vendor.

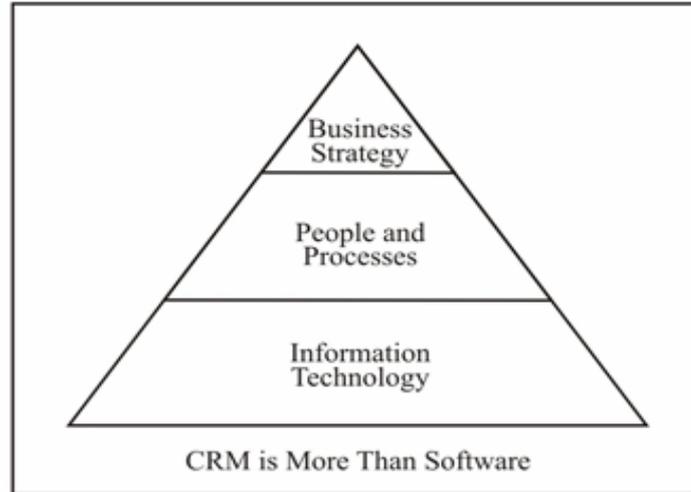


Figure 8: CRM is more than software

2.22 SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) helps businesses to enhance and understand the activities that endow with component level material for their finished product. For example, in the retail sector, wholesaler relationships are vital, and in the automotive industry, part supplier relationships can influence the manufacturer’s capability to construct a car on time. By focusing on SCM, corporations can significantly get better operational efficiency. SCM seeks to help businesses control costs by uncovering the difficulties in their key relationships (e.g., with internal suppliers and external vendors). The fundamental matter is the necessity to understand customer demand and bring into line it with the supply side of the business. By doing this, organizations can condense or even prevent costly overruns and/or product shortages.

SCM software achieves these outcomes in a diversity of ways and a variety of implementations. Fundamentally, SCM links suppliers to databases that show forecasts, current inventory, shipping, or logistics timeframes within the customer organization. By giving those suppliers such access, they can well again meet their customers’ demands. For example, the supplier can adjust shipping to make certain that their customers have the inventory necessary to meet their customers’ needs. Suppliers can download forecasts into their own manufacturing systems to automate their internal processes as well.

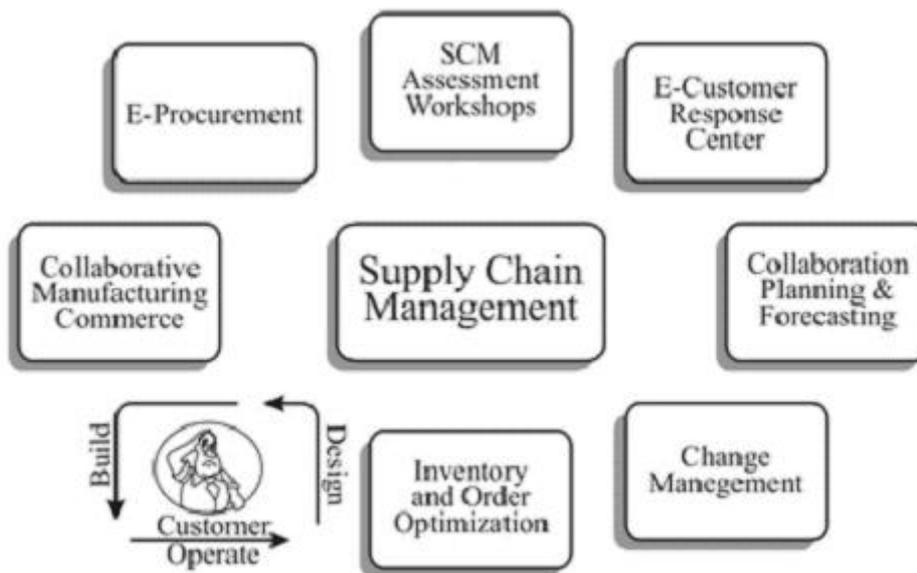


Figure 9: Supply chain management

Collaborative research on ERP integration with SCM

Implementing new software into your company's core businesses processes is a painful modus operandi. In the early 90's, ERP came of age. One and all had to have the functionality ERP packages promised. Since then, as Web and Internet technologies have matured, ERP packages on the front end, and Supply Chain Management packages on the back end, these packages have come into their own. One of the most enduring instructions of the mount and collapse of the dotcoms was their breakdown to recognize the magnitude of sound Enterprise Resource Planning & Supply Chain Management. The capability to deliver on time is perhaps the only differentiator between companies in an arena where the competitor is only a mouse click away. ERP is one such vicinity, which has revolutionized business environment from underneath to pinnacle. Information shows that fortune 1000 firms have or will install ERP system, which will boost the global ERP market from 675 billion to 2250 billion rupees, over the next 5 years. So far, ERP sounds like a great idea. Yet, switching to an ERP system is a bit like constructing a new-fangled residence to replace an aged cottage. You know you necessitate it, and you can envisage how much more functionality the new residence will have, but the aged cottage is paid for and hard to give up. In addition there's bound to be interference during the constructing process and of course some surprises along the way. Victory in today's manufacturing environment is no longer measured merely on the basis of how proficiently your plants can manufacture products. Rather, success is increasingly measured by how effectively and efficiently you can consistently congregate customer requirements. Meeting those ever-changing requirements demands the greatest enterprise solutions for your business – solutions built for manufacturers, by experts who understand manufacturers. ERP with SCM recommends a established enterprise software solution, optimized on and provided specifically the proper platform. The solution offers deep functionality for manufacturing execution and the other areas of a manufacturing.

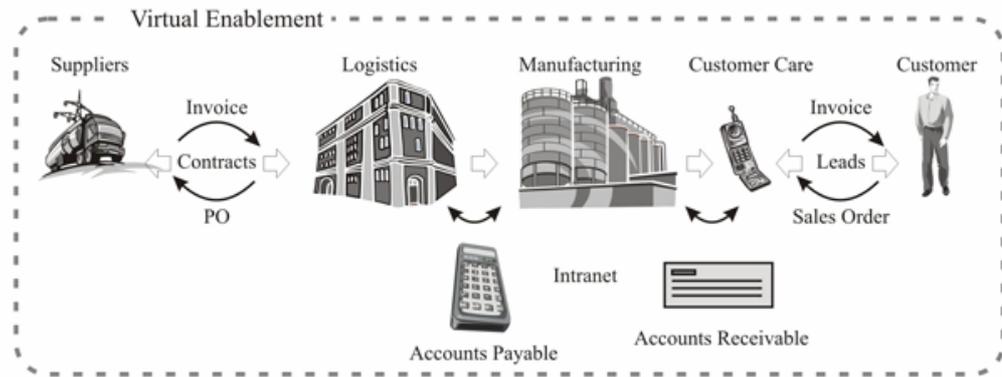


Figure 10: Pictorial presentation of ERP and SCM functioning

Importance of ERP in SCM

Traditionally ERP tools were not considered for SCM and resultantly, the information flow between various members of the supply chain was slow. This was because until the late 1990's the concentration of organizations was on improving the internal efficiency alone. Therefore, ERP systems also supported only such functionalities and the systems across the supply chain were disparate. The organizations however, soon realized that although internal efficiency is important, its benefit would be limited unless complemented by increased efficiency across the supply chain. They also realized that, faultless flow of real-time information across the supply chain was key to success in the emerging market scenario which was characterized by galloping advancements of technology, shorter product life cycle's etc. Therefore, organizations started integrating ERP applications with SCM software. This ensures that the efficiency was achieved across the supply chain and there is a seamless flow of information. ERP in such state of affairs, becomes a vital link in the integrated supply chain as it serves as the integrated planning and control system.

In summary, ERP applications help in effectual SCM in the following ways:

- **Share data:** They can create opportunities to share data across supply chain members, which can help managers in making better decisions. They also make available wider scope to mangers of supply chain by making available much broader information.
- **Real-time information:** ERP systems can provide real-time information, which can be great help in supply chain decisions. For example, ordering raw materials can be based on the inventory details provided by the ERP systems.

Web-enabled ERP and its impact on SCM

The web-based technologies have revolutionized the way business is carried on and supply chain management and ERP are no exceptions. In order to leverage the benefits offered by this new technology enabler, ERP systems are being "web-enabled." Internet allows linking of the websites to back-end systems like ERP and providing connections to host of external parties. The benefits of such a system are that customers have direct access to the suppliers ERP system and the vendors in turn can provide real-time information about inventory, pricing, order and shipping status. Internet thus provides an interface between ERP system and the supply chain members allowing real-time flow of reliable and consistent information. To illustrate a benefit of web-enabling ERP, such a facility allows customers to go on-line and configure their own products and get price information and immediately gets to know whether the configured product is in stock or not. This is made possible, as the customer's request directly accesses the ERP system of the supplier.



ERP vs SCM

The difference between ERP systems (e.g. SAP, Baan, People soft) and SCM systems has been subject to extreme debate. One of reasons for the same is that the ERP vendors are adding additional SCM functionality to their products while SCM vendors are also expanding their functionality, encroaching on the area handled by the ERP vendors. With the vendors of ERP systems and SCM systems adding new and more functionality, the divergences between the same have been distorted. For example, major ERP vendors are introducing advanced planning and optimization as an integrated component (also a component in SCM) of their system. In the following table, let us try to understand the main discrepancy between ERP and SCM systems at the moment available.

Table 2.1: ERP vs. SCM

Point of Comparison	ERP	SCM
1. Comprehensive	More elaborative	Moderately less
2. Sourcing tables	Somewhat still	Self-motivated
3. Complexity	High	Reasonably less
4. Functionality	Moderately less dynamic	Execute simulation of alteration
5. Processing Speed	Quite slower	Quicker
6.. Managing of Constraints	Considered in isolation to each other	Synchronized handling

Check Your Progress 2

1) Can CRM be ERP?

.....

2) How does Supply Chain Management evolves? Explain in brief the concepts of SCM?

.....

3) Distinguish between ERP and SCM.

.....

4) A supply chain management is a business approach that focuses on integration, and partnerships, in order to meet customer’s need on a timely basis, with relevant and high quality products, produced and delivered in a cost effective manner?



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2.23 SUMMARY

In the world of networked markets, to be innovative, one needs not only to think out of the box, but also think more importantly about reaching equilibrium. ERP Systems helps organizations to maximize their growth & potential. ERP suites can improve and update corporate resource management, but the training and costs involved can be high-priced. ERP is one such vicinity, which has revolutionized business environment from underneath to pinnacle. If you throw a little light on the *Figure 11* there is an elephant, which had been compared with ERP system. Purpose is that ERP had got so much **height + solidity+ depthness**, which in general elephant possess. And whatever functions you are imagining you will search out by a click of mouse.

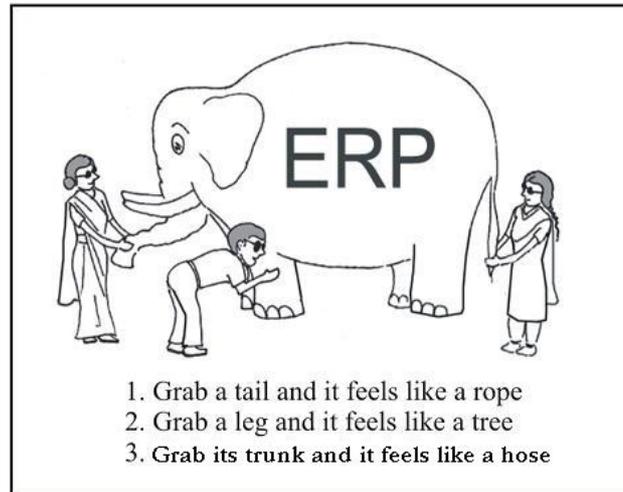


Figure 11: ERP is like an elephant

ERP deployment, management, and evolution are significant operational concerns in today's cost conscious business atmosphere. The performance of enterprise applications designed to streamline ERP processes and operations is dependent on the fundamental network infrastructure. Companies should take a holistic view of their mission critical application, networking environments and include best-in-class networking solutions. Enterprises have long made flamboyant statements about getting closer to their customers and streamlining operations. The ERP, CRM, and SCM applications and the organizations implementing them are at slightest in part, "bringing teeth" to those superior intentions. It is not a trouble-free process, though. In reality, the extremely publicized failures of these initiatives have in some minds polluted these applications and their possible benefits. However, more and more organizations are moving ahead with these initiatives, and the successful organizations will gain from higher margins, better customer relations, and improved back office operations. Organisations are only paying attention in deploying tools and applications that have a quantifiable impact on customer relations, supplier relations, and internal competence; this unit outlines three such tools. The future role of ERP systems may be far more decisive than the reasons for which they have conventionally been adopted. With the speedy emergence of wave after wave of new-fangled technologies, the accessibility of an effectual infrastructure on which to build may be one of the most important factors that facilitate and uphold future competitive advantage. Moreover, the lessons learned in the process of establishing this architecture may be invaluable in

concrete manner for technological innovations to move forward. This work has attempted to illustrate that the benefits of ERP systems, beyond well-documented subjective evidence, are rationally rooted in this theory.

2.24 SOLUTIONS/ANSWERS

Check Your Progress 1

- 1) (Refers to Section No. 2.12)
- 2) (Refers to Section No. 2.8 and 2.12)
- 3) (Refers to Section No. 2.5, 2.6, 2.7 and 2.8)
- 4) (Refers to Section No. 2.13 and 2.14)
- 5) (Refers to Section No. 2.2, 2.3 and 2.4)
- 6) (Refers to Section No. 2.4 and 2.5)
- 7) (Refers to Section No. 2.6)
- 8) (Refers to Section No. 2.7)

Check Your Progress 2

- 1) (Refers to Section No. 2.21)
- 2) (Refers to Section No. 2.22)
- 3) (Refers to Section No. 2.22 and Table 2.1)
- 4) (Refers to Section No. 2.22)

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