

Human Resource Information system

UNIT:1

Introduction: Data & Information needs for HR Manager; Sources of Data; Role of ITES in HRM; IT for HR Managers; Concept, Structure, & Mechanics of HRIS; Programming Dimensions & HR Manager with no technology background; Survey of software packages for Human Resource Information System including ERP Software such as SAP, Oracles Financials and Ramco's Marshal [only data input, output & screens];

Learning Objectives:

After reading this chapter, you should be able to understand

- The meaning and definition of HRIS
- The importance of HRIS
- Data and information needs for HR manager
- Sources of data
- Concept structure and mechanics of data
- Survey of software packages for HRIS
- Basic knowledge of ERP software such as SAP, Oracles Financials and Ramco's MARshal

Introduction

Many well-known examples of the use of information technology for competitive advantage involve systems that link an organization to suppliers, distribution channels, or customers. In general, these systems use information or processing capabilities in one organization to improve the performance of another or to improve relationships among organizations. Declining costs of capturing and using information have joined with increasing competitive pressures to spur numerous innovations in use of information to create value. The ideas do not constitute a procedure leading inexorably to competitive advantage. However, they have been of value when combined with an appreciation of the competitive dynamics of specific industries and a grasp of the power of information.

Results from "The Gap Between IT and Strategic HR in the UK", (June 2006) a study by talent management solutions company Taleo, show a significant disconnect between HR's strategic functions, including talent acquisition and workforce planning, and IT ability to support these business initiatives.

The survey of 100 senior HR managers, all in organizations employing more than a thousand people, found that only a quarter thought that strategic functions such as workforce planning, leadership development and performance management were well supported by their IT systems. Only a third felt confident in systems support for recruitment and employee progression. Other findings included:

- Current technology systems were out-of-date. Over half the respondents (55%) felt that more sophisticated technology systems and processes were needed to support recruitment and development.

- IT focused on lower-level, administrative functions. Respondents said that payroll and employee administration (68%) and evaluation and management reporting (53%) were adequately supported by IT. However, more strategic HR initiatives such as performance management (28%), leadership development and planning (25%) and strategic workforce planning (25%) were not well supported.
- Inadequate data and technology systems obstructed workforce management. Just 29% of respondents felt that they had sufficient systems in place to gain a clear picture of existing employee skills.
- The HR function was striving to become more strategic. 63% of respondents cited talent management (including recruitment) as a significant priority in the year ahead.

Taleo Research Vice President, Alice Snell said:

"The gap between the support of administrative functions and strategic HR responsibilities needs to be addressed in order for HR directors to deliver results to the Board. When HR directors can assess the workforce changes needed by the business, acquire and develop the talent needed to optimise the workforce, and then measure the results, their true value can be realised."

"Findings of this study clearly show that HR is evolving to play a more strategic role in supporting fundamental business objectives, but the systems being used by HR functions are not keeping up," added Neil Hudspith, Senior Vice President, International Operations, Taleo. "It's clear that talent management and other strategic initiatives are being recognised as essential functions by ambitious companies that want to retain and recruit the best people, but organisations need to arm their HR directors with the tools and technology

needed to support this strategy. The right HR technology is a critical element of any HR strategy moving forward."

Meaning and Definition of HRIS

Human Resources Information System, is a system that lets you keep track of all your employees and information about them. It is usually done in a database or, more often, in a series of inter-related databases.

These systems include the employee name and contact information and all or some of the following:

- department,
- job title,
- grade,
- salary,
- salary history,
- position history,
- supervisor,
- training completed,
- special qualifications,
- ethnicity,
- date of birth,
- disabilities,
- veterans status,
- visa status,
- benefits selected,
- and more.

Any HRIS include reporting capabilities. Some systems track applicants before they become employees and some are interfaced to payroll or other financial systems. An HRIS is a management system designed specifically to provide managers with information to make HR decisions

- You notice that this is not an HR system...it is a management system and is used specifically to support management decision making .
- The need for this kind of information has increased in the last few years, especially in large and/or diverse companies, where decision making has been moved to lower levels
- And large companies generally have the advantage when it comes to HRIS's...the cost to develop an HRIS for 200 people is usually close to that for 2000 people...so it is a better investment for large companies...larger companies tend to have systems that have a fair degree of customization

Therefore, HRIS can be defined in simple words as given below.

Human Resource Management Systems (HRMS, EHRMS), Human Resource Information Systems (HRIS), HR Technology or also called HR modules, shape an intersection in between human resource management (HRM) and information technology. It merges HRM as a discipline and in particular its basic HR activities and processes with the information

technology field, whereas the planning and programming of data processing systems evolved into standardised routines and packages of enterprise resource planning (ERP) software. On the whole, these ERP systems have their origin on software that integrates information from different applications into one universal database. The linkage of its financial and human resource modules through one database is the most important distinction to the individually and proprietary developed predecessors, which makes this software application both rigid and flexible.

Advantages of HRIS

- An HRIS can reduce the amount of paperwork and manual record keeping
- It retrieves information quickly and accurately
- It allows quick analysis of HR issues

Most HRIS Contain:

- Personal history - name, date of birth, sex
- Work history - salary, first day worked, employment status, positions in the organization, appraisal data and hopefully, pre-organizational information
- Training and development completed, both internally and externally
- Career plans including mobility
- Skills inventory - skills, education, competencies...look for transferable skills

The pressure is on for proactive HR innovations that contribute directly to the bottom-line or improve employee morale and efficiency. Ajuwon (2002) points out that the typical HR professional gets involved with one step in many different flows of work. Very often the involvement of HR has no purpose except to validate the process in some way and acts as an interruption to the flow of work. In other words, the HR function is a 'gatekeeper for information that's been deemed too highly classified for the data owner.'

So HR is not actually making a measurable contribution - in fact, the opposite. HR involvement creates a queue or delay in the process. We should ask if the HR involvement is really necessary. Once upon a time the HR database had an 'all-or-nothing' quality - probably because it was paper-based. But now technology allows controlled access to various portions of the database. So an employee can safely amend his or her own address or bank account details, while the ability to change certain appraisal details might be confined to the line manager. In either case, there is no reason for HR to be involved. HR should move on from the role of intermediary.

Not surprisingly, the use of employee self-service systems for records, information, payroll and other functions is becoming increasingly common. Libraries of forms can be kept online to be downloaded as and when required. Systems can be enhanced to include streaming video and other new software providing wide access to corporate videos, training, etc. Obviously, e-mail announcements and newsletters can also be used to alert employees to new developments or urgent requests.

Ajuwon (2002) argues that HR should be proactive in the process and highlights three different perspectives for action:

* **The process perspective** - getting the fundamental building blocks (people processes) right and ensuring their relevance at all times. This demands close and detailed knowledge of HR processes and a commitment to improvement and efficiency. HR professionals need to understand their own objectives and the relationship with business strategy.

* **The event perspective** - a focus on providing a framework for knowledge management. In other words, capturing the experience and information available in that harnesses the organisation and making it available to individuals.

* **The cultural perspective** - acknowledging that HR has a 'pivotal role in the proactive engagement of the entire organisation in a changing climate.

During the 1990s the business process re-engineering approach resulted in many organizations taking a 'root and branch' look at HR and other processes. Subsequent reorganizations may have produced fresh, streamlined processes but often they became inappropriate or inefficient as circumstances changed. It is not enough to design a corporate human resource strategy or acquire a piece of technology. There has to be some way of ensuring effective operational delivery. A more fluid, constantly changing methodology is required. Ajuwon contends that we have the means:

"It's more than innovating and/or streamlining your HR processes; or building an HR portal or introducing a culture change programme.

"It's about weaving together all three in a way that sustains change, engages the entire organization and deploys the organization's knowledge assets to gain competitive advantage and deliver profitability, even in times of economic downturn."

Human resource systems can differ widely. They may be:

* **Intranets** using web-type methods but operating purely within one organization or location.

* **Extranets** - encompassing two or more organizations.

* **Portals** - offering links to internal information and services but also accessing the worldwide web.

Advantages

- Familiarity (looking like web pages)
- Attractiveness (colourful, clearly laid out, graphics)
- Integration (linking different HR systems such as basic personnel records, employee handbooks, terms and conditions, contracts, various entitlements and payroll)
- Allowing employees and managers to enter, check and amend controlled ranges of personal and other information.
- Eliminating printing, enveloping and mailing of personnel and other employee information
- Reducing need for telephone handling of routine enquiries by HR staff.

Basic system requirements

1. Desktop PCs for accessing and inputting information locally. Standard browsers are used to access information (e.g. Netscape or Internet Explorer).
2. Organization-wide server. In a small company this need be nothing more than a PC as well. The server must have an intranet server software package installed (Microsoft Internet Information Server, or Netscape Communications Server are examples.)
3. Server-side software such as HTML, Java, Javascript, Perl.
4. Intranet communications protocol running on both PCs and the server.
5. Relational database/Information processing software for records, payroll, etc. If data is to be accessed then the procedure is made slightly more complicated with the need for CGI scripts and database server software on the server.
6. Basic documents such as policy manuals typically loaded in HTML - but formats such as Adobe Acrobat PDF are also an alternative.

Cost-benefit analysis

Difficult to quantify because the greatest return is in improved morale.

Robert Musacchio, CIO with the American Medical Association in Chicago is quoted as having installed between 50-60 intranet applications for 1400 employees at \$10,000 to \$20,000 per application.

"Musacchio says a self-service employee-benefits site, which provides information on benefits and lets employees pick health-care, day-care, and retirement investment options, was built for "almost six figures." Musacchio figures it provided a 40% return on investment, based on the time saved by human resource managers who don't have to answer employees' questions about these topics because they're answered by the application".(Intranet ROI: Leap Of Faith',(*Information Week Online*, May 24 1999.)

Fletcher argues that businesses have to adopt a 'Human Capital Management' approach to make the most of any organization's greatest asset: the skills, knowledge and experience of its staff. She describes how, in the 1990s, most large businesses introduced 'Human Resources Information Systems' (HRIS) and that, in combination with re-engineering (the buzzword of the time), this enabled them to "replace antiquated, time-consuming personnel processes with automation."

Walker (Walker, A.J. 'Best Practices in HR Technology' in *Web-Based Human Resources*, McGraw Hill, 2001) states that if HR technology is to be considered successful, it must achieve the following objectives: It must provide the user with relevant information and data, answer questions, and inspire new insights and learning.

Efficiency and effectiveness

HRIS must be capable of changing the work performed by the Human Resources personnel by dramatically improving their level of service, allowing more time for work of higher value, and reducing their costs.

But, despite extensive implementation of Enterprise Resource Planning (ERP) projects, Human Resource Information Systems (HRIS), and HR service centres costing millions of dollars, Walker concludes that few organizations have been entirely happy with the results. Why is this?

Many systems have been implemented by cutting HR staff, outsourcing and imposing technology on what was left. Arguably this approach should, at least, have cut costs. But Walker argues that survey results demonstrate that overall HR departments have actually increased their staffing levels over the past decade to do the same work. Moreover he considers that:

"Most of the work that the HR staff does on a day-to-day basis, such as staffing, employee relations, compensation, training, employee development, and benefits, unfortunately, remains relatively untouched and unimproved from a delivery standpoint."

Fletcher explores the issue of effectiveness in a very telling paragraph (page 15) in which she states that: "Executives struggle with what to measure and how to clearly tie employee metrics to business performance." Not only are they pressured by the vast costs of Human Capital Management (payroll, etc.) but they also have to report to analysts "whose valuations consist partly of measuring such intangible assets as the corporate leadership's team to execute on strategy or the ability of the business to attract and retain skilled talent."

She concludes that:

- Executives are not sure about the kind of data that would prove to analysts that their employees are delivering better and creating more value than their competitors.

- Analysts are struggling to make sense of intangibles, often falling back on a 'revenue per employee' metric which does not tell the whole story.

The HR Function

The business process should be re-engineering the HR function first, then E-engineering the HR work. He suggests the formation of re-engineering teams of providers, customers and users to examine the whole range of HR activities - including those which are not being done at present. The end product is a set of processes organized into broad groupings such as resourcing, compensation or training and development. These processes should then be examined by the re-engineering team and redesigned to:

- Be better aligned with organizational goals.
- Streamlined so as to be cost-effective in comparison with the 'best in class'.
- Have a better integration with other processes.

From this redesign comes the picture of a new HR function. What next? The organization could be restructured and the tasks handed out existing or new staff. But Walker argues that the most effective approach is to introduce new technology to deal with the redesigned processes.

For HR to survive in this brave new world it needs to "possess a technology acumen like never before." A tall order, one suspects, for many die-hard personnel traditionalists. But if they do not demonstrate the ability to recommend appropriate technology and control automated HR processes, organizations will use other people for these tasks some replacements for 'traditional' HR executives may have no direct experience of human resource management at all. Instead, they may have "led a line of business and have had

P&L responsibility, understand what it means to be accountable for delivering business results."

Walker (Walker, A.J. 'Best Practices in HR Technology' in *Web-Based Human Resources*, McGraw Hill, 2001) discusses a range of technologies available for re-engineered HR processes, contending that they are all capable of dealing with HR activities in a secure and confidential manner.

1. **Workflow.** Walker describes this as being like e-mail with a database and built-in intelligence.' Essentially, a user accesses a range of employee records (perhaps their own) through a computer terminal, keys in data such as a change of address and submits the data electronically to the next person in the chain. The system is configured so that only certain individuals are authorized for a specific range of access or actions. The workflow chain is organized to ensure that the most suitable person approves an action. For example, a bonus payment would be authorized by a line manager's own manager. Also, the system can be structured so that bonuses over a certain level can be monitored by a HR specialist. The paths and actions are all specified in accordance with company rules.

2. **Manager self-service.** Managers can have access to 'front-end' applications on their desk tops in the form of HR portals. Typically, they are able to view a range of personal details and aggregate information. They are also allowed to change and input certain details and model the consequences on their budgets of salary increases or bonus payments. More generally, policy manuals, plans and strategies can be made available. Walker highlight the facility to 'push'

information requiring attention to managers - including those dreaded employee performance appraisals.

3. **Employee self-service.** Similarly, employees can view company information, change selected personal details, make benefit enquiries (pension plans, sick pay entitlement), book leave and apply for training programmes. Walker makes the point that 'portal technology will personalize this data further and "push" relevant data to them as well.'

4. **Interactive voice response (IVR).** A low-tech method, using the push-button control facility found in most modern telephones. Most of us are familiar with automatic responses such as: "If your call is about vacancies in the accounts department - press 3 followed by #" when we dial large organizations. The system is restricted but easy to use and inexpensive in comparison to web-based methods. It is suitable for job openings and training course details where straightforward information can be recorded as simple scripts.

5. **HR Service Centres.** Walker notes that this has become one of the most widely used solutions to re-engineered HR in large organizations. Such centres centralize a number of HR processes and may deal with geographically widespread users. For example, the Raleigh, North Carolina service center can deal with all of IBM's North American current and former staff.

Operators or 'Agents' take enquiries by phone, e-mail or online that may already have been filtered through interactive voice response scripts or desktop HR systems. In effect, they deal with the relatively non-routine issues that cannot be

handled by basic technology. However, they do use recognisable Call Centre techniques such as scripted protocols. The Agent can enter keywords or a question into a knowledge database and bring up relevant information with which to answer the caller's query. If that query is not covered by information in the knowledge database it can be referred to a supervisor using workflow.

HR service centres also have a fax, e-mail and postal facility to send information, confirmations, follow-up queries and printed brochures to users. They are also monitored in the same way as conventional Call Centres and can generate useful statistics on types and frequency of enquiries. Walker contends that most reports show that organizations find HR service centres to be highly cost-effective and provide faster and more consistent answers than traditional HR departments.

6. Human Resource Information Systems (HRIS) and databases. According to Walker (2001):

"The HRIS system is the primary transaction processor, editor, record-keeper, and functional application system which lies at the heart of all computerized HR work. It maintains employee, organizational and HR plan data sufficient to support most, if not all, of the HR functions depending on the modules installed.

It will also supply information to other systems and generate reports.

7. Stand-alone HR systems. A massive choice of applications available from commercial vendors which can be linked to a HRIS. They include online application forms, tests, appraisal databases, 360-degree performance assessments and so on.

8. Data-Marts and Data-Warehouses. Sources of information, usually held as relational databases which can be interrogated. *Data-Marts* normally hold data from single sources, such as HR; *Data-Warehouses* amass information from multiple sources.

DATA AND INFORMATION NEEDS FOR HR MANAGER

Collect Data

Assess the mission, vision, strategy, and culture of the organization, from whatever written material there is in the company (check with the department or person who handles public, customer, or shareholder relations).

Collect existing data such as:

- Hiring statistics (acceptance rate, hiring rate, hiring projections)
- Turnover
- Compensation and benefits philosophy and practice
- Exit interview summaries
- Employee complaints (discrimination, harassment, safety, other)
- Promotion and advancement practices and trends
- Human Resources budget and expenditures

Where possible, compare the data collected with market data. This information will provide you with a point of view for the next phase of the audit: the interviews. If, during the interview, discrepancies arise between the data and the interviewee's answer, ONE can explore the reasons for the discrepancy(s).

Conduct Interviews

The purpose of the interview is to collect input from the internal customer on their Human Resources needs and how those needs are being met. Begin the interview with top management. Next conduct interviews with a sample of subordinate managers including first line management. The topics to discuss during the interview include:

- Perceptions of the company and its goals
- Strengths and weaknesses of top management
- Employee perceptions of the company and top management
- Relations with subordinates
- Support of career goals for self and employees
- Major Human Resources issues
- Which Human Resources functions work well
- Which Human Resources functions need improvement

In addition they can provide indirect feedback. For example, the results may indicate that different organizations have conflicting goals. Perhaps a performance management system could correct this problem. Or perhaps communication isn't flowing well in the organization, suggesting a need for communication programs or some training and development.

Some of the information collected during the interviews will be sensitive. Confidentiality must be respected. Get advanced approval from top management on the questions you will ask during the interview phase.

Summarize the Results

Consolidate the information you collected. Compare the results with market surveys. Determine which practices are good/popular/effective/competitive. Determine which practices need improvement. Recommend specific improvements referring to the results of both the Effectiveness audit and the Regulatory compliance audit. Justify the recommendations. Determine how to measure whether the improvements are successful.

Obtain Approval from senior Management

Present the preliminary results and recommendations to senior management individually. Point out how these recommendations will support their needs. Obtain their support, and then present the final results and recommendations to the senior management staff for final approval.

Implement the Program

Consider implementing the program in part of the organization as a pilot program. Monitor and measure success and seek to continuously improve processes. Be prepared to modify the program if an organizational change requires it.

SOURCES OF DATA

Absence of sufficient qualification required for the job puts extra efforts on the HR department or the colleagues to train the new appointees. Many companies do take the pain of training new recruits by conducting induction training and other regular workshops. However, the best training one can get is on the job. Some companies give so much importance to the 'training' part that it turns out to be the best company for new comers to learn. A good training schedule is important, but simultaneously, all other HR concerns are equally important. Companies should learn to not just appoint and train people, but retain them through smart ways.

Recruitment source:

DQ Channels asked members of the solutions provider community to rank the best sources of recruitment. The best recruitment sources according to majority of the respondents were 'Referrals'. Yes, referrals or word-of-mouth is no doubt the best source of recruitment. This also saves a lot of time energy spent in testing a new candidate's caliber. "There is an element of trust involved. When a person is sent to us by a person known to us and who knows our requirement, he or she is the best we can get," said one HR manager.

The next best source for recruitment is consulting agencies, job sites and print advertisements in that order. Surprisingly, very few responded with 'Campus recruitment' as an alternative source for getting people

ITES IN HUMAN RESOURCE MANAGEMENT:

The people working in IT Enabled Services have a great amount of stress when compared to other people and their nature of jobs. Nowadays the company's work on target basis so to reach the target the employees have to strive hard therefore for the strain in their jobs the HR department have to think about coping their stress by giving some

- ✚ Recognition
- ✚ Hike in the pay
- ✚ Fringe benefits
- ✚ Fun programs & some recreational activities.

IT FOR HR MANAGERS:

It is essential for a Human Resource Manager to have some knowledge on information technology because everything nowadays is becoming computerized and especially when it comes to human resource information systems the HR manager has to be aware about the system well at least for the sake of minor things like payroll, compensation, etc.

So information technology plays a vital role for any department & especially HR Department in any organization.

CONCEPT, STRUCTURE, AND MECHANICS OF HUMAN RESOURCE INFORMATION SYSTEMS (HRIS)

Integrated HR Information Systems (HRIS) have a profound effect on firms that implement them. Most often these firms are replacing several related systems, such as a personnel database, payroll system and benefits system, with one HRIS that does it all. Many people focus on the improved reporting and processing that will be realized from the new system, and those are the reasons most firms choose to implement a new HRIS. But what many people don't focus on is that the new HRIS will most likely affect the company much more deeply – it will challenge the operating structure and principles of all the HR-related departments.

An integrated HRIS results in a drastically different environment than a cluster of related but separate systems. The core concept of a centralized data store inherent with an HRIS demands integrated work processes for consistently managing that store. The two attributes – centralized data storage and integrated work processes – will affect the company in ways most managers don't expect.

EVALUATING AND PREPARING FOR A NEW HRIS

Many companies go through a process of comparing and evaluating several HRIS packages using a team of analysts or managers from the various departments affected – HR, Payroll, Benefits, Employee Relations, Training and so on. As this team prepares its evaluation criteria and reviews HRIS features, much is learned about the goals and values of the various departments. The HR department is looking for improved reporting of employee data, Payroll is concerned with the system's paycheck calculations and regulatory reporting, while Benefits may be looking for a more streamlined enrollment process. As this team drives deeper into the selection criteria, the members learn more about

each other and may start to see the emergence of some really messy business processes. It can be a bittersweet process.

The hiring process is a good example. As a person is recruited, hired and paid each department may have its own specialized system and process for managing the employee data. As the HRIS evaluation team discovers redundant processing and data storage, its members start to see ways to make the process more efficient by aligning their part of the hiring process with the requirements of the other departments. The team members are excited to find a better way to get the work done, but scared by the ramifications of closer ties to other departments. They think: "If we improve the efficiency of the process we won't need as many people in our department and we might lose control of some piece of data that is critical to our business function.

As the team evaluates an HRIS software package, it begins to get a better grasp on what the entire company's business processes are, and therefore what the company might require in an HRIS. The team will most likely find that none of the packages are an exact fit and that substantial effort is required to modify or integrate the chosen HRIS. Or if not enough due diligence and research have been done, the team may be facing this effort and not be aware of it. This gap in planning will show itself later in the implementation phase when the project team realizes there are not enough resources – time, people and money – to implement the HRIS.

Perhaps the most critical results of the HRIS evaluation process are that the evaluation team set correct expectations for the project and gain executive management commitment. With correct, or at least realistic expectations and an executive management team that seriously supports the team's efforts, an HRIS implementation project has a much greater chance to succeed. Most often the

HRIS evaluation team members spend most of their efforts building selection criteria and choosing an HRIS, instead of setting expectations and building executive support.

THE HRIS IMPLEMENTATION PROJECT (Configuring the New HRIS)

There are three primary activities in an HRIS implementation – configuring the HRIS for the firm’s business processes and policies, interfacing data with other systems and converting historical data into the HRIS, and preparing the organization for the new HRIS. An HRIS comes with built-in processes for most HR activities, but firms will need to customize the system to process according to their specific needs. For example, every HRIS supports the process of benefits open enrollment, but the system does not come delivered with a firm’s specific benefit providers and eligibility rules. Customizing the HRIS for this typically does not involve programming; the common activity is to enter specific data into control tables that then direct how the HRIS operates. The customizing, or configuration tasks then become a process of understanding the firm’s business processes well enough to encode that logic into the HRIS.

This mapping of business processes and policies into system control tables requires people who understand both the business process and the HRIS – typically the existing IT support and HR business analysts. Due to the large amount of work, the HRIS project team usually needs these analysts fully dedicated to the project, requiring the “home” departments to fill the gaps in their absence. Having partially dedicated team members may cause tension since the team members have to maintain responsibilities at the home

department while also fulfilling responsibilities on the project team. Either way, back-filling resources becomes a big issue if not planned for during the evaluation stage. Firms may find that the internal resource people assigned to the project do not have the skills or capabilities needed for the job. Sometimes training can resolve this, but other times the people lack basic analytical skills required for the implementation. One of the key requirements for a person to be successful on an HRIS implementation project is that he/she have excellent analysis skills. The most analytical people in HR and IT should be assigned to the project, or else the company should rely on external resources (i.e. contractors or consultants). The project can get done this way – but the more an implementation team relies on external resources the more difficult it will be for the company to become self-sufficient in ongoing HRIS support, maintenance, and operations.

Many HRIS implementations include, to one degree or another, business process reengineering. As a firm documents, investigates, and discovers its true business processes, it's natural that the firm also take time to improve them, or at least integrate the processes across departments. The integrated nature of most HRIS packages drives this activity. When a process is reengineered or integrated, once-independent departments become much more dependent on each other. That dependency can increase tensions on the project team as representatives from those departments learn to trust others to do their part of the process. Or, once the project team members become comfortable with the new processes they have designed, they may have a hard time selling those changes back to their departments.

Most HRIS packages don't handle exception processing very well. As new business processes are designed, the project team customizes the HRIS around those new processes. Users will most likely find that exception cases require significant manual thought or labor to process – since the exception does not fit into the business process as implemented in the HRIS. HRIS project team analysts will walk a fine line between generalization of the process to fit exceptions vs. a more narrowed implementation of the process to enforce data integrity and accurate application of HR policy. This is a great time to enforce some standards and clean-up "special deals" – but HR managers and policymakers must be willing to support these efforts, and to help implement them. Finally, as the project team analysts dig into the current business processes, they may find that the HR users, and sometimes managers, don't really understand or know the processes well. Users may know what is done, but not why it is done. Knowing the why part is critical to getting the most out of your HRIS implementation. In most every HRIS there are two or three technical methods of implementing any given requirement – knowing why something is done in a business process helps ensure the project team analysts select the best method of implementing it in the HRIS.

Linking the New HRIS with Other Systems

Most HRIS project teams have a number of people assigned to converting historical data from the existing HR databases into the new HRIS, as well as for interfacing the new HRIS with other systems that rely on HR data. As this group starts mapping historical data to the new system for conversion, most often group members will find (particularly when combining data from several existing systems to go into one HRIS) that the existing HR data contains a significant amount of invalid, incomplete, or contradictory data. As the new

HRIS was configured for new, reengineered or streamlined business processes, the existing employee data may not fit well into the new system. The new HRIS will demand more complete and accurate employee data.

Making sense of these data conversion problems is a skill that falls to HR analysts, not the programmers writing data-conversion routines. Conversion and interfacing are not solely technical activities – user consultation and input are required. Many HRIS project teams discover these requirements too late, thus increasing the demand for time from HR analysts on the project team – time that the analysts most likely do not have.

If the firm has a data warehouse, the new HRIS data will need to be mapped to it. If the data model in the warehouse is based on the legacy HR database, the two data models may not be compatible. A lot of effort can be spent mapping the new HRIS to an existing data warehouse. Or if the HRIS vendor has its own data warehouse application, the project team might be tempted to use it, but they'll still have to contend with converting existing historical HR data into the new warehouse. Either way, HRIS project teams spend more effort than planned on this issue – the details can get very tedious and time consuming.

Replacing HR systems involves any area of the company that reads or relies on employee data. New system implementation may highlight employee data privacy issues, or increase the scope of interfacing once the project team realizes just how many systems read employee data from the current HR-related databases.

Preparing the Organization

Many times it is easier for project teams to focus on technical aspects of the implementation, which is ineffective. For example, configuring the HRIS to correctly assign resident tax codes based on the employee's address is easier than getting HR, benefits, payroll, and recruiting to buy into and implement a reengineered hiring process. The HRIS project team must track progress not only on the technical aspects of implementing the HRIS, but also on the softer side of managing the organization as a whole to accept the new business processes that come with the HRIS. Companies typically underestimate this change-management effort. From the very beginning there must be a focus on preparing the organization and the employees for the new HRIS. A new HRIS, with more integrated work processes, tends to pull related departments together. Some firms recognize this as they go through the implementation process, and also implement a new organizational structure with the HRIS roll-out. For example, HR and Payroll may have reported to separate areas of the company, and parts of HR business processes were scattered throughout various departments. But as a new HRIS is implemented, the previous organizations are transformed to report to a single authority, and a shared-services group is established to perform the integrated work processes that were once scattered. This is a common, but often unexpected, result of HRIS implementations.

During the implementation phase, firms should also be determining what their support model will look like – what kind of organization will be required to support this new HRIS? Those who study this task in detail will realize they need cross-functional support teams – containing programmers (ABAP), configuration experts, and business analysts – to successfully support the new HRIS. But this integrated support team does not fit well into the vertical

departments in most companies today. Finding a way to implement this cross-functional team is a critical success factor for the new HRIS' ongoing operation. All of the items mentioned so far force HR managers to become involved in what is usually perceived as an IT project. They may be accustomed to pushing responsibility for such projects onto IT managers, but implementing an integrated HRIS requires HR manager participation and active involvement in scoping, implementation, cutover, resourcing and management.

LIVING WITH THE NEW HRIS (Changes in the HR User Community)

An integrated HRIS leads to more integrated reporting of employee data, which can lead to efforts that benefit the company. Better reporting of employee costs, skills and requirements, time-keeping and recording, etc. give senior managers information that can be used to improve the application of HR policy or to cut costs (i.e. reducing time-card fraud, highlighting wasteful compensation practices, etc.). Most integrated HRIS packages are very sophisticated in the functionality and processes they offer. Compared to legacy, or screen-based/code-based systems, the new HRIS requires a more analytical user. The user cannot simply be trained to put certain codes into certain fields -- he/she must know the business process and how it relates to the HRIS. In most companies, a certain portion of users will be able to make this jump to "analytical" thinking; others will not. The resulting shakeout has to happen, and it is most often painful – either for the employees themselves or for the HRIS support organization.

If a more centralized, integrated HR organization doesn't surface during the implementation period, the organization will tend to evolve in that direction. An integrated, centralized HRIS tends to pull user departments together. Using integrated work processes across departments that do not operate under a common authority will highlight data and process ownership issues. These issues in turn get pushed up to HR managers or executive management. Eventually, these managers resolve the issues by increasing the integration of the departments to match the processes. Either way it happens – at implementation or via evolution -- this level of organizational change is always difficult.

Supporting the HRIS

IT support analysts may be accustomed to, and only skilled for, flat-file processing techniques. Most HRIS packages rely on relational data models, higher-level programming languages, and interactive data management – presenting technical requirements for which some IT analysts may not be ready.

The new HRIS may have proprietary languages or facilities, requiring new IT skills. Often these skills will be in high demand, driving a premium rate of pay. Internal resources may opt to leave the company for the higher pay, or they may demand higher pay at the company. The higher pay might be outside the HR guidelines for fair salary. The resulting dilemma can create retention problems. HR users – the analysts in HR, payroll and benefits – must take a more active role in ongoing support and system changes. Since business rules are often coded into the HRIS instead of resting in manual processes, the business analysts are necessarily drawn into this activity. Some firms may push this “business rule” knowledge to their IT support analysts, or rely on consultants who help with the implementation. Although either of those scenarios can work,

HR business analysts and managers have the most to lose if the HRIS does not process transactions correctly. Placing HR analysts in system support and change roles will help ensure that the HRIS processes transactions correctly.

Some companies depend too much on consulting firms or contractors to perform an implementation. Many times this happens because the firm can pay a consultant to do precisely what the firm wants to do, which is often easier than getting internal resources to do the same thing. It takes some of the pain out of change management. This can lead to a continued dependence on external resources and might be acceptable for firms that have historically relied on external resources. For others it may generate substantial internal conflict in the way of higher IT budgets or continued presence of non-employees in the HRIS support organization.

RECOMMENDATIONS FOR SUCCESS

Given all the things that often do go wrong with HRIS implementations, what can be done to ensure a smooth transition? There is no one solution, no grand secret for avoiding all the problems. As with most successful efforts, a successful HRIS implementation requires participation and commitment from all areas of the firm. The first area from which to gain commitment is the firm's executive management – the sponsors of the project. Given the level of change such a project will create, there will be areas that resist the implementation. Support from executive management is invaluable for making sure new business processes are implemented effectively, for funding the project, and for ensuring appropriate staffing on the project team. Without this support, the payoff of the new HRIS will most likely be compromised, and will cause disruptions in employee service.

The executive managers should appoint a steering committee containing stakeholders from all areas affected by the HRIS (payroll, benefits, HR, IT, employee relations, etc). This group should contain members who can ensure that their line managers have the necessary directives and responsibilities for making the HRIS operational. The steering committee should take an active role in resolving broad issues and taking corrective actions if the project gets off course. One of the most important roles of the steering committee is that of “winning the HR managers.” The steering committee needs to ensure that managers fully understand the impact of a new HRIS system, that they are involved in the implementation, and that they support the project with a positive attitude towards change. This will not only set an example and guideline for each committee member’s department, but also prepare the ground for dealing with change-management issues. The steering committee should be responsible for appointing a project manager or project management team, as well as assuring that the project is appropriately staffed. The project manager should carry out team-building exercises for employees who will have to work together, since many people who will be assigned to the team may not have experience operating in such an environment. The HR analysts and the technical analysts must learn how to work together to solve issues neither group can solve alone – such as data conversion and interfacing. HR analysts will become more technical, and technical analysts will learn more about HR. The project planning process needs to include not only the technical tasks but also the processes and deadlines for change management tasks. The project manager can get an indication of these issues early in the project by comparing the goals of the different stakeholders involved and identifying all the inconsistencies.

For those HR analysts who are placed on the HRIS project team, their managers need to be fully aware of the analyst roles in the project. Managers need to review and possibly redefine the roles before, during and after the

implementation. New job descriptions may need to be prepared and managers need to brief employees about any changes and additional responsibilities. Managers also must start back-filling the positions left by the analysts to ensure their departments still run smoothly and the analysts are not torn between working in their departments vs. working on the HRIS project.

Not every person will be able to make the transition to a new HRIS. Certain employees – payroll clerks, benefits analysts, IT support, and even managers -- may not want anything to do with the new HRIS and the processes that come with it. Instead of forcing them to make the transition, it is often wiser to place them outside the HRIS-related organization in roles appropriate for their skills. A transition plan needs to be constructed, and the steering committee must accept the fact that there will be some turnover.

Likewise, employees who have demonstrated their interest and ability to work with the new system and who have gained substantial knowledge of it should be offered an active system-support role together with a promotion. This should motivate other employees to follow their colleagues' paths and will discourage internal system experts leaving the company for a higher-paying consulting job.

Training – technical and non-technical – must be identified and performed to help people make the transition to working with the new HRIS and the new organization model. The training needs to go beyond screen-prints and mouse-clicking sequences to an explanation of how the new process fits into the organization, its relationship to other processes, and the execution steps in the process. Employees will have to know the why as well as the how of the process.

Formalized cross-functional support teams are essential to the steady operation of the HRIS. Firms can be successful by patching together an informal organization of HR analysts and IT analysts, but that loose-knit framework may

not hold up to the continued demands of HRIS support. A formalized, co-located team of HR and IT analysts will be most effective.

Many firms also find it useful to preserve the steering committee past HRIS implementation and into the productive life of the HRIS. The steering committee is an excellent group to monitor the ongoing quality of HRIS operations, manage relationships with the HRIS vendor, and clear the path for later HRIS upgrades or enhancements.

It may take years for a firm to adjust to a new HRIS. As it does, most will see that their organizational structure will tend to reflect the HRIS structure. This is natural – managers for years have organized their departments to fit the way work is done, and the organizational culture often reflects that structure. When the way that work is done changes – and an HRIS will engender that change – it's natural for the organization to change as well. Structural and cultural changes might be painful, and people will resist, but it's hard to fight these natural tendencies. Instead of fighting them, managers need to be aware of what's happening and proactively prepare for this new world.

SURVEY OF SOFTWARE PACKAGES FOR HUMAN RESOURCE INFORMATION SYSTEMS INCLUDING ERP SOFTWARE SUCH AS SAP, ORACLE FINANCIALS AND RAMCO MARSHALL:

ERP Software Market will grow to USD 29 Billion in 2006

The ERP market continues to benefit from a widespread acceptance of the idea that businesses must have integrated information systems to be competitive. Management and IT organizations are realizing that the most effective way to satisfy this need is to purchase an ERP package that features broad functionality and pre-built integration.

The ERP software market came into being in the early 1990s when companies realized they had to integrate the databases and applications that drove their back offices, their manufacturing floors, and their distribution operations. ERP software expanded beyond manufacturers into healthcare, financial services, and other businesses because the same kinds of problems, assembling a product, delivering it, and charging for it, span all industries.

Just like companies need to consolidate their business operations into one place, the biggest ERP software vendors have been on a buying binge, and after all of the acquisitions, the installed bases of ERP software are increasingly controlled by a handful of players. Shepherd reckons that 66 percent of new ERP license sales in 2006 will be done by SAP and Oracle. SAP will have 43 percent, with Oracle getting 23 percent. The next biggest player will be Sage Group, with five percent, followed by Microsoft with four percent and Infor (which now owns SSA Global) getting three percent.

As the ERP methodology has become more popular, software applications have emerged to help business managers implement ERP in business activities such as inventory control, order tracking, customer service, finance and human resources.

ERP Software Services

Enterprise Resource Planning or ERP may be defined as an information system that takes into account all related applications of an enterprise and integrates all departments and functions across a company in a single computer. There are a number of departments (finance, human resource, production, etc) which form the backbone of the company. Each of these departments has their own processes running. ERP integrates all the individual processes of all individual departments into a single system.

Synapse is a leading offshore software development company in India with a determined focus on ERP software. We develop customized ERP software tailor made according to the business needs of small, medium and large companies. At our state of art software development facility, we have the perfect blend of expertise and infrastructure that help us devise ERP software that are unique and confirms to the highest standards for quality.

Their in-depth industry experience gives us the ability to devise our software. In other words, their ERP software include a vast range of business analysis and efficiency tools, and are user friendly. They give special importance to navigation methods in their ERP software so that users can easily find what they are looking for. However, the "Enterprise Resource Planning" is the most common term that has been used widely.

Enterprise Resource Planning systems (ERPs) integrate (or attempt to integrate) all data and processes of an organization into a single unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration. A key ingredient of most ERP systems is the use of a single, unified database to store data for the various system modules. Examples of modules in an ERP which formerly would have been stand-alone

applications include: Manufacturing, Supply Chain, Financials, CRM, Human Resources, and Warehouse Management.

SAP

SAP, started in 1972 by five former IBM employees in Mannheim, Germany, states that it is the world's largest inter-enterprise software company and the world's fourth-largest independent software supplier, overall. The original SAP idea was to provide customers with the ability to interact with a common corporate database for a comprehensive range of applications. Gradually, the applications have been assembled and today many corporations, including IBM and Microsoft, are using SAP products to run their own businesses.

SAP applications, built around their latest R/3 system, provide the capability to manage financial, asset, and cost accounting, production operations and materials, personnel, plants, and archived documents. The R/3 system runs on a number of platforms including Windows 2000 and uses the client/server model. The latest version of R/3 includes a comprehensive Internet-enabled package.

SAP has recently recast its product offerings under a comprehensive Web interface, called mySAP.com, and added new e-business applications, including customer relationship management (CRM) and supply chain management (SCM).

In early 2001, SAP, a publicly traded company, had 21,500 employees in over

50 countries, and more than 30,000 installations. SAP is turning its attention to small- and-medium sized businesses. A recent R/3 version was provided for IBM's AS/400 platform

SAP focus on SMEs

Having sold its wares to most of the world's largest businesses, SAP now believes it has to tap into the small- and midsized-business market to keep growing. The small-business software market is estimated to be worth \$10 billion a year worldwide, but SAP won't corner it without a fight from more consumer-oriented rivals like Microsoft and IBM. As if that competition weren't fierce enough, upstart companies like Salesforce.com, Sage Group plc and Upshot (acquired last year by SAP rival Siebel Systems) are grabbing a piece of the small-business market with products they hope will squeeze SAP out.

Oracle Financials

The Oracle E-Business Suite Financials family of applications automates and streamlines all your financial business processes, for enterprise-wide daily business intelligence that lets you make more informed decisions, improve operations, and reduce costs. A unified data model provides a single accurate view of all your financial information, including a 360-degree view of your customers. And Oracle Financials, running on Oracle technology, gives you industry-leading performance and scalability.

Seamless Integration, Complete Flexibility

Oracle Financials is part of the Oracle E-Business Suite, integrating with other E-Business Suite applications including Oracle marketing and Oracle Supply Chain Management. Implement one or several application families—or

implement the complete Oracle E-Business Suite for the fastest way to high-quality enterprise information.

Oracle eBusiness Suite

Oracle Applications is a collection of business ERP (Enterprise Resource Planning) applications developed by Oracle Corporation, which utilize their core RDBM database technology. Sometimes referred to as Oracles "E-Business Suite", Oracle Applications (currently in the 11i series version), contains several product lines such as Oracle Financials, Oracle Logistics, Oracle HR, Oracle Sales, and others. Within each product, there are several modules, each to be separately licensed.

Key technologies incorporated into the applications are the [Oracle database](#) technologies, (RDBMS, [PL/SQL](#), java, html, xml, engines), the "technology stach" ([Oracle Forms Server](#), [Reports Server](#), [Apache Web Server](#), [Discoverer](#), [Jinitiator](#) and ([Sun Java](#)).

Oracle developed the applications from a terminal based [VT220](#) interface to a client server model in 10.7, only to drop this within the space of a year for the Network Computing Architecture (NCA). This was a revolutionary concept exploiting the internet/network and [thin client](#) computers.

Oracle Financials

Oracle Financials includes several dozens of "modules", each which is separately licensed within the E-Business Suite. Examples of these modules include:

- General Ledger

- Cash Management
- Purchasing
- Payables
- Receivables
- Inventory
- Projects
- Fixed Assets
- HRMS (Human Resource Management System)
- Work in process
- Bills Of Material.

Oracle Ledger includes ERP features like Intercompany transactions, Consolidation etc.

Main competitor: [SAP](#).

Cobra Solutions

Human Resource Managers are constantly being asked to retrieve employee information (even on employees who have not been with the company for years). Without the proper tools, employee information may be lost or worse, stolen. As a way to maintain employee information in a safe and secure method, COBRA Solutions has created the *Employee Database Manager* (EDM).

EDM will not only store all the necessary employee information, it will retain all e-mails and documents in a digital filing cabinet so HR Managers will have documentation on



every aspect of an employee's time with the organization.

EDM is a software product that resides on either a Personal Computer or Network Server and has been designed to:

- **maintain employee information;**
- **replace paper files with a “digital file cabinet;”**
- **notify the user of when “Tasks” need to be performed;**
- **divide employee data between separate divisions/locations;**
- **import and export important employee information;**
- **retain all e-mails sent to each employee;**
- **provide a history of wages and benefits;**
- **track vacation days as well as other days “absent;”**
- **store Emergency information;**
- **provide a system to store/track notes on an employee;**
- **perform a “mass enrollment” into group plans;**
- **personalize mailings with a mail merge;**
- **create Benefit Statements;**
- **interact with other COBRA Solutions products;**
- **schedule tasks to be performed at a later date; and**
- **provide numerous reports to document everything!**

Conclusion

In all, the HR function is still to a large degree administrative and common to all organisations. To varying degrees, most organisations have formalised selection, evaluation, and payroll processes. Efficient and effective management of the "Human Capital" Pool (HCP) has become an increasingly imperative and

complex activity to all HR professionals. The HR function consists of tracking innumerable data points on each employee, from personal histories, data, skills, capabilities, experiences to payroll records. To reduce the manual workload of these administrative activities, organisations began to electronically automate many of these processes by introducing innovative HRMS/HCM technology. Due to complexity in programming, capabilities and limited technical resources, HR executives rely on internal or external IT professionals to develop and maintain their Human Resource Management Systems (HRMS). Before the "client-server" architecture evolved in the late 1980s, every single HR automation process came largely in form of mainframe computers that could handle large amounts of data transactions. In consequence of the high capital investment necessary to purchase or program proprietary software, these internally developed HRMS were limited to medium to large organisations being able to afford internal IT capabilities. The advent of client-server HRMS authorised HR executives for the first time to take responsibility and ownership of their systems.

The payroll module automates the pay process by gathering data on employee time and attendance, calculating various deductions and taxes, and generating periodic pay cheques and employee tax reports. Data is generally fed from the human resources and time keeping modules to calculate automatic deposit and manual cheque writing capabilities. Sophisticated HCM systems can set up accounts payable transactions from employee deduction or produce garnishment cheques. The payroll module sends accounting information to the general ledger for posting subsequent to a pay cycle.

The time and labour management module applies new technology and methods (time collection devices) to cost effectively gather and evaluate employee

time/work information. The most advanced modules provide broad flexibility in data collection methods, as well as labour distribution capabilities and data analysis features. This module is a key ingredient to establish organisational cost accounting capabilities.

The benefit administration module permits HR professionals to easily administer and track employee participation in benefits programs ranging from healthcare provider, insurance policy, and pension plan to profit sharing or stock option plans.

The HR management module is a component covering all other HR aspects from application to retirement. The system records basic demographic and address data, selection, training and development, capabilities and skills management, compensation planning records and other related activities. Leading edge systems provide the ability to "read" applications and enter relevant data to applicable database fields, notify employers and provide position management and position control.

Through employee or manager self-service (ESS or MSS), HR activities shift away from paper based processes to using self-service functionalities that benefit employees, managers and HR professionals alike. Costly and time consuming HR administrative tasks, such as travel reimbursement, personnel data change, benefits enrolment, enrolment in training classes (employee side) and to instruct a personnel action, authorise access to information for employees (manager's side) are being individually handled and permit to reduce HR transaction time, leading to HR and organisational effectiveness. Consequently, HR professionals can spend fewer resources in managing administrative HR

activities and can apply freed time and resources to concentrate on strategic HR issues, which lead to business innovation.

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Questions:

1. Explain HRIS in detail.
2. How to collect data that is required for the HRIS?
3. How does e-HR enhances the quality of HR functions?
4. What is ERP?
5. Explain the various ERP packages with examples
6. Write a note on the current trends in HRIS.

UNIT – II

HUMAN RESOURCE INFORMATION SYSTEM

DATA MANAGEMENT FOR HRIS

Objectives

After reading this lesson you should be able to know about

- 2.1 - data management for Human Resource Information System
- 2.2 - data formats
- 2.3 - entry procedure & process
- 2.4 – data storage & retrieval
- 2.5 - transaction processing
- 2.6 - office automation
- 2.7 – information processing and control functions
- 2.8 - design of Human Resource Information System
- 2.9 - relevance of decision making concepts for information system design
- 2.10 - human resource management needs analysis
- 2.11 - concept & mechanics
- 2.12 - standard software and customized software
- 2.13 - investment in Human Resource Information System

The human resource of any organization is recognized as the greatest asset. With high training and educational standards, numerous technical and professional certifications, job descriptions and classifications, benefits coverage, changing work environments, health and safety issues, diverse working conditions and pay scales, it is very much necessary to develop a

comprehensive Human Resource Information System to address these issues on a secure database.

INFORMATION SYSTEM

Information system is a systematic formal assemblage of components to perform data processing operations of an organization for (i) meeting legal data processing requirements, (ii) providing information to managers to carry out their function effectively and (iii) providing various useful reports required.

MANAGEMENT INFORMATION SYSTEM (MIS)

The Management Information System refers to connection of managed operating system by exchange of information. It is the operative system required to perform variety of functions to produce useful outputs for efficient management of an organization. It is very significant to find that more and more organizations emphasize application of management information system for increase in the efficiency of management. The Management Information System utilizes computer hardware and software, manual procedures, management decision models and a database to provide information in support of management operations, and decision-making function in an organization. MIS is organized method of providing past, present and projected information relating to internal operations of an organization and external intelligence by good environmental scanning technique.

HUMAN RESOURCE INFORMATION SYSTEM (HRIS)

Human Resource Information System refers to the system of collecting, recording, classifying, presenting, processing, storing and disseminating various information, required for efficient and effective management of human resources in an organization. In order to manage diverse, expensive, and human resource information in complex environment, human resource department of various organizations have increasingly used computer based human resource information system. Human Resource Information System (HRIS) supports strategic and operational use of the human resource. HRIS is required for the following purposes.

- (1) Planning human resource requirements of organization
- (2) Employee training & development to increase efficiency
- (3) Formulation of policies and programmes relating to human resource

The Human Resource Information System (HRIS) is a software package that provides a complete management system for human resource activities in small-to-medium-sized businesses. They help streamline administrative procedures, manage employee benefits, reduce the need for paperwork and manual records, and keep track of all personal and job-related employee data.

The Human Resources Information System is helpful for different organizations to set measurable benchmarks to acquire, train and retain the best employees, co-ordinate employee job descriptions with areas of responsibility, schedule training for recertification, safety, and revised work procedures, provide incentives to motivate and improve employee performance, track accident statistics and implement corporate strategies to improve overall health and safety. While the database provides quick access and track for the entire work history, every employee can be able to view only their personal information over systematic human resource information system.

HRIS can handle management of benefits for both HR personnel and company employees. HR directors can import payroll and benefits data into HRIS from in-house and

outside sources. This allows them to manage all facets of HR from a single location. It also provides employees with self-service access to their accounts. With a secure system that requires a log in ID and password for each user, employees can check vacation balances, review benefits data, and update personal information without having to first contact HR staff.

Basic Features of HRIS

In lieu of standardized paperwork, HRIS allows employees to fill out forms online, make changes based on life events, and get information on their benefits at any time. Rather than "pulling an employee's file," HR personnel can refer any information about an employee through the system, including personal information, benefits, number of dependents, emergency contacts, and job history.

HRIS includes both standardized and customized reports. Standard reports feature templates for various administrative purposes including employee reviews, record keeping, workers' compensation, employment history, and absence tracking. Customized reports are created that incorporate categories and information unique to business. Most HRIS applications have a comprehensive tracking system. HRIS tracking capabilities can maintain grievances filed by or against the employee stemming from discipline, disputes, and complaints.

Quick reference guides can be available relating to all areas of the Human Resources Information System, including staff benefits, benefit contribution rates, calendars, personnel change reason codes, and the payroll process flowchart. Detailed instructions regarding establishing and changing employee benefit and deduction information, including retirement, pension, health care, flexible spending accounts and employee selected deductions. Documentation on the human resource accounting structure can be possible; including staff benefit calculations and charges, review and correction of human resource accounts. Documentation is helpful for payroll issues, including time reporting requirements, check and auto deposit distribution, taxable benefits, terminations, review and correction of employee pay and leave, and tax forms. Instructions and forms for employees to establish or change their employee

information related to the Human Resources system, including name, address, retirement, pension, and health care.

2.1 DATA MANAGEMENT FOR HRIS

Only some of the organizations have sufficient policies and procedures in place to collect the majority of necessary human resource data. For those not having sufficient policies and procedures in place, this deficiency limit their ability to extract, report or analyze performance in areas where information is not collected and maintained in a structured format. The organizations themselves should be aware of many of the shortcomings in their HR data. Partly, this may be the result of a number of internal audits that had been carried out in the organizations, and partly, feedback from staff and external bodies. Issues surrounding data quality indicates that data collection policies and procedures are not always implemented successfully in practice.

The organizations, which take, planned and measured approach to the implementation and ongoing management of their HRIS, tend to make more effective use of their systems. These organizations were better positioned to generate information for a greater range of strategic and operational human resource purposes. The other organizations take a less structured, more urgent approach, as short-term human resource processing requirements drove their management of the system.

Elements of Data Management

As noted above data management can be viewed as comprising the following tasks:

- **Capture** refers to movement of data from the instrument or simulation to the storage mechanism. This often involves some form of data selection or compression. It also involves the creation of Meta data.
- **Storage** refers to the place and procedure required for storage of data by the use of automatated data vaults and tape stores

- **Management** refers to indexing and cataloguing the data and providing methods to organize and move it from site to site or between programs which involves meta data and self-defining data formats.
- **Analysis** refers to processing or fusion and mining the data to extract the science.
- **Visualization** refers to presenting the data in a variety of forms to aid analysis and the dissemination of results.

2.2 DATA FORMAT

Only some of the organizations had sufficient policies and procedures in place to collect the majority of the necessary HR data. For those not having sufficient policies and procedures in place, this deficiency may limit their ability to extract, report or analyze performance in areas where information cannot be collected and maintained in a structured and easy to access format.

Data has motion, going from one location to another. It is more and more moving between systems, persons, departments, and organizations. This is essential, as it indicates that data is actually used, rather than just stored. In order to emphasize the actual use of data, there is need for information or knowledge. When data is in motion, there is not only a change of place or position, but also change in other aspects. The data "format" may change when it is transferred between systems. This includes changes in data structure, data model, data schema, data types, etc. The "interpretation" of data may also vary when it is passed on from one person to another. Changes in interpretation are part of data semantics rather than data structure. The "level of detail" may change in the exchange of data between departments or organizations, e.g. going from coworkers to managers or from local authorities to the central government.

In this context often changes are seen in the level of detail, by the application of abstraction, aggregation, generalization, and specialization. Moreover, the "systems development phase" of data models may vary. This is particularly the case when implementation-independent data models are mapped to implementation-oriented models (e.g. semantic data models are mapped to operational database specifications).

Common Data Format

The Common Data Format is a self-describing data format for the storage and manipulation of scalar and multidimensional data in a platform and discipline independent fashion. When one first hears the term "Common Data Format" one intuitively thinks of data formats in the traditional sense of the word. Although there may be own internal self-describing format, it consists of more than just a data format.

This is a scientific data management package, which allows programmers and application developers to manage and manipulate scalar, vector, and multi-dimensional data arrays. Therefore, programmers are not burdened with performing low level physically format and unformat data file.

2.3 ENTRY PROCEDURE AND PROCESS

All organizations should have appropriate guides and instructions, which outline the processes for entering data and preparing reports from their HRIS systems. However, in most cases, considerable efforts and resources are required to collect and arrange the data for presentation to users. Lack of awareness of the capabilities of the HRIS, and lack of staff training, also indicates that the capabilities of HRIS are not being maximized in the most efficient and effective manner.

In most of the organizations, there may be a number of significant gaps in the human resource reports produced for management. These gaps may be the result of the organizations not identifying these issues as information needs or not having policies, procedures and systems in place to capture required information.

Information used for Decisions

All organizations should use information from the HRIS to monitor progress in some important HR areas and to make decisions regarding key operational issues. Although shadow systems were sometimes used to generate additional HR data, particularly for some of the more

strategic HR issues, this represented something of a missed opportunity. However, many managers consider that there is scope to improve the information that is provided to them on a regular basis.

Continuous Improvement

Although the organizations review aspects of their HR information needs, processes and data quality from time to time, it is not usually done as part of a systematic management plan and business plan. There may be lack of basic financial and operational information on costs, which made it impossible for the organizations to measure the cost-effectiveness of their HRIS, including core and shadow systems, and the return on their investment.

Human Resource Process

The Human Resource Process includes maintenance of personnel records, annual review and revision of employee handbook, audit of HR strategies, policies and procedures, implementation of employment/termination procedures, employee development program, performance management process, on-site support, employee retention programs, employee morale building, and compensation plan review.

Recruiting and Employment Process

Different activities of recruiting service process are employment verification, job description development strategy, applicant screening, reference and background check, conduct of interviews etc. This process involves back-office support for recruitment processes, skill testing and new employee orientation programme.

Benefits Administration Processes

Various activities of this process are brokerage services, custom benefit plan strategies and design, benefit analysis, cost control and reduction, recommendations, development of employee communications, eligibility and enrollment services, employee claims resolution, monthly invoice audit and reconciliation, on-line employee access to benefits information, health and welfare, defined benefit, defined contribution, employee call center, E-commerce etc.

Other Processes

Other processes are payroll process, HR outsourcing processes, talent solutions consulting processes, contact center processes, health care processes, talent and organizational change processes, personnel policies & procedures, human resource administration processes, training & development processes, wage and salary administration processes, employee relations processes, knowledge management processes etc.

2.4 DATA STORAGE AND RETRIEVAL

A data storage and retrieval system separates information regarding the expertise of individuals into four files, which can be independently and separately accessed. The records in the various files include fields for indicating the beginning and end of a range of topics within a hierarchical classification system, the level of the topic within the classification system and a field for facilitating alphabetic sorting of topics independently of hierarchical level, and a novel code format for the beginning and end of range indicators permits a

small computer to effectively manipulate data in a hierarchical classification system.

DATA STORAGE

Data storage is a method of operating a computer system having memory for storing and retrieving information concerning a subject, which comprises the following.

(a) in the computer system memory, storing subject data concerning a plurality of subjects wherein said data includes descriptive phrases regarding various matters with which said subjects are concerned and wherein said data includes identifying information for identifying the subjects associated with said descriptive phrases;

(b) assigning selected designation numbers to said descriptive phrases and storing said selected designation numbers in the computer system memory in association with the corresponding descriptive phrases and with the identifying information wherein said designation numbers correspond to a respective plurality of topics;

(c) in the computer system memory, storing a plurality of topic headings with each heading being designated to include a specified range of designation numbers;

(d) in the computer system, for each designation number assigned to a descriptive phrase, determining which of said topic heading range includes said designation number and storing that designation number and corresponding descriptive phrase in association with the associated topic heading;

(e) searching the computer system memory for one of the phrase descriptive of a selected matter of interest, a range of designation numbers, and a designation number, and if a descriptive phrase is identified, determining the designation number;

(f) using one of said range and designation number determined in step (e) to retrieve from the computer system memory the corresponding identifying information concerning the associated subject.

Primary Storage

Primary storage relates to semiconductor memory chips and is used to store the data and programmes currently in use. In some data processing, all instructions and data are entered in primary storage by which the computer completes its processing for results to be presented. Each storage element of memory is directly accessible which can be examined and modified without affecting other cells. Thus primary memory is also called Random Access Memory (RAM). In some applications, computer's primary storage capabilities are insufficient and unable to handle the instructions and data needed for processing. Primary storage has volatile memory for which it is desirable to save the results of processing.

Secondary Storage

Secondary storage is the nonvolatile memory that is stored externally to the computer. Three secondary storage media used with all sizes of computer are magnetic tapes, magnetic disks and optical technology. Through secondary storage, large volume of information can be conveniently stored for future retrieval. The two types of secondary memory available are serial access memory and random access memory. It is helpful to understand in terms of a cassette tape to provide serial access memory and L.P. record to provide random access memory.

Data Warehouse for Storage

A data warehouse is a computer system designed for analyzing the historical data of an organisation, such as sales, salaries, or other information from day-to-day operations. Normally, an organization summarizes and copies information from its operational systems (such as human resources) to the data warehouse on a regular schedule, such as every night or every weekend; after that, management can perform complex queries and analysis on the information without slowing down the operational systems.

The data warehouse also normally stores information at a coarser grain than the operational systems: for example, if the operational systems contain a record for every sale, the data warehouse might simply contain the total number of sales for each product at each store. The data warehouse need not be a [relational database](#), as it must be organised to hold information in a structure that best supports not only query and reporting, but also advanced analysis techniques, like data mining. Most data warehouses hold information for at least one year and sometimes can reach half century, depending on the business/operations data retention requirement. As a result these databases can become very large.

History of Data Warehousing

Data Warehouses became a distinct type of [computer database](#) during the late 1980's and early 1990's. They developed to meet a growing demand for management information and analysis that could not be met by operational systems. Operational systems were unable to meet this need for a range of reasons:

- The processing load of reporting reduced the response time of the operational systems,
- The database designs of operational systems were not optimised for information analysis and reporting,
- Most organizations had more than one operational system, so company-wide reporting could not be supported from a single system, and
- Development of reports in operational systems often required writing specific computer programs which was slow and expensive

As a result, separate computer databases began to be built that were specifically designed to support management information and analysis purposes. These data warehouses were able to bring in data from a range of different data sources, such as [mainframe computers](#), [minicomputers](#), as well as [personal computers](#) and office automation software such as [spreadsheet](#), and integrate this information in a single place. This capability, coupled with user-friendly reporting tools and freedom from operational impacts, has led to a growth of this type of computer system.

As technology improved (lower cost for more performance) and user requirements increased (faster data load cycle times and more features), data warehouses have evolved through several fundamental stages:

- **Offline Operational Databases** - Data warehouses in this initial stage are developed by simply copying the database of an operational system to an off-line server where the processing load of reporting does not impact on the operational system's performance.
- **Offline Data Warehouse** - Data warehouses in this stage of evolution are updated on a regular time cycle (usually daily, weekly or monthly) from the operational systems and the data is stored in an integrated reporting-oriented data structure
- **Real Time Data Warehouse** - Data warehouses at this stage are updated on a transaction or event basis, every time an operational system performs a transaction (e.g. an order or a delivery or a booking etc.)
- **Integrated Data Warehouse** - Data warehouses at this stage are used to generate activity or transactions that are passed back into the operational systems for use in the daily activity of the organization.

Data warehouse operations comprise of the processes of loading, manipulating and extracting data from the data warehouse. Operations also cover user management, security, capacity management and related functions.

Optional Components

In addition, the following components also exist in some data warehouses:

1. **Dependent Data Marts:** A dependent data mart is a physical database (either on the same hardware as the data warehouse or on a separate hardware platform) that receives all its information from the data warehouse. The purpose of a Data Mart is to provide a sub-set of the

data warehouse's data for a specific purpose or to a specific sub-group of the organisation.

2. **Logical Data Marts:** A logical data mart is a filtered view of the main data warehouse but does not physically exist as a separate data copy. This approach to data marts delivers the same benefits but has the additional advantages of not requiring additional (costly) disk space and it is always as current with data as the main data warehouse.

Different Methods of Storing Data

All data warehouses store their data grouped together by subject areas that reflect the general usage of the data (Customer, Product, Finance etc.). The general principle used in the majority of data warehouses is that data is stored at its most elemental level for use in reporting and information analysis. Within this generic intent, there are two primary approaches to organising the data in a data warehouse.

Dimensional Approach

The first is using a "dimensional" approach. In this style, information is stored as "facts" which are numeric or text data that capture specific data about a single transaction or event, and "dimensions" which contain reference information that allows each transaction or event to be classified in various ways. As an example, a sales transaction would be broken up into facts such as the number of products ordered, and the price paid, and dimensions such as date, customer, product, geographical location and sales person. The main advantages of a dimensional approach is that the Data Warehouse is easy for business staff with limited [information technology](#) experience to understand and use. Also, because the data is pre-processed into the dimensional form, the Data Warehouse tends to operate very quickly. The main disadvantage of the dimensional approach is that it is quite difficult to add or change later if the company changes the way in which it does business.

Database Normalisation Approach

The second approach uses [database normalisation](#). In this style, the data in the data warehouse is stored in [third normal form](#). The main advantage of this approach is that it is quite

straightforward to add new information into the database, whilst the primary disadvantage of this approach is that it can be quite slow to produce information and reports.

Advantages of Using Data Warehouse

Through data warehouse, business decision makers can obtain various kinds of trend reports e.g. the item with the most sales in a particular area / country for the last two years. This may be helpful for future investments in a particular item.

There are many other advantages of using a data warehouse, some of which are explained below. The data warehouse

- enhances end-user access to a wide variety of data.
- increases data consistency.
- increases productivity and decreases computing costs.
- combines data from different sources, in one place.
- provides an infrastructure that could support changes to data and replication of the changed data back into the operational systems.

Concerns in Using Data Warehouse

The use of data warehouse has the following concerns for the storage of data for an organization.

- Extracting, cleaning and loading data could be time consuming. But this can be made easy with the help of warehousing tools.
- Data warehousing project scope might increase.
- Problems with compatibility with systems already in place e.g. transaction processing system.

- Providing training to end-users, who end up not using the data warehouse.
- Security can be developed into a serious issue, especially if the data warehouse is web accessible.

Retrieval System

One form of retrieval system relates to locating and retrieving books in a library. With the advent of computers, the development of on-line automated catalogs for bibliographic retrieval became a reality. Another form of data retrieval involves searching data bases based on specific query criteria, and such data storage and retrieval systems of great complexity and sophistication are possible

With the advent of the personal computer, three developments occurred. First, data base application programs are created, which make it possible for any computer-literate person to create and use his own database. Second, the data base application programs make it very easy to modify, change, and adapt the form and structure of existing databases. Third, by creating individual databases, data control and security is moved much closer to the database.

Effectiveness of the data base application program is directly related to the power, sophistication, and ease-of-use of the query or search routines incorporated into the program. The ability of the data base application program to employ Boolean algebraic search routines, combined with the capacity to handle searches expressed, as complex, large formulas is critical.

A significant dimension of a retrieval system is its ability to define and accommodate hierarchical searching procedures. This critical and useful

dimension, usually missing from most systems because of complexity in implementation, must be incorporated at the time of storage and retrieval.

While single-site data bases require no special characteristics, data base systems intended for multiple-site configuration pose special problems if the data control and security benefits inherent in single-site data bases are not to be compromised in an effort to catalog individuals at multiple sites and/or to provide multiple-site access to the data base.

Data retrieval can be regarded as a natural instance of multicriteria decision-making. Queries are formulated as selection criteria aggregated by means of appropriate operators. Retrieval is then performed as a process by evaluating the degrees of satisfaction of the criteria by each document, and then aggregating them. Another decisional instance concerns the problem of improving retrieval performance by taking into account user indications on documents relevance. Relevance feedback mechanisms exploit user-system interaction in order to improve retrieval results by means of an iterative process of query refinement. In this process the main decisional issue is that of finding new concepts, with which to expand-modify the initial query so that it better reflects the user's information needs.

2.5 TRANSACTION PROCESSING

A transaction is a unit of program execution that accesses and possibly updates various data items. It refers to collection of operations that form a single logical unit of work. Transaction processing is designed to maintain a [database](#) in a known, consistent state, by ensuring that any operations carried out on the database that are interdependent are either all completed successfully or all cancelled successfully.

Transaction processing allows multiple individual operations on a database to be linked together automatically as a single, indivisible transaction. The transaction-processing system

ensures that either all operations in a transaction are completed without error, or none of them are. If some of the operations are completed but errors occur when the others are attempted, the transaction-processing system “rolls back” all of the operations of the transaction (including the successful ones), thereby erasing all traces of the transaction and restoring the database to the consistent, known state that it was in before processing of the transaction began. If all operations of a transaction are completed successfully, the transaction is “committed” by the system, and all changes to the database are made permanent; the transaction cannot be rolled back once this is done.

Transaction processing guards against hardware and software errors that might leave a transaction partially completed, with a database left in an unknown, inconsistent state. If the computer system crashes in the middle of a transaction, the transaction processing system guarantees that all operations in any uncommitted (*i.e.*, not completely processed) transactions are cancelled.

The concept of a transaction, and a transaction processing service simplifies construction of such enterprise level distributed applications while maintaining integrity of data in a unit of work. A transaction is a unit of work that has the following properties:

ATOMICITY: A transaction should be done or undone completely and unambiguously. In the event of a failure of any operation, effects of all operations that make up the transaction should be undone, and data should be rolled back to its previous state.

CONSISTENCY: A transaction should preserve all the invariant properties (such as integrity constraints) defined on the data. On completion of a successful transaction, the data should be in a consistent state. In other words, a transaction should transform the system from one consistent state to another consistent state. For example, in the case of relational databases, a consistent transaction should preserve all the integrity constraints defined on the data.

ISOLATION: Each transaction should appear to execute independently of other transactions that may be executing concurrently in the same environment. The effect of executing a set of transactions serially should be the same as that of running them concurrently. This requires two things:

1. During the course of a transaction, intermediate (possibly inconsistent) state of the data should not be exposed to all other transactions.
2. Two concurrent transactions should not be able to operate on the same data. Database management systems usually implement this feature using locking.

DURABILITY: The effects of a completed transaction should always be persistent and durable for the human resource information system of different organizations.

Transaction management is one of the most crucial requirements for enterprise application development. Most of the large enterprise applications in the domains of finance, banking and electronic commerce rely on transaction processing for delivering their business functionality. Given the complexity of today's business requirements, transaction processing occupies one of the most complex segments of enterprise level distributed applications to build, deploy and maintain.

Enterprise applications often require concurrent access to distributed data shared amongst multiple components, to perform operations on data. Such applications should maintain integrity of data (as defined by the business rules of the application) under the following circumstances:

- distributed access to a single resource of data, and

- access to distributed resources from a single application component.

In such cases, it may be required that a group of operations on (distributed) resources be treated as one unit of work. In a unit of work, all the participating operations should either succeed or fail and recover together. This problem is more complicated when

- a unit of work is implemented across a group of distributed components operating on data from multiple resources, and/or
- the participating operations are executed sequentially or in parallel threads requiring coordination and/or synchronization.

In either case, it is required that success or failure of a unit of work be maintained by the application. In case of a failure, all the resources should bring back the state of the data to the previous state (*i.e.*, the state prior to the commencement of the unit of work).

Application Components

Application components are clients for the transactional resources. These are the programs with which the application developer implements business transactions. With the help of transaction manager, these components create global transactions, propagate the transaction context if necessary, and operate on the transactional resources within the scope of these transactions. These components are not responsible for implementing semantics for preserving properties of transactions. However, as part of the application logic, these components generally make a decision whether to commit or rollback transactions.

Resource Managers

A resource manager is a component that manages persistent and stable data storage system, and participates in the two-phase commit and recovery protocols with the transaction manager. A resource manager is typically a driver or a wrapper over a stable storage system, with interfaces for operating on the data (for the application components), and for participating in two-phase commit and recovery protocols coordinated by a transaction manager. This component may also, directly or indirectly, register resources with the transaction manager so that the transaction manager can keep track of all the resources participating in a transaction. This process is called as resource enlistment. For implementing the [two-phase commit](#) and recovery protocols, the resource manager should implement supplementary mechanisms using which recovery is possible.

Resource managers provide two sets of interfaces: one set for the application components to get connections and perform operations on the data, and the other set for the transaction manager to participate in the [two-phase commit](#) and recovery protocol.

Transaction Manager

The transaction manager is the core component of a transaction-processing environment. Its primary responsibilities are to create transactions when requested by application components, allow [resource enlistment](#) and delistment, and to conduct the [two-phase commit](#) or recovery protocol with the resource managers.

Responsibilities of Transaction Manager

The Transaction Manager of an organization has the following important responsibilities.

1. Establish and maintain transaction context
2. Maintain association between a transaction and the participating resources.
3. Initiate and conduct [two-phase commit](#) and recovery protocol with resource managers.

4. Make synchronization calls to the application components before beginning and after end of [two-phase commit](#) and recovery process

A typical transactional application begins a transaction by issuing a request to a transaction manager to initiate a transaction. In response, the transaction manager starts a transaction and associates it with the calling thread. The transaction manager also establishes a transaction context. All application components and/or threads participating in the transaction share the transaction context. The thread that initially issued the request for beginning the transaction, or, if the transaction manager allows, any other thread may eventually terminate the transaction by issuing a commit or rollback request.

Before a transaction is terminated, any number of components and/or threads may perform transactional operations on any number of transactional resources known to the transaction manager. If allowed by the transaction manager, a transaction may be suspended or resumed before finally completing the transaction.

Once the application issues the commit request, the transaction manager prepares all the resources for a commit operation (by conducting a voting), and based on whether all resources are ready for a commit or not, issues a commit or rollback request to all the resources.

Transaction Demarcation

A transaction can be specified by what is known as transaction demarcation. Transaction demarcation enables work done by distributed components to be bound by a global transaction. It is a way of marking groups of operations to constitute a transaction.

The most common approach to demarcation is to mark the thread executing the operations for transaction processing. This is called as programmatic demarcation. The transaction so established can be suspended by unmarking the thread, and be resumed later by explicitly propagating the transaction context from the point of suspension to the point of resumption.

The transaction demarcation ends after a commit or a rollback request to the transaction manager. The commit request directs all the participating resource managers to record the effects of the operations of the transaction permanently. The rollback request makes the resource managers undo the effects of all operations on the transaction.

An alternative to programmatic demarcation is declarative demarcation. Component based transaction-processing systems such as Microsoft Transaction Server, and application servers based on the Enterprise Java Beans specification support declarative demarcation. In this technique, components are marked as transactional at the deployment time. This has two implications. Firstly, the responsibility of demarcation is shifted from the application to the container hosting the component. For this reason, this technique is also called as container managed demarcation. Secondly, the demarcation is postponed from application build time (static) to the component deployment time (dynamic).

Transaction Context and Propagation

Since multiple application components and resources participate in a transaction, it is necessary for the transaction manager to establish and maintain the state of the transaction as it occurs. This is usually done in the form of transaction context.

Transaction context is an association between the transactional operations on the resources, and the components invoking the operations. During the course of a transaction, all the threads participating in the transaction share the transaction context. Thus the transaction context logically envelops all the operations performed on transactional resources during a transaction. The underlying transaction manager usually maintains the transaction context transparently.

Resource Enlistment

Resource enlistment is the process by which resource managers inform the transaction manager of their participation in a transaction. This process enables the transaction manager to keep track of all the resources participating in a transaction. The

transaction manager uses this information to coordinate transactional work performed by the resource managers and to drive [two-phase commit](#) and recovery protocol.

At the end of a transaction (after a commit or rollback) the transaction manager delists the resources. Thereafter, association between the transaction and the resources does not hold.

Two-Phase Commit

This protocol between the transaction manager and all the resources enlisted for a transaction ensures that either all the resource managers commit the transaction or they all abort. In this protocol, when the application requests for committing the transaction, the transaction manager issues a prepare request to all the resource managers involved. Each of these resources may in turn send a reply indicating whether it is ready for commit or not. Only when all the resource managers are ready for a commit, does the transaction manager issue a commit request to all the resource managers. Otherwise, the transaction manager issues a rollback request and the transaction will be rolled back.

Transaction processing has always been complex and critical. However, transaction processing has caught the interest and attention of both developers and IT organizations simultaneously. This is not without reason. These recent technologies simplify distributed transaction management, and are fueled by two major developments:

- **Component Based Development:** Based on the above *interface* centric paradigms, component based distributed application development has become a reality.
- **Object Orientation:** The maturity of object-oriented programming assisted by design patterns and frameworks, made implementation of these technologies feasible.

In addition, these technologies address the scalability and robustness that are required for today's enterprise applications.

2.6 OFFICE AUTOMATION

Office automation refers to the varied [computer](#) machinery and [software](#) used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks and goals. Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an office automation system. Office Automation helps in optimise or automate existing office procedures.

The backbone of office automation is a [LAN](#), which allows users to transmit data, mail and even voice across the network. All office functions, including dictation, typing, filing, copying, fax, telex, microfilm and records management, telephone and telephone switchboard operations, fall into this category. Office automation was a popular term in the 1970s and 1980s as the desktop computer exploded onto the scene. One critical variable affecting the success in office automation is user acceptance. No matter how technologically superior the equipment is, there may be failure if users reject it.

Office Automation for different organisations should include the following important functions.

- Generate [Microsoft Word](#) documents or business forms from data stored in other applications such as [Microsoft Access](#)
- Generate presentations from external data
- Automatically send emails to customers or groups in [Microsoft Outlook](#)
- Create custom data entry mechanisms for [Microsoft Office](#) Documents
- Create custom procedures for [CAD](#) programs
- Maintain and organise data stored in [Microsoft Excel](#) or [Microsoft Access](#)
- Create stand-alone executables to automate your office environment

Attributes and Advantages

It is observed that, there is rapid growth in the use of Office Automation systems from the past few years. This growth can be attributed to the following reasons.

1. Value of information and information explosion
2. Increase in office cost and need to improve office productivity
3. Availability of equipment and skills

Large number of organisations are being benefitted by office automation due to the following advantages related to the human resource information system.

1. Better utilisation of human resources
2. Improved quality of work
3. Efficient decision
4. Better service for customers
5. Increased organisational effectiveness

Office Automation Functions

Different offices perform the same basic functions and operations irrespective of the type and size of the office. There can be creation of original documents and providing inputs to the automation system from documents received outside. There is extraction of data for further presentation as required, storing and retrieving it for subsequent reference. Additional comments, notes and references can be helpful for decision making and duplicating the documents for distribution. For transferring documents and communications to different individuals, the office automation makes extensive use of data communications and networking facilities. Another function of office

automation is presentation of data either on screen for visual inspection or in the form of printouts or in any other form required by the users.

2.7 INFORMATION PROCESSING & CONTROL FUNCTIONS

Invariably it is found that various information flow from one place to another and from person to person for the purpose of taking appropriate decision in an organization. Information processing requires lot of detailed planning to provide control mechanisms in every stage to ensure data integrity. Because in computerised MIS, information can be processed as per predefined set of instructions and computer can not take decisions like human being to change data to meet particular condition or wrong reporting. In computerised MIS, a synthesis between human efforts and computer capacity need to be brought about for successful information processing at different levels.

Higher Level

In the higher level for processing of selected data human efforts are related to appropriate decision, proper policy, future plan and required feedback for effective control. Through computer efforts, there should be achievement of targets by having exception reports and predictive reports.

Middle Level

In the middle level, for having summary data from different inputs, human efforts should be related to preparation of process schedule, planning of control activities and collection of feedback information for improvement. At this level, required data should be processed as per schedule to prepare output reports and to create back up data.

Lower Level

In the lower level, database can be created and data can be processed for editing, compiling and reporting. In this level, much importance is necessary for

data review, correct data control input to edit data, store data and prepare control reports according to the requirements of an organization.

2.8 DESIGN OF HRIS

A system means a group of procedures, which are interrelated and interdependent for acting upon to result in a large unit of work. The system approach to human resource management must precede the design and use of HRIS. The management of different organizations must take active part in the design of HRIS. Participatory design process is advocated for successful implementation of HRIS in an organization. Technical knowledge of the computer, though preferable, is not very much necessary for the manager to perform the role in the design of HRIS. The information system should have a systematic formal assemblage of components to perform data processing operations for the following purposes.

1. Meeting the the legal and transactional data processing requirements
2. Providing information to managers to carry out their functions effectively
3. Providing various useful reports required by internal and external constituents

The design of Human Resource Information System depends on the nature and size of the organisation, requirements of management, compliance of governmental regulatrions, availability of suitable software packages etc. For the design of HRIS, the following steps should be taken.

Preliminary System Analysis

This step involves definition of the problem, specification of objectives, identification of operational needs, diagnosis of constraints, preparation of feasibility report etc.

Systems Design

In this step, the problems are to be described in detail, alternative solutions are to be developed and evaluated, broad engineering requirements of the selected alternatives are to be specified to evaluate the effects on people.

Systems Engineering

In the next step, a detailed study of engineering components and their cost effectiveness should be made to make recommendations about the system to top management for approval and adoption in the organisation.

System Testing and Installation

This step includes various activities for testing of Human Resource Information System for effective operation and successful installation in different departments in the organisation.

Systems Monitoring and Evaluation

This step involves measuring the performance of the system, its continuous evaluation and modification according to strategic requirements and competitive advantages of the organisation.

2.9 Relevance of Decision Making Concepts for Information System Design

Despite the fact that decision making can be treated as a central aspect of managing, the literature and teaching surrounding decision making have generally focussed on the moment of decision rather than the on the whole lengthy, complex process of defining and exploring many alternatives in a decision that precedes the final act of deciding. Those who utilize management information system to assist in decision making process, the steps in problem solving and systems design are extremely important.

It is very important to differentiate between programmed and nonprogrammed decisions representing the extremities of the range of decisions. The major reason to distinguish between these two types of decisions is to arrive at some classification of decision-making methods in order to have appropriate decisions.

Programmed Decisions

The concept of programmed decision is important because the ultimate goal of information systems is to provide purely programmed decisions. Many examples of programmed decisions are available in almost any organisation, the most familiar being the computation of pay in accordance with union agreement, contract, organisation policy or regulation.

One of the goals of MIS design is to devise decision rules for the problems that lend themselves to solution by decision rule and the programmed approach.

Nonprogrammed Decisions

Decisions are unprogrammed to the extent that, they are unstructured, new or high consequence or complex or involve major commitments.

Advertising budgets, new recruitment decisions, acquisition and merger considerations, board member selection, and similar problems illustrate the nonprogrammed type of decision, that cannot be automated.

Over the years, managers are required to learn and acquire the habit of making decisions based on the problem-solving process of defining problem, identifying alternatives and selecting the best alternative. This process is being followed today and still accepted as good advice for taking nonprogrammed decisions.

MIS for Decision Making

Future prospects for programming the decisions of the organisation through proper design of Management Information System are enormous. There is increase in the automation of programmed decisions to support the Human Resource Information System needs throughout the organisation. The decision making concepts for information system design can be related to following three basic considerations.

1. The essential elements in programming a decision is rules followed for the problem to be solved, the decision process to be programmed and the process for which information required.
2. Management Science includes operation research, associated mathematical tools, and the scientific approach to solve problems which provides methods and techniques to design decision rules.
3. The computer is a fantastic device for processing information and making programmed decisions according to predetermined decision rules.

Information System Design

The objective of information system design is related to information production process by which the computer automatically makes decision. This process is completed by taking the following steps.

1. Analyzing the problem by means of management science approach
2. Designing decision rules to solve all applications required
3. Programming the decision rule for the computer processing
4. Developing the input and output of the computer information system to provide for automated decisions by the computer

Design of Decision Rule

Decision rule for programming or automating decisions can be designed by the utilisation of management science techniques and a general procedure for having decision rules in complex situations. This procedure includes following rules.

1. Identify and formulate the manager's decision in writing
2. Find out the constants, parameters and variables involved
3. Select the variables that appears to be most influential
4. Distinguish between controllable and uncontrollable variables
5. State verbal relationships among the variables, based upon known principles
6. Perform symbolic manipulations solving systems of equations

Decision-Assisting Information Systems

This system concentrates on the information required by the manager as decision-maker. This information may be furnished independently or in an

interactive sense where there is a man-machine relationship in a problem-solving network. This vital type of system has the following characteristics and outputs.

1. Some outputs are decisions as the computer made decision according to programmed decision rule
2. Some outputs are secondary information in the form of reports to be used by a subsequent human decision maker
3. The methods of management science can be utilized in both types of systems for the design of decision rules
4. There are provisions for man-machine type interactions in the sense that the manager or decision maker can model the decisions prior to commitment
5. Optimum solutions are provided by management science decision rules

Use of Human Resource Data

All organizations should have a number of committees that received or considered Human Resource information on a regular or ad hoc basis, including Governing Boards, Executive management committees, and Human Resource committees.

The range of HR issues considered by the committees varies. This includes recruitment and selection, performance management, workforce planning, workforce diversity, learning and development, absenteeism, leave, turnover rates and exit surveys, and capability frameworks.

Where the relevant data had been captured by the HRIS, most of the HR data presented at these meetings was sourced from the HRIS. However, as noted earlier, this was not always the case and shadow HR systems were very common in the organisations. In such cases these systems were often the source of data.

There was evidence that committees were using this information to monitor progress in a number of key areas and to make some decisions regarding operational strategies to be pursued by the organisation.

Learning and development

Although learning and development is a common agenda item discussed by committees, only one used its HRIS to record and report on learning and development activities. This was despite the fact that all of the HRISs examined as part of the audit had the capability to record a significant amount of learning and development information. For two of the four organisations examined, information recorded was maintained on one or more shadow systems.

2.10 HRM NEEDS ANALYSIS

Human Resource Management (HRM) is required for an organization to provide the benefits available from managerial and operative functions. All human resource managers are supposed to perform both the functions. HRM needs relate to every aspect of the way in which the organization interacts with its people, e.g. by providing training and development opportunities, appraisal to find out about individual needs for training and development.

Human Resource Management

The concept of Human Resource Management (HRM) in the public sector has evolved since the 1980s. HRM is now recognized as an important management tool, as it supports one of the key resources of an organization. Traditionally, managers see the human resources function as primarily one of administrative processing. However, the focus of human resource has now widened to a broader, more strategic role. HRM is now seen as having two dimensions: operational HRM, which includes basic human resource processing tasks such as pay, recruitment, leave processing; and strategic HRM, which involves delivering those services, in a way that directly supports the implementation of organizational strategies.

Strategic Information Needs

To achieve the organizational objectives, efficiently and effectively, it is important that management at different levels in an organization has access to appropriate information, including human resource information, to enable it to make informed decisions. Ideally, government objectives should be driving an organization's strategic directions, including the human resource initiatives adopted by the organization. This, in turn, should be determining the human resource data that is collected, analyzed and reported. The organizations should report human resource data monthly, quarterly or six monthly to executive management committees as part of a consolidated package of management information. However, although there may be some exceptions, regular human resource reporting is generally limited to basic operational data such as staff commencements and separations, staff numbers by divisions / regions, and leave balances. Sometimes this is supplemented with additional data such as various types of leave taken.

Operational Information Needs

It is important that not only executive management should have access to human resource data but that line managers should also have access to human resource data relevant to their sphere of responsibilities. It is noted that the reporting functions of the human resource information system are complex and complicated to provide required information. Documentation defining the information required for basic regular monthly reports, such as payroll expenditure, should be generally apparent in the organizations.

Documentation and Communication of Human Resource Policies

Human resource policies, procedures and guidelines should be located on the organization's intranets, thereby giving all departmental officers access to the policies and procedures. Displays on intranets are usually supplemented with hard copy circulars, forms, checklists, templates, and guidance material to assist users when entering data, and also to assist in the completeness, accuracy, and management of information.

The organizations tend to communicate policies and procedures through their intranets. It is also important for the organizations to ensure that information on the intranet is up-to-date, as documents are generally only reviewed when they are considered a priority topic.

Managerial Functions

The basic managerial functions include planning, organizing, directing and controlling different human resource related activities. All these functions are to be coordinated effectively through appropriate human resource information system followed in an organization.

Operative Functions

The following operative functions are entrusted to the Human Resource Department to perform various works efficiently by taking proper decisions on the basis of Human Resource Information System.

1. Staffing & Employment
2. Training & Development
3. Wage & Salary Administration
4. Work Culture & Environment
5. Security & Welfare Activities
6. Employer & Employee Relation
7. Records & Statistics
8. Promotion & Transfer
9. Integration & Separation
10. Retirement & Retrenchment
11. Legal Compliance & Government Reporting

Internet

The Internet has become a major force for change in human resource management. HRM system can be involved for recruitment of employees through developed website of the organization. Companies are also using commercial recruiting services and database on the world wide web, posting messages in selected Internet news groups and communicating with job applicants by Internet E-mail. The Internet has wealth of information for the employers and prospective employees.

Intranet

Intranet technologies allow companies to process HRM applications over their corporate intranets which allows the HRM department to provide information service to their employees. The concerned HRM department can provide around the clock services to large number of customers. There can be faster dissemination of information for timely action through appropriate decisions. Intranets can collect information online from employees for input to their personal files. Employees can easily download instructions to get the required information.

Human resources are the people that work for an organization, and human resource management is concerned with how these people are managed efficiently. However, the term Human Resource Management (HRM) has come to mean more than this because people are different from the other resources that work for an organization. People have thoughts and feelings, aspirations and needs. The term HRM has thus come to refer to an approach, which takes into account both:

1. The needs of the organization

2. The needs of employees

Different individuals have their own needs and aspirations. HRM therefore involves finding out about the needs and aspirations of individual employees, for example through the appraisal process and then creating the opportunities within the organization and outside the organization for employees to improve themselves.

Information Needs in HRM

A very sound information base is required for planning and control of human resources. Human Resource Management needs are related to various information for the following functions.

1. Procurement function
2. Development Function
3. Compensation Function
4. Maintenance Function
5. Integration Function

The computerized human resource information system needs following important information for efficient management of the employees working in different organizations.

1. Recruitment information
2. Personnel information
3. Manpower planning information
4. Training information
5. Health information
6. Appraisal information

7. Payroll information
8. Placement information

Training and Development Needs Analysis

There should be analysis of the opportunities and experiences that are required for individuals to train and develop in order to meet organizational and personal objectives. A training and development plan can then be created to set out how these needs can be addressed in practical steps. HRM needs are related to provision of training opportunities and courses for individuals to develop skills, knowledge and attitudes that help the organization to achieve its objectives. For developmental needs there should be provision of opportunities and courses for individuals to develop skills, knowledge and attitudes.

2.11 CONCEPT AND MECHANICS

The management of different organizations should carefully understand the concept and mechanics relating to human resource information system.

Concept

The concept of Human Resource Management Information System is veering around federation of sub systems developed and implemented as per requirement conforming to the overall plan. Thus rather than a single general Human Resource Management Information System , an organisation should have some required types of information system to serve managerial needs in various ways. Human Resource Management relates to various managerial activities of organization which provide opportunity for maximum employee contribution under healthy working conditions, promote individual development

and encourage mutual confidence in between employer and employees. Human resource management is required for maximum contribution of individuals and groups working in the organization for effective achievement of organizational goals through proper information system.

Mechanics

The Human Resource Management (HRM) mechanics relate to the computer based management information system. The internet and intranet facilities are very much helpful for collection, record, process, and analysis of various information for increasing efficiency of human resource management.

SOFTWARE AND OPERATING SYSTEM

Software is a set of programmes. Procedures and related documents associated with a computer system. A programme is a coded set of instructions that interprets the information provided to computer with the keyboard or mouse and then direct to carry out the required task. The operating system gets the computer running and controls the operation of the computer activities. It manages the entry, flow and display of software to and from each part of the computer system.

The disc operating system is the interpreter between the user and the computer. The instruction fed through the keyboard by the user is converted into digital signal into the system circuitry and the instruction is processed to display resulting output on the screen.

2.12 STANDARD SOFTWARE AND CUSTOMISED SOFTWARE

There is a distinct difference between American and European software providers: US vendors dominate the market for standardized software, whereas their European counterparts focus on customer-orientated applications. In South Africa, vendors and user organizations alike source software from both territories, with the result that the state of these markets has a direct impact on the economic fortunes.

US companies specialize in standard software because they have maximum interest in gaining a monopoly for their applications through economies of scale. European companies, on the other hand, specialize in services and system integration. They have learned to form alliances with all types of companies along the value-added chain. Today, with their knowledge, they are in a position to work in a customer-orientated fashion. Instead of forcing the customer to use a standard, they meet the customer's needs.

The software industry consists of two different markets - the primary sector of software companies and the secondary software industry that has led to new business models in many sectors of the economy. They develop packaged software, standardized applications and system software for standardized customer requirements. Furthermore, there are thousands of small and medium-sized companies in Europe and South Africa with selected customers that develop and sell applications, which are customized for individual customer needs. Software is a real engine for innovation in this area.

The last major wave of implementing standardized solutions is the turn of the new millennium. Since then, companies' budgets for new IT projects have dropped drastically, even while their demands for information technology have grown considerably. Today's customers want to protect their investments. They

require a single view of all information relevant to the company. They must be able to call up their information in real time, so that they can react flexibly to markets that are growing more quickly all the time.

This can be achieved only if existing applications are integrated and modernized. Providers must offer their customers integrated applications that are customized for their needs, which are developed in close consultation with the customers. A commercial enterprise's competitiveness depends on its ability to innovate. Companies must be able to react ever more quickly to increasing corporate demands, such as short product lifetimes and greater innovation speed.

Therefore, companies that face this competition need operational application software that is customized for them and their market. At the same time, providers of operational system software must continually modify their software to meet the market's changing demands. This is true for applications involving such sectors as e-government and online banking, as well as for products customized by customers who place their orders via the Internet.

Users need customized software that makes it possible for them to innovate with their products, processes, and collaborations, and that develops with the customers. Standardized software can do this to only a limited degree.

2.13 HRIS-An Investment

Cost incurred for information on location, selection and training of employees are the capital components of investment in Human Resource Information System. These are similar to purchase or installation cost. The

investment in HRIS can be related to various cost involved in recruitment, selection, hiring, placement, training and development of employees in different organizations. The HRIS continues to provide return on investment through increased reporting and data analyses.

Human Resource Information Systems (HRIS) range from basic programs that automate business processes such as payroll, through to the most advanced learning management and performance management. This may represent a significant investment for any organization, costing from thousands to literally millions of dollars in capital and implementation costs.

MODULE - I

MANPOWER PLANNING

Concept

Manpower Planning (MPP) now referred to as Human Resource Planning (HRP) is an attempt to meet organization's need for Human Resources with the available supply of manpower in the local and national labor markets. For many organizations, specialized departments within personnel may be established to concentrate exclusively on manpower planning. Issues that these departments may address include:

- ❖ How many employees does the organization currently employ?
- ❖ What is the age profile, by the department, of our employees?
- ❖ Where in the organization are these employees to be found?
- ❖ Which are the biggest departments in the organization?
- ❖ What skills do our employees?
- ❖ How many employees, on average, leave the organization every year?

- ❖ In which areas of our business do we tend to 'lose' more employees?

These questions are fundamental to the day-to-day activities of manpower planners and are crucial for the future success of the business. Human resources are considered the most valuable, yet the most volatile and potentially unpredictable resource, which an organization utilizes. If an organization fails to place and direct human resources in the right areas of the business, at the right time, and at the right cost (Bramham, 1990; Smith, 1971), serious inefficiencies are likely to arise creating considerable operational difficulties and likely business failure. Consider the rather unlikely, but illustrative example, of a business, which one-day finds that all its employees in the accounts department suddenly retire! This ridiculous situation is an extreme example of poor manpower planning. Most organizations would keep records on the age profile of their departments so that such events can be created for with specific development, progression, recruitment and training plans. Such contingencies would ensure that human resources are channeled through organizations in an orderly and disciplined fashion.

In order to hire personnel on a scientific basis one should establish in advance a standard with which applicants can be compared. This standard should establish minimum acceptable qualities necessary adequate performance of job duties and responsibilities to determine human abilities required for execution.

HRP determines the human resource needs of the whole enterprise and its every department for given future period for the various operations envisage in connection with the accomplishment of organizational objectives and departmental goals. HRP is the predetermination of the future course of action chosen from a number of alternatives for procuring, developing, managing, motivating, compensating, career planning, succession planning and separating

human element of the enterprise. It determines a conscious choice of patterns of the humanization of work environment in an organization.

According to Geisler, “HR planning is the process – including forecasting, developing and controlling – by which a firm ensures that it has the right number of people and the right kind of people at the right places at the right time doing work for which they are economically most useful”.

According to Wendell French, human resource planning may be defined – “as the process of assessing the organisation’s human resources needs in the light of organisational goals and making plans to ensure that a competent, stable work force is employed”.

According to E.W.Vetter, human resource planning is “a process by which an organisation should move from its current manpower position to its desired manpower position. Through planning, management strives to have the right number and right kind of people at the right places at the right time, doing things which result in both the organisation and the individual receiving maximum long-run benefit”.

Leon C Megginson is of the opinion that, human resource planning is “an integrated approach to perform the planning aspects of the personnel function in order to have a sufficient supply of adequately developed and motivated people to perform the duties and tasks required to meet organisational objectives and satisfy the individual needs and goals of organisational members”.

Characteristics of Human Resources Planning

From the above definitions, we can get some general characteristics of human resources planning. They are

1. Human resources plan must incorporate the human resources needs in the light of organisational goals.
2. Human resource plan must be directed towards well-defined objectives.
3. Human resource plan must ensure that it has the right number of people and the right kind of people at the right time doing work for which they are economically most useful.
4. Human resource planning should pave the way for an effective motivational process.
5. A human resource plan should take into account the principle of periodical reconsideration of new developments and extending the plan to cover the changes during the given long period.
6. Adequate flexibility must be maintained in human resources planning to suit the changing needs of the organisation.

Human resource planning or manpower planning are synonymous. It incorporates all human beings at all stages in the organisation. It is essentially concerned with the process of estimating and projecting the supply and demand for different categories of personnel in the organisation for the years to come.

The Need for Manpower Planning

1. The rationale of human resources planning stems from the challenges posed by an overflowing realization that managerial success depends on the success of human resources management. If the desired people were not in position, then the implementation of the plans would suffer.
2. Capabilities, skills, performance abilities and potentialities of each individual are evaluated in the human resources audit. On many occasions, replacement charts or succession plans are kept so that

potential executives are located for every position in the organisation during the given future period.

3. Forecasting and auditing provide background information about internal factors like current and expected skills and vacancies. Accordingly manpower planning can be done. The normal wastage of HR due to turnover, death, superannuation, needs to be planned. Thus, manpower planning must be supported by human resource forecasting, human resource auditing and human resources analyzing.
4. There is an increasing awareness among the managers that no business can survive and grow without adequate and appropriate human resources and their proper management. Taking cognizance of the emerging trends, the human resources planning must respond to the need for structural changes on the one hand and to the emerging set of human expectations on the other.
5. Adequate investment in human capital is indispensable in a business environment. A substantial improvement in quality of life and quality of work life backed by total quality management, require systematic human resource planning.
6. Planning will help in positioning needed employees at the desired time taking into account the lead time for the process of identifying the shortages, getting the vacancy cleared and going through the selection process. It identifies and develops the personnel to move up and assume greater responsibility.
7. Human resources planning must always be backed by proper evaluation and appraisal systems. Periodical appraisal of performance, both in qualitative and quantitative terms, throws light on actual performance as a result of planning. Scientific performance appraisals facilitate in

identifying the gaps existing so that corrective measures can be undertaken.

8. Changes in the environment are continuously taking place. Human resource planning suggests training and development programmes so that personnel can adapt to these changes.
9. Human resource planning helps in reducing the cost of production and keeps the wheels moving, by providing adequate personnel, utilizing the human resources present in the organisation itself and effectively controlling and utilizing them.

It should be sufficiently obvious at this stage that manpower planning involves both a quantifiable and quantitative dimension leading to:

- ❖ Recruitment plans: to avoid unexpected shortages etc.,
- ❖ The identification of training needs: to avoid skill shortages
- ❖ Management development: in order to avoid bottlenecks of trained but disgruntled management who see no future position in the hierarchy but also to avoid managerial shortages – this often requires careful planning.
- ❖ Industrial relations plans: often seeking to change the quantity and quality of employees will require careful IR planning if an organization is to avoid industrial unrest.

In practice, ‘manpower planning is concerned with the demand and supply of labor and problems arising from the process of reconciling these factors’ (Tyson and York, 1989:76). In summary the need for manpower planning lies with the long-term and short-term operational needs for the organization but also, critically, with the needs and aspirations of individuals within the business. It is with respect to this issue that we must now turn.

The Creation of a Manpower Plan

The creation of manpower plan involves certain factors, which contribute to the planning of manpower resources both in terms of internal considerations, and external factors which influences the final outcome of the manpower plan.

- Internal Considerations
- Wastage analysis

Initially the manpower planner will be concerned with the average number of employees that leave and therefore need replacing just in order to maintain a constant number of employee resources in the organization. In large organizations with many departments and demarcated lines of responsibility this can become quite a difficult statistical task requiring considerable time and effort in the collection, synthesis and analysis of data. In smaller organizations it can often be calculated very simply because the informality and personal nature of the organization creates a climate where everybody knows everyone else and when someone leaves it is quite an important and visible event. In large organizations it is far more likely that an employee is simply seen as a payroll number, or a job code. The constant ebb and flow of 'numbers' within the organization requires a far more rigorous calculation of 'wastage' than the rule of thumb and management owner discretion in smaller firms.

The simplest way of calculating wastage is through a turnover analysis:

Number leaving in one year / Average number of employees x 100 = x%

However, this gives a somewhat crude and unrealistic picture of wastage because it fails to locate where these people are leaving from. In general, though, it gives a broad picture of the current state of employee in total and it is

usual to consider a 25% turnover rate as perfectly respectable in modern large-scale organizations. Anything approaching 30-35% may well start alarm bell ringing because it suggests that a large amount of money is being directed into advertising and recruiting employees who are more likely to leave than in an average 25% turnover organization. However, as we suggested above when the manpower planner comes to formulate plans and policies to address this turnover this figure does not provide much useful and practical information. For example, where are these people leaving from? What is the average age of the person who is leaving? For example, it could be that your turnover figure has become distorted over the recent past because of the age profile of the organization and in any one year it may be that there are far more employees than on average reaching retirement age. Consequently it would be more useful to decompose this figure into those that are retirements from those, which are 'voluntary'. Furthermore, turnover might be limited to one particular category of employment, one department, a certain grade or one geographical area. The variety of influences which affect employee turnover are far too numerous to be captured by one calculation such as the labor turnover ratio. Thus for practical reasons we need a more subtle index of turnover which is more closely identifiable with factorial influences.

An alternative to the labor turnover ratio is the Labor Stability Index (Bowex, 1974), which is calculated from the following formula:

Number of employees exceeding one year's service / Number of employees employed one year ago x 100 = x%

The calculation by contrast calculates and emphasis those that stay and hence is known as a stability index. Its importance can be demonstrated through a calculation and comparison with the turnover ratio. Consider two companies:

- ❖ Company X, which in January 1990 employs 2,00 assistants, but from which by January 1991 800 have ‘voluntary’ left. This gives a turnover of $800/2,000 \times 100 = 40\%$.
- ❖ Company Y which January 1990 employs 2,00 assistants, but from which by January 1991 only 100 have actually ‘voluntarily’ left the company, although they have been replaced eight times during the year. This would again give a turnover of 40%.

The labor stability index by contrast would show that Company X has a stability rate of only 60% whereas company Y has a far more impressive stability rate of 95%.

Far more sophisticated techniques have evolved in order to more accurately plot and account for employee wastage. In recent years many companies have become interested in the length of service of employees and it is possible to develop a frequency distribution of leavers by length of service.

It is possible to identify three distinct phases in the analysis of turnover. Following the work of the Tavistock Institute, in particular by Hill and Trist (1953, 1955) in two notable papers of study at the Park Gate Iron and Steel Company, a relationship was established between an initial ‘induction crisis’, a period of ‘differential transit’, and a concluding ‘settled connection’. During the induction crisis it can be seen that the relationship between the individual and the organization is unsettled and a little insecure as the frequency of leavers was far greater in the first eighteenth months of service than during subsequent periods of employment. This can be seen as a ‘trial period’ in which employees are not sure if they are going to stay. Furthermore, the ‘shock’ of employment and the concomitant attention to discipline, hard work and regular time keeping

takes some time to adjust to. In the crisis period therefore there are likely to be a far greater incidence of inductees leaving than in subsequent periods. Hill and Trist also found that other problems associated with manpower planning could be discerned during this period as the rates of 'unsanctioned' absence and industrial accidents were far greater during the induction crisis than during the period of settled connection. In attempting to explain and analyze this relationship they found considerable evidence to suggest that accidents would fall and relatively 'sanctioned absences' would rise. This was explained as a result of the quality of the relationship established between the individual and the organization. After the induction crisis a more stable and secure relationship was established such that a more positive relationship between the individual and the organization reduced accidents and unauthorized absences so that:

Only sickness, therefore, remains; and the suggests is that recourse is had to some kind of sickness when the individual, no longer able, in virtue of his improved relationship, to project his...bad feelings on to the firm as freely as he once did.

Thus the authors conclude that employees internalize stress and dissatisfaction and do not 'blame' the organization after the induction crisis. The word 'blame' is used by the authors to denote a psychological reaction to the organization such that the individuals are looking to punish or hit back at the organization for the stress of employment. Accidents are likely to be higher because of the lack of commitment and dedication to the organization, and thus absences are more likely to be a result of the organization's fault rather than the individual employee. Therefore an overall fall in the level of absence after the induction crisis suggests 'a dynamic connectedness between sanctioned absence (in the form of sickness) and the phase of settled connection' (Hill and Trist, 1955:136). Consequently the employee moves from being a victim at the

psychological level to one who increasingly looks to himself for the cause of sickness or the need for absence.

Such internal considerations as absence, accidents and sickness ratios provide, as Timperely and Sission (1989) state, manpower planning policy implications in that 'there are inherent predictabilities in the process, allowing wastage to be expected and therefore, forecast'.

Not only do manpower planners need accurate information on absence and turnover rates but also statistical records and forecasts of retirements by department, sabbaticals, and the average number of employees engaged in training and retraining.

Markov Models

These models are often used by manpower planners in the consideration of internal factors, which need to be considered in the development of a manpower plan. The Markov model and variants of it attempt to model the flow of individuals within the organization. It states that organizations have predictable wastage patterns according to length of service, and that this pattern can be discerned early on in an individual's career. Once 'survival' rates have been calculated and barring no future shocks, a fairly stable pattern of progression and replacement needs over time can be calculated. Furthermore, adaptations of the basic Markov model are used to project recruitment on the basis of stable patterns of both wastage and promotion. From this a planner can predict the probability and the likely time span of an individual progressing from one grade to another further up the hierarchy. From a consideration of these factors important planning information can be used in the recruitment and selection process, but also importantly in the training needs of individuals progressing

from one grade to another further up be used in the recruitment and selection process, but also importantly in the training needs of individuals such that the organization does not suffer from supply shortages. If a planner knows with some certainty that an individual tends to spend only two years in a particular managerial grade before being promoted to some other department, contingent a training and recruitment plans can be made so that shortages in that area can be eliminated. Thus if 'recruitment, promotion and wastage patterns of staff are stable over reasonable periods of time. The probability that someone in a particular grade at any time will be in some other grade at a later time can be established from the detailed recent career histories of staff' (Timperely and Sission, 1989: 111).

Integrated Strategic Planning and HR Planning

The starting point of effective human resource planning is the organisations' overall purpose or mission. Strategic plans are as unique as the organisations that develop them, but underlying most organisational strategies that is the determination of some unfulfilled need for products or services that the organisation can satisfy. Providing these products or services then becomes part of the organisation's goals. An organisational goal is a long-term broad purpose or aim. Part of strategic planning is the development of organisational goals and objectives.

To a great extent, organisational goals influence the nature of all managerial processes and of human resource management in particular. This means that the structure of the organisation, the specific jobs to be performed, and the financial and technological resources needed and the qualifications and numbers of people employed will consistently reflect organisational goals. Human resource planning is the ongoing planning of the organisation's human

resources, philosophy, policies and programmes in the context of the overall strategic plans and the changing conditions within and outside the organisation.

Significance of HR Planning

From the above, it is clear that any failure in HR planning will be a limiting factor in achieving the objectives of the organisation. If the number of persons in an organisation is less than the number of persons required, then, there will be disruptions in the work, production will be hampered and the pace of production will be slow and employees will be burdened with more work. If there is surplus manpower in the organisation, there will be unnecessary financial burden on it in the form of a large pay bill if employees are retained in the organisation or if they are terminated the compensation will have to be paid to the retrenched employees. Therefore, it is necessary to have adequate number of persons in an organisation to attain its objectives.

In order to achieve the objectives of the organisation, the HR planner should be concerned with the timing and scheduling of planning of human resources. Furthermore, the management has to be persuaded to use the results of manpower planning studies.

Manpower planning can also be used as an important aid in framing the training and development programmes for the employees because it takes into account the anticipated changes in the human resource requirements of the organisations.

Nature of HR Planning

1. Manpower planning involves all the activities with regard to human resources, which belong to a heterogeneous species.

2. Manpower planning includes determination of manpower needs both in quantitative and qualitative terms. The determination of needs must be made in advance to permit adequate time for education, training and development.
3. It includes an inventory of present manpower in order to determine the status of the present supply of manpower so that the labour force can be used to its full capacity.
4. To be effective, manpower planning must focus not only on the people involved but also on the working conditions and the relationships in which they work.
5. Manpower is an important asset of an organisation, which is affected by its social, cultural, economic and psychological backgrounds. Therefore, the manpower must be planned and utilized carefully.

HR Planning at different levels

HRP may be made at different levels and for different purposes. National planners may make a HR plan at the national level whereas a company may make a HR plan at the unit level.

1. **HRP at National Level:** HRP at the national level helps to plan for educational facilities, health care facilities, agricultural and industrial development, and employment plans etc. The government of the country plans for human resources at the national level. National plans for HR forecast the demand and supply of human resources at the national level.

It also plans for occupational distribution, sectoral and regional allocation of human resources.

2. **HRP at the Sectoral Level:** HRP at the sectoral level helps to plan for a particular sector like agriculture, industry etc. It helps the government to allocate its resources to the various sectors depending upon the priority accorded to the particular sector.
3. **HRP at the Industry Level:** HRP at the industry level takes into account the output/operational level of that particular industry when manpower needs are considered.
4. **HRP at the Unit Level:** HRP Planning at the company level is based on the estimation of human resource needs of the particular company in question. It is based on the business plan of the company. A manpower plan helps to avoid the sudden disruption of the company's production since it indicates shortages of particular types of personnel, if any, in advance, thus enabling management to adopt suitable strategies to cope with the situation.
5. **HRP at the Departmental Level:** HRP at the departmental level looks at the manpower needs of a particular department in an organisation.

Process of HR Planning

With the expansion of business, adoption of complex technology and professional management techniques, the process of human resource planning has assumed great significance. HRP consists of the following stages.

1. Analysing organisational plans and deciding objectives.
2. Analysing factors for manpower requirements.

- (a) Demand Forecasting: Forecasting the overall human resource requirements in accordance with organisational plans.
 - (b) Supply Forecasting: Obtaining the data and information about the present inventory of human resources and forecasting the future changes in present human resource inventory.
- 3. Developing employment plans.
 - 4. Developing human resource plans.

1. Analysing organisational plans and deciding objectives:

The purpose of HRP is to relate future human resources so as to maximize the future returns on investment in human resources. Analysis of organisations plans, objectives and programs help in forecasting the human resource demand and provides quantum of future work activity. Based on the objectives, growth opportunities diversification plans and Govt. policies HRP should meet two requirements:

- (a) It should be directly related to the essential nature of the organisation.
- (b) The changes in the selected factors should be proportional to changes in the human resources required in the organisation.

In a large organisation, HRP is done by separate departments while smaller organisations formulate to cover the entire organisation.

2. Analysing factors for manpower requirements

The review of job design and analysis would provide an insight into future capabilities, knowledge and skills of present employees. The job generally should be designed and analysed reflecting the future needs and plans of the

organisation. The factor for manpower requirements can be analysed in two ways:

- (A) Demand Forecasting and
- (B) Supply Forecasting

(A) **Demand Forecasting** is the process of estimating the future manpower requirements according to the function level of skills of employees that would help the planners to assess the overall demand for operative, supervisory and managerial personnel. However, it is difficult to assess demand for supervisory and managerial levels. Therefore, two forecasting techniques may be used for this purpose.

- (i) Judgmental Forecasts, and
- (ii) Statistical Projections.

(i) **Judgmental Forecast** is a conventional method, which is based on judgement of managers and executives who have intensive and extensive knowledge of HR requirement. Judgmental forecasts are two types.

(a) **Managerial Estimate:** Under this method the managers who have sufficient knowledge about the workload, efficiency and ability of employees think about their future workload, capabilities in future and decide on the number and type of human resources to be required. An estimate of staffing needs is done by first level managers and passed on to the higher level managers for revision and approval.

(b) **Delphi Method:** A survey approach can be adopted with the Delphi technique. The Delphi process requires a large number of experts who take turns to present their forecast statement and underlying assumptions to the

others, who then make revisions in their forecasts. Fact-to-face contact among the experts is avoided.

(ii) Statistical Projection: Some forecasting techniques are based on statistical methods. Some of them are given below:

(a) **Ratio-Trend Analysis :** The ratio-trend analysis is carried out by studying past ratios and forecasting ratios for the future. The components of internal environmental changes are considered while forecasting future ratios. Activity level forecasts are used to determine the direct human resource requirements. This method depends on the availability of past records and the internal environmental changes likely to occur in future.

(b) **Econometric Model:** Under the econometric model, the previous data is analysed and the relationship between different variables in a mathematical formula is developed. The different variables affecting the human resource requirements are identified. The mathematical formula so developed is then applied to the forecasts of movements in the identified variables to produce human resource requirements.

(c) **Work-Study Techniques:** Work measurement, workload analysis and techniques to increase productivity, study the internal mobility of workers like promotions and transfer, external mobility like, retirement, etc. are studied. The forecasting of manpower needs for expansion and modernization may increase the demand for workers but when organisations go for downsizing the demand for workers decreases. Suitable techniques should be selected to measure work and analyse the volume of workload by the planners.

(B) Supply forecasting: It is concerned with human resource requirements from within and outside the organisation. The first step involves future supply human resources is to obtain the data and information about the present human resource inventory. Supply Forecasting includes HR audits, employee wastage, changes due to internal promotion, changes due to working conditions. Some of the steps are discussed below:

- **HR Audit:** The employee skills and abilities are analysed and a clear understanding of competencies available in the organisation help the planners to identify manpower supply problems arising in the near future so that, no eligible employee is left out when promotion and other decisions are taken.
- **Employee Wastage:** Supply forecasting estimates future losses of HR of each department and the entire organisation. This is done to identify the employees to quit due to various reasons and to forecast such future losses in future. This helps in reducing the wastage or loss of manpower talent.
- **Internal Promotions:** Analysis is undertaken to assess the retirement position and consequent vacancy position arising out of such eventualities. Forecasting changes in HR supply in various departments and the effect of promotions and transfers on the total number of moves should be analysed and taken into consideration to assess the same.

(3) Development Employment Plans:

After determining the number of personnel for each job in the organisation, the human resource department has to determine the nature of job, i.e., job description and job specification.

(4) Developing a Human Resource Plan:

Net human resource requirements in terms of number and components are to be determined in relation to the overall human resource requirement. After estimating the supply and demand of human resources, the management starts adjustment. When the internal supply of employees is more than the demand, human resource surplus exists and the external recruitment is stopped. Besides the existing employees are encouraged to take voluntary retirement. It gradually reduces the surplus. If human resource deficit exists then the planners have to rely on the external sources. They then proceed for scanning of the employment market for recruitment purposes. If future supply of human requirements, the manpower planner has to suggest to the management to alter or modify the organisational plan. In case of shortage of certain categories of employees, the organisation has to take care not only of recruitment but also retention of existing employees. Control and review of human resource needs from time-to-time ensures adequate supply of human resources in the organisation.

HUMAN RESOURCE RECRUITMENT

The quality of an organization's human resources depends on the quality of its recruits. Recruitment is the process of finding and attracting capable applicants for employment. The process begins when new recruits are sought and ends when their applications are submitted. The result is a pool of applicants from which new employees are selected.

Managers become involved because they want the best people they can get, and they often know about places where appropriate applicants can be found. However, in large organizations, specialists in the recruiting process, called recruiters, are often used to find and attract capable applicants. Recruiters identify job openings through HR planning or requests by managers. The HR plan can be especially helpful because it shows the recruiter both present openings and those expected in the future. Advanced knowledge of job openings allows a recruiter to be proactive. Once openings have been identified, the recruiter learns what each job requires by reviewing the job analysis information, particularly the job descriptions and job specifications. Recruiters also may supplement their knowledge about a job's requirements through talks with the appropriate manager.

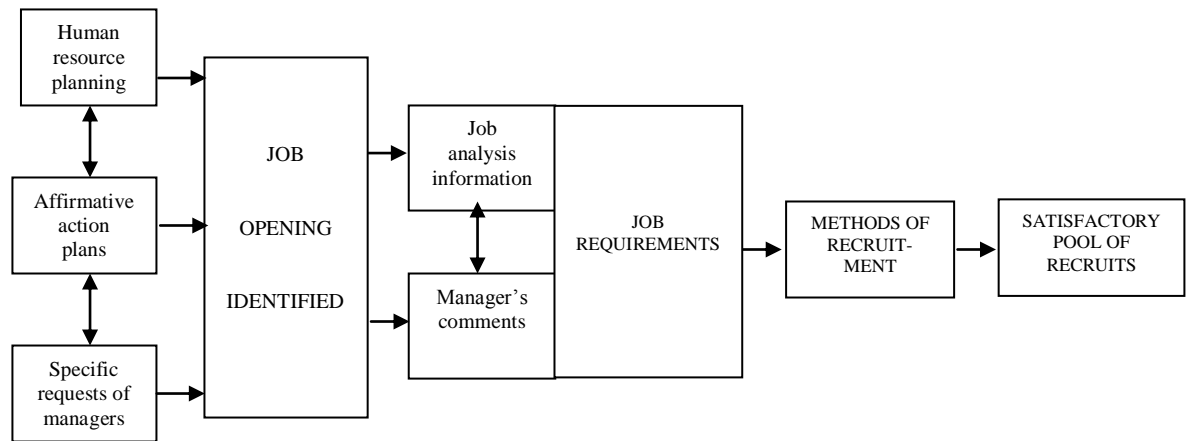
Human resource recruitment refers to any organizational activity that is designed to affect (1) the number of people who apply for vacancies, (2) the type of people who apply for them, and/or (3) the likelihood that those applying for vacancies will accept positions if offered. The goal of an organizational recruitment program is to ensure that the organization has a number of reasonably qualified applicants, who could be chosen when vacancies occur.

The goal of the recruiting is not simply to generate large numbers of applicants. If the process generates a sea of unqualified applicants, the organization will incur great expense in personnel selection, but few vacancies will actually be filled.

The goal of personnel recruitment is not to finely discriminate among reasonably qualified applicants either. Recruiting new personnel and selecting new personnel are both complex processes. Each task is hard enough to accomplish successfully, even when one is well focused. Organizations explicitly trying to do both at the same time will probably not do either well.

Because of strategic differences among companies, the importance assigned to recruitment may differ. In general, however, all companies have to make decisions in three areas of recruiting: (1) personnel policies, which affect the kinds of jobs the company has to offer; (2) recruitment sources used to solicit applicants, which affect the kind of people who apply; and (3) the characteristics and behaviours of the recruiter, which affect the perceived fit between the applicant and the job.

The recruitment process is illustrated in the following diagram.



Recruitment Constraints and Challenges

The most common constraints and challenges faced by recruiters include –

1. Strategic Human Resource Plans
2. Affirmative Action Plans
3. Environmental Conditions
4. Organizational Policies
5. Recruiters habits
6. Job Requirements
7. Costs
8. Incentives

Strategic Human Resource Plans. These plans point out the direction of the firm and suggest the type of tasks and jobs that need to be undertaken. HR plans outline which job should be filled in recruiting outside the firm and which are to be filled internally. Internal placements are much less costly and time consuming than external recruitments, although the available pool of recruits is

limited. When external recruiting must take place, bunching up similar jobs for college recruitment trips or advertisements can be cost effective techniques.

Affirmative Action Plans. Equal employment opportunities and the legislation governing it guide the recruiters in recruiting certain categories of recruits. The employers should be well informed of these implications and the recruiters need to prepare affirmative action plans to ensure justice to all sections of recruits.

Recruiters Habits. Recruiter's past success can lead to certain habits. Admittedly, habits can eliminate time consuming decisions. But habits may also continue past mistakes or avoid more effective alternatives. Recruiters must guard against self-imposed constraints in the form of habits.

Environmental Conditions. The unemployment rate, spot shortages in specific skills projections of the labour force by the Department of Labour, Labour laws, and the recruiting activities of other employers all affect recruiters' efforts. Although these factors are considered in HR planning, the economic environment can change quickly after a plan is finalized. To be sure that the plan's economic assumptions remain valid, recruiters can check three fast changing measures. (1) Leading economic indicators, (2) Predicted versus actual volume of business, (3) Want-ads index.

Job Requirements. What does the job require? A study of the Economic development Committee found that specific vocational skills are less crucial than is a high level of literacy. In addition, a responsible attitude towards work, the ability to communicate in English, and the capacity to learn were all found to be important. To find the best and most experienced applicant is a constraint that is often imposed on recruiters. One problem is recruiters ability to locate good candidates. If high level of experience is not necessary, the recruit may

become bored with the job. If intensive experience is unneeded, experience may be an artificial job requirement. Another problem is cost. People with greater experience usually require a higher salary than do less experienced people. Besides, for some people in some jobs, ten years of experience is another way of saying one year of experience repeated ten times.

Costs. The cost of identifying and attracting recruits is an ever-present limitation. Careful HR planning and forethought by recruiters can minimize these expenses. Of course the best solution is to use proactive HR practices to reduce employee turnover, minimizing the need for recruiting. Evaluating the quantity, quality and costs of applicants helps ensure that recruiting is efficient and cost effective.

Incentives. Incentives may be a constraint. Common sense suggests that employer will have to become more proactive. Recruiters also will have to develop more of customer service attitude in dealing with recruits. They will have to keep applicants better informed, schedule interviews at the applicant's convenience, and minimize the number of return interviews. Higher pay and benefits will be important too.

Organizational Policies. Organizational policies are used to achieve uniformity, economies, public relations benefits and other objectives that may be unrelated to recruiting. The policies that may affect recruitment are highlighted below.

Compensation Policy. Pay policies are a common limitations faced by recruiters. Recruiters seldom have the authority to exceed the stated pay ranges of the organization. Of course, international openings and special or additional assignments entail additional/increasing salary package.

Employment Status Policies. Some companies have policies on hiring part-time and temporary employees. Although there is growing interest in hiring these types of workers, policies can cause recruiters to reject all but those seeking full-time work. Limitations on part-time and temporary employees reduce the pool of potential applicants, especially since this segment of the workforce is a fast-growing one

International Hiring Policies. Policies also may require that foreign jobs be staffed with local citizens. The use of host-country foreign nationals reduces relocation expenses, lessens the likelihood of nationalization. If top jobs are held by local citizens, minimizes charges of economic exploitation. Foreign nationals are apt to be involved in the community to enable them to understand local customs and business practices.

Promote-from-within Policies. Promote-from-within policies give present employees the first opportunity for job openings. These policies may limit the recruiter in several ways. They may require the recruiter to search within the company before looking elsewhere for recruits. If an internal search must be completed before recruiting outside the firm can begin filling job openings will be delayed when internal candidates are unsuitable. Even if internal candidates are acceptable, the pool of potential applicants is likely to be smaller than is the case when internal and external channels are used. Hard choices often must be made when internal recruitment involves the eventual selection of one coworker in preference to another, attendant morale and motivation issues may surround such decisions.

Challenges related to Recruitment

In the global business environment the corporate are posed with a number of challenges in recruiting people matching with the job needs. The challenges include - (1) recruiters face growing constraints in attracting applicants, (2) traditional sources or channels of recruits are unlikely to be sufficient as the growth in the labor force shows during the 1990s, (3) HR departments must continue to meet the needs of their “customers,” operating managers who have jobs that need to be filled, (4) competition for scarce human resources sometimes causes managers to hire qualifiable candidates who need more extensive post hire training and development.

Internal versus External Recruiting. One desirable feature of a vacancy, which is mentioned earlier, is that it provides ample opportunity for advancement and promotion. One organizational policy that affects this is the degree to which the company “promotes from within” –that is, recruits for upper-level vacancies internally rather than externally.

Lead-the-Market Pay Strategies. Because pay is an important job characteristic for almost all applicants, companies that take a “lead-the-market” approach to pay—that is, a policy of paying higher-than-current market wages—have a distinct advantage in recruiting. Pay can also be used to make up for a job’s less desirable features—for example, paying higher wages to employees who have to work midnight shifts.

Employment-at-Will Policies. Employment-at-will policies state that either party in the employment relationship can terminate that relationship at any time, regardless of cause. Companies that do not have employment-at-will provisions typically have extensive due process policies. Due process policies formally lay out the steps an employee can take to appeal a termination decision. Recent court decisions have increasingly eroded employers’ rights to terminate

employees with impunity. To protect themselves from wrongful discharge suits, employers have been encouraged to state explicitly, in all formal recruiting documentation, that the employment is ‘at will.’”

Image Advertising. Organizations often advertise specific vacancies. Sometimes, however, organizations advertise just to promote themselves as a good place to work, in general. Image advertising is particularly important for companies in highly competitive labour markets.

Sources of Recruitment

The sources from which a company recruits potential employees are a critical aspect of its overall recruitment strategy. The total labour market is expansive. Any single organization needs to draw from only a fraction of that total. The size and nature of the fraction that is needed by the organization depends on its vacancies. The type of person who is likely to respond to a job advertised on the Internet may be different from the type of person who responds to an ad in the classified section of a local newspaper. In the following paragraphs, an analysis is made about different sources from which recruits can be drawn, highlighting the advantages and disadvantages of each.

Internal versus External Sources. In the earlier pages it was discussed internal versus external sources of recruits earlier in this chapter and focused on the positive effects that internal recruiting can have on recruits’ perceptions of job characteristics. Now the focus of discussion is how internal sources affects the kinds of people who are recruited.

In general, relying on internal sources offers a company several advantages. First, it generates a sample of applicants who are well known to the firm. Second, these applicants are relatively knowledgeable about the company’s

vacancies, which minimizes the possibility of inflated expectations about the job. Third, it is generally cheaper and faster to fill vacancies internally.

With all these advantages, it is questionable why any organization would ever employ external recruiting methods. There are several good reasons why organizations might decide to recruit externally. First, for entry-level positions and perhaps even for some specialized upper-level positions, there may not be any internal recruits from which to draw. Second, bringing in outsiders may expose the organization to new ideas or new ways of doing business. Using only internal recruitment can result in a work force whose members, all think alike and who therefore may be poorly suited to innovation.

Direct Applicants and Referrals. Direct applicants are people who apply for a vacancy without prompting from the organization. Referrals are people who are prompted to apply by someone within the organization. These two sources of recruits share some characteristics that make them excellent.

First, many direct applicants are to some extent already “sold” on the organization. Most of them have done some homework and concluded that there is enough fit between themselves and the vacancy to warrant their submitting an application. This process is called “self-selection,” and when it works effectively, it takes a great deal of pressure off the organization’s recruiting and selection systems. A form of aided self-selection occurs with referrals too. Current employees (who are knowledgeable of both the vacancy and the person they are referring) do their homework and conclude that there is a fit between the person and the vacancy. They, thus sell the person on the job. Indeed, research shows that new hires that used at least one informal source reported having greater pre-hire knowledge of the organization than those who relied exclusively on formal recruitment sources. Those who report having

multiple sources were even better, in terms of both pre-hire knowledge about the position and subsequent turnover. It is observed by some studies that the turnover rate for applicants who came from multiple recruiting sources was half that of those recruited via campus interviews or newspaper advertisements.

Advertisements in Newspapers and Periodicals. Advertisements to recruit personnel are ubiquitous, even though they typically generate less desirable recruits than direct applications or referrals, and at greater expense. However, since few employers can fill all their vacancies with direct applications and referrals, some form of advertising is usually needed. Moreover, an employer can take many steps to increase the effectiveness of this recruitment method.

The organization placing the advertisement has to decide which medium it will use. The classified section of local newspapers is the most common medium. It is a relatively inexpensive means of reaching a large number of people within a specified geographic area. On the downside, this medium does not allow an organization to target skill levels very well. Typically, classified ads are read by many people who are either over-or under qualified for the position. Moreover, people who are not looking for work rarely read the classifieds, and thus this is not the right medium for luring people away from their current employers. Specially targeted journals and periodicals may be better than general newspapers at reaching a specific part of the overall labour market. In addition, employers are increasingly using television—particularly cable television—as a reasonably priced way of reaching people.

Employers can register their job vacancies with their local state employment office, and the agency will attempt to find someone suitable job seekers using its computerized inventory of local unemployed individuals. The agency makes referrals to the organization at no charge, and these individuals can be

interviewed or tested by the employer for potential vacancies. Because of certain legislative mandates, state unemployment offices often have specialized “desks” for minorities, handicapped individuals, weaker sections, women, etc. Thus, this is an excellent source for employers who feel they are currently underutilizing any of these subgroups.

Private Employment Agencies. Public employment agencies serve primarily semi-skilled, unskilled, skilled human resource segment of labour market. Private employment agencies perform much the same service. Unlike public agencies, however, private employment agencies charge the organization for the referrals. Another difference between private and public employment agencies is that one doesn't have to be unemployed to use a private employment agency.

Private placement agencies, which exist in every major metropolitan area, arose to help employers find capable applicants. They take an employer's request for recruits and then solicit job seekers, usually through advertising or among walk-ins. Candidates are prescreened, matched with employer requests, and then told to report to the employer's HR department for an interview. The matching process conducted by private agencies varies widely. Some placement services carefully prescreen applicants; others simply provide a stream of applicants and let the HR department do most of the screening.

Users of private placement agencies should realize that payment is handled in one of two ways: either the employer or the applicant pays the placement firm a fee, which commonly equals 10 percent of the first year's salary or one month's wages. Fee-paid positions are openings for which the employer agrees to pay. Other positions require the recruits to pay once they are offered a job or begin employment.

Users of private placement agencies should be advised to carefully review any contracts the agency asks them to sign. Some agencies will provide minimum assistance, being more interested in the placement and less interested in an appropriate match between the applicant and the employer. Signed contracts may mean that even an unsatisfactory placement leads to a financial obligation on the part of the recruit if the position is not a fee-paid one.

Professional Search Firms

Professional search firms are much more specialized than placement agencies. Search firms usually recruit only specific types of human resources for a fee paid by the employer. For example, some search firms specialize in executive talent, while others find technical and scientific personnel. Perhaps the most significant difference between search firms and placement agencies is the approach taken. Placement agencies hope to attract applicants through advertising, but search firms actively seek out recruits among the employees of other companies. Although they may advertise, search firms use the telephone as their primary tool to locate and attract prospective recruits.

Professional Associations

Professional groups of engineers, accountants, trainers, and others often maintain placement rosters and hold job fairs, especially at annual conventions. Some have publications that accept classified ads that reach their membership, and a growing number of associations are willing to sell mailing lists classified by geographic areas.

Colleges and Universities. Most colleges and universities have placement services that seek to help their graduates obtain employment. Indeed, on-

campus interviewing is the most important source of recruits for entry-level professional and managerial vacancies.

Many employers have found that to effectively compete for the best students, they need to do more than just sign prospective graduates up for interview slots. One of the best ways to establish a stronger presence on a campus is with a college internship program. These kinds of programs allow an organization to get early access to potential applicants and to access their capacities directly.

Another way of increasing one's presence on campus is to participate in university job fairs. In general, a job fair is a place where many employers gather for a short time to meet large numbers of potential job applicants. Although job fairs can be held anywhere (e.g., at a hotel or convention center), campuses are ideal locations because of the large number of well-educated, yet unemployed, individuals who live there. Participation in job fairs is a rather inexpensive means of generating an on-campus presence, and it can even provide some one-on-one dialogue with potential recruits—the kind of dialogue that could not be achieved through less interactive media like newspaper advertisements.

Finally, as more organizations attempt to compete on a global level, the ability to recruit individuals who will be successful both at home and abroad is becoming an increasing concern, and many organizations feel that college campuses are one of the best places to search for this type of transportable talent.

Electronic Recruiting. Many of the advantages of a typical job fair can now be gained without the need to place the recruiter and recruit in the same physical location. Computer recruitment networks allow employers to conduct searches that are widely distributed geographically, without ever leaving the home office.

Within the last few years, the use of computer networks to recruit employees has expanded a great deal.

Application Blanks

Job application blank collects information about recruits in a uniform manner. Even when recruits volunteer detailed information about themselves in the form of a resume, applications are often required so that the information gathered is comparable. An example of an application blank and its major divisions is given below.

A Typical Application Blank

Personal Data

1. Name _____
2. Address _____
3. Phone Number _____

Employment Status

4. Type of employment sought _____ Full-time _____ Part-time
_____ Permanent _____
Temporary
5. Job or position sought _____
6. Date of availability, if hired _____
7. Are you willing to accept other employment if the position you seek is unavailable?
_____ Yes _____ No
8. Approximate wages/salary desired \$ _____ per month

Education and Skills

9. Circle the highest grade completed:
8 9 10 11 12 13 14 15 16 Graduate
School
10. Please provide the following information about your education. (Include high school, trade or vocational schools, and colleges)
 - a. School name _____ Degree(s) or diploma

School _____ address

b. School name _____ Degree(s) or diploma

School _____ address

11. Please describe your work skills. (Include machines, tools, equipment, and other abilities you possess.)

Work History

Beginning with your most recent or current employer, please provide the following information about each employer. (If additional space is needed, please use an additional sheet.)

12. a. Employer _____ Dates of employment

Employer's _____ address

Job title _____ Supervisor's name

Job _____ duties

Starting pay _____ Ending pay

b. Employer _____ Dates of employment

Employer's _____ address

Job title _____ Supervisor's name _____

Job duties _____
Starting pay _____ Ending pay _____

Military Background

If you were ever a member of the Armed Services, please complete the following :

13. Branch of service _____ Rank at discharge _____
Dates of service _____ to _____
Responsibilities _____

Memberships, Awards, and Hobbies

14. What are your hobbies? _____
15. List civic/professional organizations to which you have belonged. _____

16. List any awards you have received. _____

References

In the space provided, list three references who are not members of your family:

17. a. Name _____ Address _____
b. Name _____ Address _____
c. Name _____ Address _____
18. Please feel free to add any other information you think should be considered in evaluating your application.

By my signature on this application, I:

- a. Authorize the verification of the above information and any other necessary inquiries that may be needed to determine my suitability for employment.
b. Affirm that the above information is true to the best of my knowledge.
c. Realize that falsification may be grounds for dismissal.

_____ Date _____

Applicant's Signature

SELECTION

Introduction

It can be argued that staff selection is becoming the axis on which all other human resource issues turn. In this fast moving work environment the time available for new employees to adapt and develop is diminishing. They are expected to become effective almost instantly, to perform and to move on.

The fluid nature of employment which Atkinson (1984) described as more evident in the 1980s and which he encompassed in his concept of the 'flexible firm', implies that the selection process requires greater thought and emphasis because, although employees may be with organisations for shorter and shorter periods of time, the quantity and quality of output required will be greater and greater.

There also appears to be a shift in the onus of responsibility, with human resource specialists becoming 'casting directors' rather than 'actors' agents and managers' as employees take on the task of directing and planning their own careers. With the growing popularity of shorter-term contracts of employment the assessment of skills and abilities will be a shared and critical activity which starts with the selection process.

This section deals with various methods of selection validity of selection tests and selection process. Although most human resource specialists are familiar with the interview there are a wide range of other less familiar, alternative or supplementary techniques requiring description and discussion.

It must be said that identifying the best candidate for the job is only one side of a coin, as the candidate needs to be motivated to accept the job offer. This point is made by Herriot (1984) who pointed out that the psychological contract can be terminated by either side at any point in the process. The issue of how both the selection decision is also addressed in this section.

Organizational Considerations in Staffing Decisions

There should be a fit between the internal strategy of an enterprise and characteristics of the people who are expected to implement it. For strategic reasons it is important to consider the stage of development of a business because many characteristics of a business—such as its growth rate, product lines, market share, entry opportunity and technology. All these change as the organization changes. One possible set of relations between the development stage and the management selection strategies is shown below.

Organizations that are just starting out are in the embryonic stage. They are characterized by high growth rates, basic product lines, heavy emphasis on product engineering, and little or no customer loyalty.

Organizations in the high-growth stage are concerned with two things: fighting for market share and building excellence in their management teams. They focus on refining and extending product lines, and on building customer loyalty.

Mature organizations emphasize the maintenance of market share, cost reductions through economies of scale, more rigid management controls over workers' actions, and the generation of cash to develop new product lines. In contrast to the freewheeling style of an embryonic organization, there is much less flexibility and variability in a mature organization.

Finally, an ongoing organization struggles to hold market share in a declining market, and it demands extreme cost control obtained through consistency and centralized procedures. Economic survival becomes the primary motivation.

Different management styles seem to fit each of these development stages. In the embryonic stage there is a need for enterprising managers who can thrive in high-risk environment. Such managers are known as entrepreneurs. They are decisive individuals who can respond rapidly to changing conditions. During the high-growth stage there is still a need for entrepreneurs, but it is also important to select the kinds of managers who can develop stable management systems to preserve the gains achieved during the embryonic stage. They are called "growth directors".

As an organization matures there is a need to select the kind of manager who does not need lots of variety in her or his work. But who can oversee repetitive daily operations, and who can search continually for economies of scale. Individuals who fit best into mature organizations have a "bureaucratic" style of management.

An ageing organization needs ‘movers and shakers’ to reinvigorate it. Strategically, it becomes important to select (again) entrepreneurs capable of doing whatever is necessary to ensure the economic survival of the firm. This may involve divesting unprofitable operations, firing unproductive workers, or eliminating practices that are considered extravagant.

These characterizations are coarse, but they provide a starting point in the construction of an important link between the development stage of an organization and its staffing strategy. Such strategic concerns may be used to supplement job analyses as bases for staffing.

Organizational Culture

A logical extension of the mating theory of recruitment (i.e., concurrent search efforts for a match by organizations and individuals) is the mating theory of selection. That is, just as organizations choose people, people choose jobs and organizations that fit their personalities and career objectives and in which they can satisfy needs that are important to them.

In the context of selection, it is important for an organisation to describe the dimensions of its culture. Culture is the pattern of basic assumptions a given group has invented, discovered, or developed in learning to adapt to both its external environment and its internal environment. The pattern of assumptions has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. Organizational culture is embedded and transmitted through mechanisms such as the following:

1. Formal statements of organizational philosophy and materials used for recruitment, selection, and socialization of new employees

2. Promotion criteria
3. Stories, legends, and myths about key people and events
4. Aspects of performance or experience leaders pay attention to, measure, and control
5. Implicit and possibly unconscious criteria that leaders use to determine who fits into key slots in the organization

Organizational culture has two implications for staffing decisions. One, cultures vary across organizations. Individuals will consider this information in their job-search process if it is available to them. Companies such as IBM and Procter & Gamble have a strong marketing orientation, and their staffing decisions tend to reflect this value. Other companies, such as Sun Microsystems and Hewlett-Packard, are oriented toward R&D and engineering. Still others such as McDonald's, concentrate on consistency and efficiency. By linking staffing decisions to cultural factors, companies try to ensure that their employees have internalized the strategic intent and core values of the enterprise. In this way they will be more likely to act in the interest of the company and as dedicated team members, regardless of their formal job duties.

Two, other things being equal, individuals who choose jobs and organizations that are consistent with their own values, beliefs, and attitudes are more likely to be productive, satisfied employees.

The Logic of Personnel Selection

If variability in physical and psychological characteristics were not so prevalent, there would be little need for selection of people to fill various jobs. Without

variability among individuals in abilities, aptitudes, interests, and personality traits, we would expect all job candidates to perform comparably. Research shows clearly that as jobs become more complex, individual differences in output variability increase. Likewise, if there were 10 job openings available and only 10 qualified candidates, selection again would not be a significant issue since all 10 candidates would have to be hired. Selection becomes a relevant concern only when there are more qualified candidates than there are more qualified candidates than there are positions to be filled, for selection implies choice and choice means exclusion.

Since practical considerations (safety, time, cost) make job tryouts for all candidates infeasible in most selection situations. It is necessary to predict the relative level of job performance of each candidate on the basis of available information. As we will see, some methods for doing this are more accurate than others. However, before considering them, we need to focus on the fundamental technical requirements of all such methods—reliability and validity.

Validity of Selection Method/Standards

Personnel selection is the process by which companies decide who will or will not be allowed into their organizations. Several generic standards should be met in any selection process. The focus here is on the five: (1) reliability, (2) validity, (3) generalizability, (4) utility, and (5) legality. The first four build off each other, in the sense that the preceding standard is often necessary but not sufficient for the one that follows. This is less the case with legal standards. However, a thorough understanding of the first four standards helps us understand the rationale underlying many of the legal standards.

Reliability

Much of the work in personnel selection involves measuring characteristics of people to determine who will be accepted for job openings. For example, we might be interested in applicants' physical characteristics (e.g., strength or endurance), their cognitive abilities (e.g., mathematics ability or verbal reasoning capacity), or aspects of their personality (e.g., their initiative or integrity). Whatever the specific focus, in the end we need to quantify people on these dimensions (i.e., assign numbers to them) so we can order them from high to low on the characteristic of interest. Once people are ordered in this way, we can then make decisions about whom to hire and whom to reject.

One of the key standards for any measuring device is its reliability. We define reliability as the degree to which a measure is free from random error. If a measure of some supposedly stable characteristic such as intelligence is reliable, then the score a person receives based on that measure will be consistent over time and in different contexts.

Validity

Validity is defined as the extent to which performance on the measure is associated with performance on the job. A measure must be reliable if it is to have any validity. On the other hand, reliability can be measured by many characteristics (e.g., height) that may have no relationship to whether someone can perform a job. For this reason, it is said, that reliability is a necessary but insufficient condition for validity.

Criterion-Related Validation. One way of establishing the validity of a selection method is to show that there is an empirical association between scores on the selection measure and scores for job performance. If there is a

substantial correlation between test scores and job-performance scores, criterion-related validity has been established. This correlation is referred to as a validity coefficient.

Content Validation. When sample sizes are small, an alternative test-validation strategy, content validation, can be used. **Content validation** is performed by demonstrating that the items, questions, or problems posed by the test are a representative sample of the kinds of situations or problems that occur on the job. A test that is content valid exposes the job applicant to situations that are likely to occur on the job. And then tests whether the applicant currently has sufficient knowledge, skill, or ability to handle such situations.

Generalizability is defined as the degree to which the validity of a selection method established in one context extends to other contexts. There are three primary “contexts” over which we might like to generalize: different situations (i.e., jobs or organizations), different samples of people, and different time periods. Just as reliability is necessary but not sufficient for validity, validity is necessary but not sufficient for generalizability.

Utility is the degree to which the information provided by selection methods enhances the bottom-line effectiveness of the organization. In general, the more reliable, valid, and generalizable the selection method is, the more utility it will have. On the other hand, many characteristics of particular selection contexts enhance or detract from the usefulness of given selection methods, even when reliability, validity, and generalizability are held constant.

Another organizational characteristic that affects the utility of a given test is the nature of employee turnover (in terms of performance differences between stayers and leavers). If those who leave the job tend to be low performers rather than high performers, the utility of the test increases. Under these conditions,

testing allows the company to replace low performers with individuals that the test indicates will be high performers.

There are also characteristics of a job that affect the utility of a given test. First, the degree of difficulty of performing well on the job affects utility. For jobs that have high base rates—that is, the percentage of randomly hired people who could perform well—tests have little utility. Testing pays off primarily in contexts where it is difficult to find high performers.

Second, where the economic consequences to an organization of failure versus success on the job are great, testing has greater utility.

Legality

The final standard that any selection method should adhere to is legality. All selection methods should conform to existing laws and existing legal precedents. Our treatment there was broad and dealt with legal aspects in all areas of human resource management. In this chapter, we will focus more narrowly on issues that relate directly to personnel selection.

Methods of Selection

1. Biodata

Biodata refers to biographical information about the candidate. Much of this sort of information is gathered on application forms. Application forms, as with other tools used for selection purposes should be clearly designed so that selectors know how they are going to use the information when it is received.

Some organizations use this information to indicate a person's group or individual orientation, or to give added information on leadership ability in example. I was captain of the hockey team).

Herriot, Glendinning and Wingrove (1984) found that selecting candidates on the basis of application forms was a haphazard affair with candidates who filled in the white spaces on the form standing a greater chance of selection because filling in the spaces was equated with motivation.

2. Group Methods

Roles

Many organizations are now interested in whether an employee will fit into an existing group. Some organizations are therefore using Belbin's work on team roles (Belbin, 1981) not only to identify what roles exist at present within the team and therefore what is the gap, but also to select a candidate with the required role preference.

Problem Solving

A small group of 6-8 people is asked to solve a work-related problem in a limited period of time.

Each individual may also be asked to feed back to the assessors the behaviour of a chosen candidate, thus each individual would not only be asked to contribute to solving the problem but they would be required to appraise another individual.

The candidate will be assessed on:

- Problem solving ability in the short and long term/creativity;
- Ability to work well and contribute to a team situation;
- Interpersonal skills;
- Ability to listen, to appraise and assess others;
- Leadership and chairing qualities.

3. In-Trays

The exercise simulates what a manager might find in his or her in-tray and the candidate is allocated a limited period of time - say 30 minutes – in which to go through the in-tray of memos, letters, reports and other documents and to make appropriate written decisions. These decisions or suggested actions will be communicated and explained to an assessor following the event.

The in-tray exercise will typically be assessing:

- Ability to make appropriate decisions when under time pressure;
- To deal with situations appropriately;
- To be aware of the knock-on effect of decisions to other parties;
- Ability to organize and prioritize

4. Presentation

Each candidate is asked to write and present a piece of work to an audience.

Typically the presentation will be time limited and on a relevant topic. So, for example, a person applying for a job as a manager of a multinational organization who will be liaising and managing overseas staff might be asked to present a 15 minute paper on:

‘MANAGING CULTURAL DIVERSITY’

The candidate will be assessed on:

- Verbal and non-verbal presentation skills;
- Relevant content;
- Time management.

5. Work simulation exercise

A typical work situation is simulated so that a candidate’s ability to do the job effectively can be assessed. The alternative is to rely on what the candidate

says they would do in a given situation, but what or how they say they would carry out a piece of work may be very different to what they would do in practice.

The candidate is asked to comment on or answer questions which mirror the type of activity which is involved in the job. For example, a prospective senior manager may be asked to comment individually and in writing on last year's financial figures suggesting undertake a typing test, or a prospective television newscaster may be asked to present a piece of news.

The candidate will be assessed on relevance of content.

6. Repertory Grid Technique

Kelly (1955) developed the notion of personal construct psychology as a theory of personality, which over the last five years has been developed for use in the selection process. The technique allows the individual to make sense of his or her world by identifying similarities and differences between sets of events in his or her life and in this way develops personal constructs. Anderson (1990) used the technique to elicit constructs, which relate to preferred tasks. The repertory grid was elicited from a marketing manager and shows distinct clusters: one is a liking for variety, challenge and responsibility for the marketing function and the other is a dislike of closely supervised work, desk-bound tasks and advertising responsibilities.

Kelly's repertory grid is extremely useful when trying to uncover a candidate's real motivation and preferences and marks a new and exciting step forward in the field of selection.

7. Personality Assessment

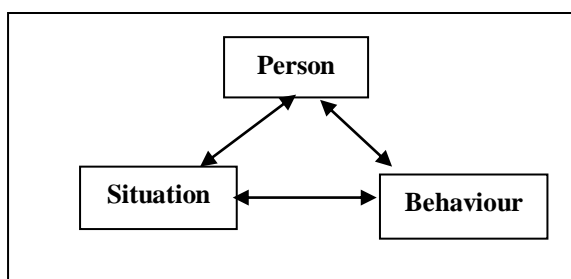
The use of personality questionnaires in employee selection is not an area for the amateur and certainly not an area in which to dabble.

Some users of this selection method find it an invaluable tool, others suggest that even to try to define personality is difficult, therefore how can this illusory characteristic be measured? Certainly the word 'personality' is much abused in general use, not least in phrases such as 'film or TV personality'. Only recently a student was overheard to say he was undertaking a personality test to see if I have any'!

There are now many psychometric self-report questionnaires on the market, which purport to measure personality. It is possible to measure personality, it must be possible to define it! So what is personality?

Jessup and Jessup (1975) define personality as:

That which makes one person different from another and includes all the psychological characteristics of an individual . . . personality is used to describe the non-cognitive and non-intellectual characteristics of an individual. It refers more to the emotional make up of a person and is reflected in the style of his/her behaviour rather than the quality of his/her performance.



Bandura (1977) questions whether the trait approach to personality, or the situation, explains the behaviour. Clearly if personality does not to a large

extent explain behaviour it may not be very useful to assess personality as part of the selection process.

Bandura (1977) suggests that behaviour is a result of the person/situation interaction, as illustrated above figure. This diagram suggests that both the personality and the situation determine behaviour. So, for example, the individual may have an extrovert personality but decide not to display this characteristic in a particular situation, for example at a funeral.

8. Interviews

A selection interview has been defined as “a dialogue initiated by one or more persons to gather information and evaluate the qualifications of an applicant for employment.” The selection interview is the most widespread selection method employed in organizations.

Unfortunately, the long history of research on the employment interview suggests that, without proper care, it can be unreliable, low in validity, and biased against a number of different groups. Moreover, interviews are relatively costly because they require at least one person to interview another person, and these persons have to be brought to the same geographic location. Finally, in terms of legality, the subjectivity embodied in the process often makes applicants upset, particularly if they fail to get a job after being asked apparently irrelevant questions.

Fortunately, more recent research has pointed to a number of concrete steps that one can employ to increase the utility of the personnel selection interview. First, HR staff should keep the interview structured, standardized, and focused on accomplishing a small number of goals. That is, they should plan to come out of each interview with quantitative ratings on a small number of dimensions

that are observable (e.g., interpersonal style or ability to express oneself) and avoid ratings of abilities that may be better measured by tests (e.g., intelligence). In the words of one experienced interviewer for Johnson and Son Inc., “Gut feelings count, but the goal is controlled subjectivity.”

The interview, as with any method of selection, should be a very thin slice between what precedes and follows. It cannot be stressed enough that if you don’t know what you are looking for, the interview will not help you to find it, and if you do not know how to use the information following the interview, the strengths of the process will be negated. The interview should be seen as a camera – it will take the picture, after you have pointed the lens and framed the shot!

	Candidates				
	9.30 – 10.30	10.45 – 11.45	12.00 – 13.00	13.00 – 14.15	14.15 – 15.15
Interviewer 1 (Subject: finance)	1	2	3	Lunch	4
Interviewer 2 (Subject: human resource management)	2	3	4	Lunch	1
Interviewer 3 (Subject: technical skills)	3	4	1	Lunch	2

Sequential Interview timetable

The interview can be:

- One to one
- Sequential
- Panel

Most people are familiar with the one-to-one interview as an interviewee if not as an interviewer, the sequential interview takes the one-to-one a step further and is a series of interviews, usually utilizing the strengths and knowledge base

of each interviewer, so that each interviewer asks questions in relation to his or her subject area of each candidate, as the candidates move from room to room. This process therefore takes no longer than the traditional one-to-one interview. A schedule for this type of selection method with three interviewers and four candidates could be planned as in above figure.

The panel interview consists of two or more interviewers and has been known to embrace as many as 15 interviewers. Any panel interview is less intimate and more formal than the one-to-one but if handled and organized well it can provide a wealth of information; if not, it can not only make the candidate feel ill at ease and unsure about where to look and to whom to address the answer to each question, but the coordination of interviewers' questions – that is who is going to ask what and in what order – can become a nightmare for the interviewers.

The setting of the interview is very important and attention should therefore be paid to noise level, avoiding interruptions, lighting, the candidate's reception, and the dress and manner of the interviewer.

The physical positioning of furniture is also instrumental in dictating the tone of the interview and is therefore important in creating the appropriate atmosphere, but it should be remembered that however informal you make the process, or as a candidate however informal the process appears to be, interviewers expect the candidate to play a certain role or to know their place.

All interviews should be well planned; the exchange is not an invitation to a coffee morning. It is essential that interviewers plan the sequence as well as the content of events. The interviewer should only talk for approximately 20% of the time thus allowing the interviewee to talk for 80% of the interview.

- Sparing use should be made of closed questions. Open questions elicit more information from the candidate and candidates prefer them (Jablin and McComb, 1984).
 - An example of a closed question would be: 'You did enjoy your last job didn't you?'
 - An alternative open question would be: 'What did you enjoy about your last job (and why)?'
- It has been estimated that the interviewer usually makes a decision within the first 4 – 9 minutes and then seeks evidence to support the decision.
- Interviewers recognize and like a candidate who is similar to them (e.g. the same social background, school, education, geographical location). One interviewer even related that he immediately felt a rapport when he noticed that both he and the candidate took artificial sweeteners in their coffee!
- Practice at interviewing does not improve performance. The old adage: 'I've been interviewing for 30 years therefore I must be good at it' does not hold true. Practice alone does not improve performance.
- Interviewers are affected by contrast so that an average performer seen after an exceptionally weak one will be rated highly. Also the last candidate tends to be remembered more clearly than the others.
- Interviewers place more emphasis on negative rather than positive information (Webster, 1964).
- The success of a selection interview when unstructured is only slightly better than chance.
- Arvey and Campion (1982) found that the interview was vulnerable to racial and other forms of prejudice but pointed out that it is a valuable

way of predicting important characteristics such as social and verbal fluency.

- Interviewers are affected by physical cues, e.g. spectacles = more intelligent.
- Only 10% of communication is through the content of the spoken word, 50% is from voice tone, level, accent, etc., and 40% from body language. How you say something is therefore as important as what you say!
- Following the last point, remember that non-verbal communication is extremely important. Interviewers like animated (but controlled) body language. Candidates should consider posture, facial gestures and intonation in the voice.
- Interviewees like the interview and feel cheated if they don't have one.
- The interview is an ideal opportunity for the organization to sell itself.
- The interview is a cheap method of selection compared to other methods (although a mistake if a poor choice is made when it can be expensive).
- Panel interviewers have difficulty in agreeing on the evaluation of the same candidates when asked to make confidential choices (Wagner, 1949) but when asked to make a group decision the most influential panel member seems to be deferred to, thus invalidating the whole idea of having a panel.
- Employers in the UK often express concern about the fairness of psychometric tests and yet continue to use and seem to feel relatively happy about the interview, when in fact there is considerable evidence of bias and discrimination in the interview process and poor evidence of validity (Arvey, 1979).

- Despite many criticisms of the interview as a method of selection it remains extremely popular. It is worth remembering that the criticisms are largely about the interviewer(s), not the process (Lopez, 1975).

Employment Tests

Employment tests are devices that assess the match between applicants and job requirements. Some are paper-and-pencil tests; others are exercises that simulate work conditions. A math test for a bookkeeper is an example of a paper-and-pencil test, and the account-executive test at Merrill Lynch is an example of a simulation. Tests are used more frequently for candidates for jobs that are paid by the hour than for management openings because hourly jobs usually have a limited number of skills that are more easily tested. A survey by the Society for Human Resource Management found that 84 percent of employers “include testing in their employment decision-making procedures.” Management and staff jobs are often too complex to be tested fairly and economically.

Considerable care must be taken in testing foreign nationals whether they are applying for a job in the home country or elsewhere. First and most obvious, the test may have cultural biases, including slang terms that are unfamiliar. Second, laws in other countries may prevent some types of testing. Third, because of cultural differences, social standing, or political connections, taking a test may be seen as an insult.

Many employment tests exist but each type of test has only limited usefulness. The exact purpose of a test, its design, its directions for administration, and its applications are recorded in the test manual, which should be reviewed before a test is used. The Chart (A) that follows gives a brief explanation of several different types of tests and their application.

Application	
Psychological Tests	<ul style="list-style-type: none"> • Measures personality or temperament (executives, nuclear power, security) • Measures personality or temperament (executives, managers, supervisors) • Measures personality or temperament (sales personnel) • Measures logic and reasoning ability (executives, managers, supervisors) • Measures creativity and judgement ability (engineers) • Measures personality components
Knowledge Tests	<ul style="list-style-type: none"> • Measures knowledge of leadership practices (managers and supervisors) • Measures verbal, spatial, numeric, and other aptitudes and dexterity (job seekers at unemployment offices)
Performance Tests	<ul style="list-style-type: none"> • Measures physical coordination (shop workers) • Measures spatial visualization (draftsmen and draftswomen) • Measures ability to work with numbers and names (clerks) • Measure a sample of “on-the-job” demands (managers, professionals)
Graphic Response Test	<ul style="list-style-type: none"> • Measures physiological responses to questions (police, retail store workers)
Attitude Tests	<ul style="list-style-type: none"> • Measures attitudes about theft and related subjects (retail workers, securities employees, banks) • Measures attitudes about work and values (entry-level, low-income workers)
Medical Tests	<ul style="list-style-type: none"> • Measure the presence of illegal or performance affecting drugs (athletes, government employees, equipment operators) • Identifies genetic predispositions to specific medical problems • Measures and monitors exposure to hazardous chemicals (miners, factory workers, researchers)

Psychological tests: These tests measure personality or temperament. They are among the least reliable tests. Validity suffers because the relationship between personality and performance is often vague or nonexistent.

Knowledge tests: These tests are more reliable because they determine information or knowledge. A math test for an accountant and a weather test for a pilot are examples. But specialists must be able to demonstrate that the knowledge is needed to perform the job. The Miami trucking company example is a case where the tested knowledge (reading at an advanced level) was unneeded.

Performance tests: These tests measure the ability of applicants to do some parts of the work for which they are to be hired, for example, a typing test for typists. Validity is often assumed when the test includes a representative sample of the work the applicant is to do upon being hired. However, if the test discriminates against a protected group, it must be backed by detailed validation studies. Merrill Lynch's test is likely to be considered valid (as discussed in connection with content and construct validity under rational validation approaches because it includes samples of the work an account representative would be expected to do.

Attitude and Honesty tests: These tests are being used in some circumstances to learn about the attitudes of applicants and employees toward a variety of job-related subjects. Since the passage of the Employee Polygraph Protection Act in 1988, polygraph (lie detector) tests have been effectively banned in employment situations. In their place, attitude tests are being used to assess attitudes about honesty and, presumably, on-the-job behaviors. Attitude tests also reveal employee attitudes and values about work. The Work Opinion Questionnaire, for example, has been effectively used in predicting the job performance of entry level low-income workers.

Medical tests: These tests have grown in popularity in recent years. Through an analysis of urine, hair, or blood samples, laboratories are able to screen for the presence of drugs. Concern about employee drug abuse has spurred IBM, American Airlines, Storer Communications, and many others to require all job applicants to pass a urinalysis for marijuana and cocaine.

As technology has improved, testing for genetic defects or predispositions has become technically and financially feasible. Genetic screening may alert employers to those with higher chances of developing specific diseases. Medical monitoring of diseases such as acquired immune deficiency syndrome (AIDS) or of the buildup of toxic chemicals such as lead or mercury among workers may alert employers to high-risk employees or shortcomings in health standards in the workplace.

Employment tests are limited to factors that can be easily tested and validated. Other items, which may not be measurable through testing, may be equally important, such as enthusiasm and motivation.

Selection interviews are the most widely used selection technique. Their popularity stems from their flexibility. They can be adapted to unskilled, skilled, managerial, and staff employees. They also allow a two-way exchange of information: Interviewers learn about the applicant, and the applicant learns about the employer.

Barriers to Effective Selection

There are a number of selection methods available which all attempt to predict future work behaviour and potential. The key to an effective method of selection is that it should not only provide more information about the candidate but that it should be relevant, useful and comparable between candidates. There

is clearly little point in putting candidates through a vigorous selection procedure which provides masses of information only to find that most of it is irrelevant in relation to the job in hand, and that the rest is relevant but difficult or even impossible to compare across candidates. There is an important distinction or difference between how much information is produced and how relevant it is. In this case more does not necessarily mean better.

Evaluative standards

The effectiveness of selection methods will depend upon a number of factors which Muchinsky (1986) refers to as the 'evaluative standards'. The usual standards or measures against which methods are selected are as follows:

- Fairness
- Cost
- User-friendliness
- Acceptability (to the candidate and the organization)
- Validity and reliability
- Applicability

Some 'evaluative standards' are easier to assess than others. Clearly the need to quantify 'cost' as it affects and constrains the process is self-evident, but not easy to quantify when considering both direct and hidden costs (such as the cost of selecting the 'wrong' candidate or the opportunity cost of selector's time. Other constraints and issues such as 'perception', 'fairness' and 'validity and reliability' are not only difficult to assess but even the importance of the concept may not be immediately obvious.

MODULE - II

PERFORMANCE APPRAISAL

Introduction

Performance appraisal is the process by which organizations evaluate individual job performance. When it is done correctly, employees, their supervisors, the HR department, and ultimately the organization benefit by ensuring that individual efforts contribute to the strategic focus of the organization. However, performance appraisals are influenced by other activities in the organization and in turn affect the organization's success.

Performance appraisals are about employee performance and accountability. In a globally competitive world, companies need high performance. At the same time, employees need feedback on their performance as a guide to future behaviour. This need is most evident among newcomers who are trying to understand their jobs and the work setting. Longer-service workers also want positive feedback on the good things they do, although they may resent corrective feedback that feels like criticism. Supervisors and managers must evaluate performance in order to know what actions to take. Specific feedback enables them to help with career planning, training and development, pay increases, promotions, and other placement decisions.

HR departments use the information gathered through performance appraisals to evaluate the success of recruitment, selection, orientation, placement, training, and other activities. Although informal and ongoing appraisals on a day-to-day basis are necessary to a smooth operation, these methods are insufficient for the HR department's needs. Formal appraisals are needed to help managers with placement, pay, and other HR decisions. In a study of 324 organizations in southern California, for example, 94 percent had a formal appraisal system. This survey research revealed that the major uses of appraisals were for compensation (74.9 percent), placement improvement (48.4 percent), feedback (40.4 percent), placement-related decisions (40.1 percent), and documentation (30.2 percent).

Yet even in otherwise well-managed organizations, appraisals are associated with problems. Supervisors and managers often view formal appraisals as unneeded. They already know how their employees are performing, so why spend precious time going through some form developed by the HR department? In addition, the design of the system may encourage unintended actions by employees and supervisors, as happened in one part of Xerox.

Uses of Performance Appraisals

- **Performance improvement.** Performance feedback allows the employee, the manager, and personnel specialists to intervene with appropriate actions to improve performance.
- **Compensation adjustments.** Performance evaluations help decision makers determine who should receive pay raises. Many firms grant part or all of their pay increases and bonuses on the basis of merit, which is determined mostly through performance appraisals.
- **Placement decisions.** Promotions, transfers, and demotions are usually based on past or anticipated performance. Often promotions are a reward for past performance.
- **Training and development needs.** Poor performance may indicate a need for retraining. Likewise, good performance may indicate untapped potential that should be developed.
- **Career planning and development.** Performance feedback guides career decisions about specific career paths one should investigate.
- **Staffing process deficiencies.** Good or bad performance implies strengths or weaknesses in the personnel department's staffing procedures.

- **Informational inaccuracies.** Poor performance may be a symptom of ill-conceived job designs. Appraisals help diagnose those errors.
- **Equal employment opportunity.** Accurate performance appraisals that actually measure job-related performance ensure that internal placement decisions are not discriminatory.
- **External challenges.** Sometimes performance is influenced by factors outside the work environment, such as family, financial, health, or other personal matters. If these factors are uncovered through appraisals, the human resource department may be able to provide assistance.
- **Feedback to human resources.** Good or bad performance throughout the organization indicates how well the human resource function is performing.

As this example emphasizes, an organization cannot have just any appraisal system; the system must be effective, accepted, and properly used. With those conditions met, performance appraisal systems can identify needed improvements in HR information related to job analysis and design, human resource planning, staffing, orientation and placement, training and development, and career planning. The performance appraisals are crucial for focusing employees on strategic goals and objectives and for developing replacement summaries for succession planning and learning objectives for training and development.

The appraisal approaches must identify performance-related standards, measure those criteria, and then give feedback to employees and the HR department. If performance standards or measures are not job-related, the evaluation can lead to inaccurate or biased results, harming the managers' relationship with their employees and violating equal employment opportunity rulings. Without feedback, improvement in human behaviour is not likely and the department

will not have accurate records in its HR information system on which to base decisions ranging from job design to compensation.

Role of HR Department

The HR department usually designs and administers the company's performance appraisal system. Centralization ensures uniformity. Although the HR department may develop different approaches for managers, professionals, workers, and other groups, uniformity within each group is needed to ensure comparability of results. The department itself seldom evaluates actual performance, however. According to one study, the employee's immediate supervisor performs the evaluation 92 percent of the time because the immediate supervisor is often in the best position to make the appraisal. However, multiple raters—including peers and even subordinates, sometimes called "360-degree" evaluations because the person is being evaluated from all directions—offer additional perspectives at progressive companies such as General Electric, General Motors, and AT&T. At AT&T, for example, 800 high-level executives have rated their superiors and have been rated in return. As jobs and teams become more fluid, some companies use electronic mail (E-mail) to track who people interact with and who should be the evaluators:

The appraisal should create an accurate picture of an individual's typical job performance. Appraisals are not done just to uncover poor performance; acceptable and good results also must be identified so that they can be reinforced. To achieve this goal, appraisal systems should be job-related and practical, include standards, and use dependable measures. Job-related means that the system evaluates critical behaviors that constitute job success. If the

evaluation is not job-related, it is invalid. Without validity and reliability, the system may discriminate in violation of equal opportunity laws.

Evaluators and employees understand a practical system. A complicated, impractical approach may cause resentment, confusion, and nonuse.

A standardized system within the organization is helpful because it allows the establishment of uniform practices. A standardized system often has well-thought-out performance standards and measures.

Some Problems in Associated with Appraisal System

1. Legal Constraints

Performance appraisals must be free of Illegal discrimination. Whatever form of evaluation the HR department uses, it should be both reliable and valid. Placement decisions may be challenged because they violate equal employment laws or other laws. Cases legal implications also arise when decisions involve layoffs, demotions, or failure to promote.

2. The halo effect. The halo effect occurs when the rater's personal opinion of the employee influences the measurement of performance. For example, if a supervisor likes an employee, that opinion may distort estimates of the employee's performance. This problem is most severe when raters must evaluate personality traits (instead of behaviors), their friends, or people they strongly dislike.

3. The error of central tendency. Some raters do not like to rate employees as effective or ineffective, and so they distort the ratings to make each employee appear average. On rating forms, this distortion causes evaluators to avoid checking extremes, such as very poor or excellent. Instead, they place their

marks near the center of the rating sheet. Thus the term error of central tendency has been applied to this bias. HR departments sometimes unintentionally encourage this behaviour by requiring raters to provide written justification of extremely high or low ratings.

4. Leniency and strictness bias. The leniency bias results when raters tend to be easy in evaluating the performance of employees. Such raters see all employee performance as good and rate it favourably. The strictness bias is the opposite; it results from raters being too harsh in their evaluations. Sometimes the strictness bias results because the rater wants others to think he or she is a “tough judge” of people’s performance. Both leniency and strictness errors more commonly occur when performance standards are vague.

5. Cross –cultural biases. Every rater holds expectations about human behaviour that are based on his or her culture. When people are expected to evaluate others from different cultures, they may apply their cultural expectations to someone who has a different set of beliefs or behaviors. In Denmark, for example, many employees and organizations resisted the use of formal performance appraisals for many years on the grounds that they were inappropriate for Danes. In many Asian cultures the elderly are treated with greater respect and are held in higher esteem than they are in many western cultures. If a young worker is asked to rate on older subordinate, this cultural value of “respect and esteem” may bias the rating. Similarly, in some Arabic cultures women are expected to play a very subservient role, especially in public. Assertive women may receive biased ratings because of these cross-cultural differences. With greater cultural diversity and the movement of employees across international borders, this potential source of bias becomes more likely.

6. Personal prejudice. A rater's dislike for a group or class of people may distort the ratings those people receive. For example, some HR departments have noticed that male supervisors give undeserved low ratings to women who hold "traditionally male jobs." Sometimes rater is unaware of their prejudice, and this makes such biases more difficult to overcome. Nevertheless, specialists should pay close attention to patterns in appraisals that suggest prejudice. Such prejudice prevents effective evaluations and may violate anti-discrimination laws. Whereas the halo bias affects one's judgment of an individual, prejudice affects one's judgment of entire groups. When prejudice affects the ratings of protected class members, this form of discrimination can lead to equal employment violations.

7. The recency effect. When one uses subjective performance measures, ratings are affected strongly by the employee's most recent actions. Recent actions—either good or bad—are more likely to be remembered by the rater.

8. Reducing rater bias. When subjective performance measures must be used, biases can be reduced through training, feedback, and the proper selection of performance appraisal techniques. Training for raters should involve three steps. First, biases and their causes should be explained. Second, the role of performance appraisals in employee decisions should be explained to stress the need for impartiality and objectivity. Third, if subjective measures are to be used, raters should apply them as part of their training.

Appraisal Methods:

I. Past-Oriented Appraisal Methods

The importance of performance evaluations has led academicians and practitioners to create many methods to appraise past performance. Most of

these techniques represent a direct attempt to minimize particular problems found in other approaches. No single technique is perfect; each has advantages and disadvantages.

Past-oriented approaches have the advantage of dealing with performance that has already occurred and to some degree can be measured. The obvious disadvantage is that past performance cannot be changed. But when their past performance is evaluated, employees can get feedback that may lead to renewed efforts at improved performance. The most widely used appraisal techniques that have an orientation to the past include:

- Rating scales
- Checklists
- Forced choice method
- Critical incident method
- Ranking method
- Forced distributions
- Point allocation method
- Paired comparisons

1. Rating Scales

Perhaps the oldest and most widely used form of performance appraisal is the rating scale, which requires the rater to provide a subjective evaluation of an individual's performance along a scale from low to high. The evaluation is based solely on the opinions of the rater, and in many cases the criteria are not directly related to job performance. Although subordinates or peers may use it, the form is usually completed by the supervisor, who checks the most appropriate response for each performance dimension. Responses may be given

numerical values to allow an average score to be computed and compared. The number of points attained may be linked to salary increases—so many points equal a raise of some percentage. Other advantages of this method are that it is inexpensive to develop and administer, raters need little training or time to complete the form, and it can be applied to a large number of employees.

The disadvantages are numerous. A rater's biases are likely to be reflected in a subjective instrument of this type. Specific criteria may be omitted to make the form applicable to a variety of jobs. For example, "maintenance of equipment" may be left out because it applies to only a few workers, although for some employees it may be the most important part of the job. This omission and others tend to limit specific feedback. These descriptive evaluations also are subject to individual biases and interpretations. When specific performance criteria are hard to identify, the form may rely on irrelevant personality traits that dilute the meaning of the evaluation. Like the subjective evaluations in the General Motors case discussed earlier, rating scales may prove to be discriminatory.

A Sample Rating Scale for Performance Evaluation

- Dependability
- Initiative
- Overall output
- Attendance
- Attitude
- Cooperation

2. Checklists

The checklist method requires the rater to select words or statements that describe the employee's performance and characteristics. Again, the rater is usually the immediate superior. However, with or without the rater's knowledge, the HR department may assign weights to different items on the checklist depending on each item's importance. The result is called a weighted checklist. The weights allow the rating to be quantified so that total scores can be determined. The weights for each item are in parentheses but usually are omitted from the form the rater sees. If the list contains enough items, it may provide an accurate picture of employee performance. Although this method is practical and standardized, the use of general statements reduces its job-relatedness.

The advantages of a checklist are economy, ease of administration, the limited training required of raters, and standardization. The disadvantages include susceptibility to rater biases (especially the halo effect), use of personality criteria instead of performance criteria, misinterpretation of checklist items, and the use of improper weights by the HR department. Another disadvantage is that this approach does not allow the rater to give relative ratings. For example, employees who gladly work overtime get the same score as do those who put in overtime unwillingly.

- Employee works overtime when asked
- Employee keeps workstation or desk well organized
- Employee cooperatively assists others who need help
- Employee plans actions before beginning job

3. Forced Choice Method

The forced choice method requires the rater to choose the most descriptive statement in each pair of statements about the employee being rated. Often both statements in the pair are positive or negative.

1. Learns quicklyWorks hard.
2. Work is reliable.....Performance is a good example for others.
3. Absent too often.....Usually tardy.

Sometimes the rater must select the best statement (or even pair of statements) from four choices. However the form is constructed, HR specialists usually code the items on the form into predetermined categories such as learning ability, performance, and interpersonal relations. Then effectiveness can be computed for each category by adding up the number of times each category is selected by the rater. The results then show which areas need further improvement. Again, the supervisor is usually the rater, although subordinates or peers may provide evaluations.

The forced choice method has the advantage of reducing rater bias because some employees must be rated as superior to others. This approach also is easy to administer and fits a wide variety of jobs. Although practical and easily standardized, the general statements may not be specifically job-related. Thus this method may have limited usefulness in helping employees improve their performance. Even worse, an employee may feel slighted when one statement is checked in preference to another. For example, if the rater checks “learn quickly” in number 1 above, the worker may feel that his or her hard work is being overlooked. This method is seldom liked by either the evaluator or the employee because it provides little useful feedback.

4. Critical Incident Method

The critical incident method requires the rater to record statements that describe extremely good or bad behavior related to job performance. The statements are called critical incidents and are usually recorded by the supervisor during the evaluation period for each subordinate. Recorded incidents include a brief explanation of what happened. Several typical entries for a laboratory assistant appear. Both positive and negative incidents are recorded and classified (either as they occur or later by the HR department) into categories such as control of safety hazards, control of scrap material, and employee development.

5. Ranking Method. The ranking method requires the rater to place each employee in order, from best to worst. The HR department knows that certain employees are better than others, but it does not know by how much. The employee ranked second may be almost as good as the one ranked first or may be considerably worse. This method is subject to the halo and recency effects, although rankings by two or more raters can be averaged to help reduce biases. Its advantages include ease of administration and explanation.

6. Forced Distributions. Forced distributions require raters to sort employees into different classifications, usually with specified proportions in each category. The criterion shown overall performance, but this method can be used for other performance criteria, such as reliability and control of costs. As with the ranking method, relative differences among employees are not known, but this method does overcome the biases of central tendency, leniency, and strictness errors. Some workers and supervisors at American Express's Western Regional Operations Center strongly dislike this method because some employees received lower ratings than they or their supervisor-raters thought were correct. However, forced distributions required that some employees be rated low.

7. Point allocation method. The point allocation method requires the rater to allocate a fixed number of points among employees in the group. Good performers are given more points than are poor performers. The advantage of this method is that the rater can recognize the relative differences between employees, although the halo effect and the recency bias remain.

8. Paired comparisons. Paired comparisons force raters to compare each employee with all the other employees in the same group who are being rated. The basis for comparison is usually overall performance. The number of times each employee is rated superior to another can be summed to develop an index. The employee who is preferred the most is the best employee on the criterion selected. A. Wilson is selected nine times and is the top-ranking worker. Although subject to halo and recency effects, this method overcomes the leniency, strictness, and central errors because some employees must be rated higher than others.

II. Future-Oriented Appraisal Methods

Using past-oriented approaches is like driving a car by looking through the rearview mirror; you know only where you have been, not where you are going. Future-oriented appraisals focus on future performance by evaluating an employee's potential or setting future performance goals. In practice, many past-oriented approaches include a section for the supervisor and employee to record future plans. Four common approaches to evaluating future performance are:

- Self-appraisals
- Management by objectives
- Psychological appraisals

- Assessment centers

1. Self-Appraisals

Getting employees to conduct a self-appraisal can be a useful evaluation technique if the goal of evaluation is to further self-development. When employees evaluate themselves, defensive behavior is less likely to occur and self-improvement is thus more likely. When self-appraisals are used to determine areas of needed improvement, they can help users set personal goals for the future. The risk is that the employee will be too lenient or too critical of his or her performance. If self-appraisals are used among a diverse or international workforce, home-office HR specialists must be aware of cultural differences that may lead to evaluations that over- or understate performance and future plans. Obviously, self-appraisals can be used with any evaluation approach, past- or future-oriented. The important dimension of self-appraisals is the employee's involvement in and commitment to the improvement process.

2. Management by Objectives

The heart of the management by objectives (MBO) approach consists of goals that are objectively measurable and mutually agreed on by the employee and the manager. Since an employee gets to participate in setting his or her goals, the expectation is that employees will be motivated to achieve those goals. Moreover, since they can measure their progress, employees can adjust their behavior to ensure attainment of the objectives. However, to adjust their efforts, employees must receive performance feedback on a timely basis.

Objectives also help the employee and supervisor discuss the specific development needs of the employee, which can make future training and development efforts appear more relevant to the employee. When done correctly, performance discussions focus on the job's objectives, not on personality variables. Biases are reduced to the extent that goal attainment can be measured objectively.

In practice, MBO programs have encountered difficulties. The objectives are sometimes too ambitious or too narrow or are not set participatively but imposed by the superior. The result is frustrated employees or overlooked areas of performance. For example, employees may set objectives that are quantitatively measurable to the exclusion of subjectively measurable ones that may be equally important. The classic illustration is quantity versus quality of work. When employees and managers focus on subjectively measured objectives, special care is needed to ensure that biases do not distort the manager's evaluation.

3. Psychological Appraisals

Some organizations employ industrial psychologists on a full-time or retainer basis. When psychologists are used for evaluations, they assess an individual's future potential, not that individual's past performance. The appraisal normally consists of in-depth interviews, psychological tests, discussions with supervisors, and a review of other evaluations. The psychologist then writes an evaluation of the employee's intellectual, emotional, motivational, and other work-related characteristics that involve individual potential and may predict future performance. The estimate by the psychologist may relate to a specific job opening for which the person is being considered, or it may be a global assessment of the person's future potential. From these evaluations,

placement and development decisions may be made to shape the person's career.

Because this approach is slow and costly, it is usually reserved for executive-level decisions or for bright young managers who others think have considerable potential within the organization. Since the quality of these appraisals depends largely on the skills of the psychologist, some employees object to this type of evaluation, especially if cross-cultural differences exist.

4. Assessment Centers

Assessment centers are another method of evaluating future potential, but they do not rely on the conclusions of one psychologist. Assessment centers are a form of standardized employee appraisal that relies on multiple types of evaluation and multiple raters. They are usually applied to managers who appear to have the potential to perform more responsible jobs. Often the members in the group first meet at a hotel or training facility. During their stay, they are individually evaluated.

The process puts selected employees through in-depth interviews, psychological tests, personal background histories, peer ratings by other attendees, leaderless group discussions, ratings by psychologists and managers, and simulated work exercises to evaluate their future potential. The simulated work experiences usually include in-basket exercises, decision-making exercises, computer-based business games, and other job like opportunities that test the employee in realistic ways. These activities usually are performed during a few days at a location physically removed from the jobsite. During this time, the psychologists and managers who do the rating attempt to estimate the strengths, weaknesses, and potential of each attendee. They then pool their estimates to arrive at a conclusion about each member of the group.

Assessment centers are both time-consuming and costly. Not only are the candidates away from their jobs, with the company paying for travel and lodging, the evaluators are often company managers who are assigned to the assessment center for short periods. These managers are often supplemented by the psychologists and HR professionals who run the center and also make evaluations. Some critics question whether the procedures used are objective and job-related, especially since rater biases may affect the subjective opinions of attendees. Nevertheless, assessment centers have widespread use, and researchers are finding ways to validate the process.

The results assist management development and placement decisions. From the composite ratings, a report is prepared on each attendee. This information goes into the HR information system to assist HR planning (particularly the development of replacement charts) and other HR decisions. Interestingly, research indicates that the results of assessment centers constitute a good prediction of on-the-job performance. Unfortunately, this method is expensive since it usually requires both a separate facility and the time of multiple raters. Consider how the process works at Johnson Wax:

Requirements of Effective Appraisal Systems

Legally and scientifically, the key requirements of any appraisal system are relevance, sensitivity and reliability. In the context of ongoing operations, the key requirements are acceptability and practicality.

Relevance

This requirement implies that there are clear links (1) between the performance standards for a particular job and an organization's goals and (2) between the

critical job elements identified through a job analysis and the dimensions to be rated on an appraisal form.

Sensitivity

This requirement implies that a performance appraisal system is capable of distinguishing effective from ineffective performers. If it is not, and the best employees are rated no differently from the worst employees. The appraisal system cannot be used for any administrative purpose.

Reliability

A third requirement of sound appraisal systems is reliability. In this context, reliability refers to consistency of judgement. For any given employee, appraisals made by raters working independently of one another should agree closely. In practice, ratings made by supervisors tend to be more reliable than those made by peers. Certainly raters with different perspectives (e.g., supervisors, peers, subordinates) may see the same individual's job performance very differently. To provide reliable data, each rater must have an adequate opportunity to observe what the employee has done and the conditions under which he or she has done it. Otherwise, unreliability may be confused with unfamiliarity.

Acceptability

In practice, acceptability is the most important requirement of all, for it is true that human resource programs must have the support of those who will use them. Or else human ingenuity will be used to thwart them. Unfortunately, many organizations have not put much effort into garnering the front-end support and participation of those who will use the appraisal system.

Practicality

This requirement implies that appraisal instruments are easy for managers and employees to understand and use.

Conclusion

These are the five basic requirements of performance appraisal systems, and none of them can be ignored. However, since some degree of error is inevitable in all employment decisions, the crucial question to be answered in regard to each appraisal system is whether its use results in less human, social, and organizational cost than is currently paid for these errors. The answers to that question can result only in a wiser, fuller utilization of our human resources.

MODULE - III

TRAINING AND DEVELOPMENT

TRAINING

For any organization to perpetuate itself and achieve growth, there is a basic need for developing its manpower resources. It is one thing to possess knowledge but yet another thing to put it to effective use. It is essential to help

develop skills and also update the knowledge. Especially, in a rapidly changing society, employee training and development is not only an activity that is desirable but also an activity that an organization must commit resources to if it is to maintain a viable and knowledgeable work force.

Meaning and Purpose of Training

Training is a process of learning a sequence of programmed behavior. It is application of knowledge. It gives people an awareness of the rules and procedures to guide their behavior. It attempts to improve their performance on the current job or prepare them for an intended job. According to Edwin D Flippo, “the purpose of training is to achieve a change in the behavior of those trained and to enable them to do their jobs better,” in order to achieve this objective, any training programme should try to bring positive changes in:

- ❖ Knowledge – it helps a trainee to know facts, policies, procedures and rules pertaining to his job.
- ❖ Skills – it helps him to increase his technical and manual efficiency necessary to do the job and
- ❖ Attitude – It moulds his behavior towards his co-workers and supervisors and creates a sense of responsibility in the trainee.

Importance of Training

The reasons why training is important are:

1. Training enables the management to face the pressure of changing environment
2. Training usually results in an increase of quantity and quality of output.
3. Training leads to job satisfaction and higher morale of the employees.
4. Trained workers need lesser supervision.

5. Trained workers enable the enterprise to face competition from rival organizations.
6. Training enables employees to develop and rise within the organization and increase their earning capacity.
7. It moulds the employees' attitudes and helps them to achieve better co-operation within the organization.
8. Trained employees make better economic use of materials and equipment resulting in reduction of wastage and spoilage.
9. Training instructs the workers towards better job adjustment and reduces the rate of labor turnover and absenteeism.

Benefits to Organization

A programme of training becomes essential for the purpose of meeting the specific problems of a particular organization arising out of the introduction of new lines of production, changes in design, the demands of competition etc. the major benefits of training to an organization are:

1. **Higher Productivity:** - Training can help employees to increase their level of performance on their present assignment. Training increases the skill of an employee in the performance of a particular job. Increased performance and productivity, because of training, are most evident on the part of new employees who are not yet fully aware of the most efficient and effective ways of performing their job. An increase in skill usually helps to increase both quantity and quality of output.
2. **Better Organizational Climate:** - An endless chain of positive result from a well planned training programme. Increased morale, less supervisory pressures, improved product quality, increased financial

incentives, internal promotions etc., result in better organizational climate.

3. **Less Supervision:** - Training does not eliminate the need for supervision, but it reduces the need for constant supervision.
4. **Prevents Manpower Obsolescence:** - Manpower obsolescence is prevented by training as it fosters the initiative and creativity of employees. An employee is able to adapt himself to technological changes.
5. **Economic Operations:** - Trained personnel will make economical use of materials and equipment. This will reduce wastage in materials and damage to machinery and equipments.
6. **Prevents Industrial Accidents:** - Proper training can help to prevent industrial accidents.
7. **Improve Quality:** - Trained employees are less likely to make operational mistakes thereby increasing the quality of the company's products.
8. **Greater Loyalty:** - A common objective of training programme will mould employees' attitudes to achieve support for organizational activities and to obtain better cooperation and greater loyalty. Thus, training helps in building an efficient and loyal work force.
9. **To Fulfill Organisation's Future Personnel Needs:** - When the need arises, organizational vacancies can be staffed from internal sources, if an organization initiates and maintain an adequate training programme.
10. **Standardisation of Procedures:** - Trained employees will work intelligently and make fewer mistakes when they possess the required know-how and have an understanding of their jobs.

Benefits to Employees

1. **Personal Growth:** Employees on a personal basis gain individually from training. They secure wider awareness, improved skill and enhanced personal growth.
2. **Development of New Skills:** Training improves the performance of the employees and makes them more useful and productive. The skill developed through training serves as a valuable personal asset to the employee. It remains permanently with the employee.
3. **Higher Earning Capacity:** By imparting skills, training facilitates higher remuneration and other monetary benefits to the employee. Thus, training helps each employee to utilize and develop his full potential.
4. **Helps Adjust with Changing Technology:** Old employees need refresher training to enable them to keep abreast of the changing methods, techniques and use of sophisticated tools and equipment.
5. **Increased safety:** Proper training can help prevent industrial accidents. Trained workers handle the machined safely. Thus, they are less prone to industrial accidents. A safe work environment also leads to a more stable mental attitude on the part of the employees.
6. **Confidence:** Training creates a feeling of confidence in the minds of employees. It gives safety and security to them in the organization.

DEVELOPMENT

Executive or Management Development

Executive or management development is a long-term educational process utilizing a systematic and organized procedure by which managerial personnel learn conceptual and theoretical knowledge. Development is a related process. It covers not only these activities, which improve job performance, but also those, which bring about growth of the personality; help individuals in the progress towards maturity and actualization of their potential capacities so that they become not only good employees but also better human beings. In organizational terms, it is intended to equip persons to earn promotional and hold greater responsibility. Training a person for a bigger and higher job is development.

According to Harold Koontz and Cyril O'Donnell, "Developing a manager is a progressive process in the same sense that educating a person is. Neither development nor education should be thought of as something that can ever be completed, for there are no known limits to the degree one may be developed or educated. Manager development concerns the means by which a person cultivates those skills whose application will improve the efficiency and effectiveness with which the anticipated results of a particular organizational segment are achieved"

According to G.R.Terry, "Management development should produce change in behavior which is more in keeping with the organization goals than the previous behavior. The change frequently consists of a number of small steps resulting from training but the cumulative effect is considerable. It is also basic that a terminal behavior is identified before the development efforts starts".

Thus, executive or management development implies that there will be a change in knowledge and behavior of the individual undergoing development programme. The individual will not only be able to perform his job better but

also increase his potential for future assignments through the acquisition, understanding and use of new knowledge, insights and skills. Self-development is an important concept in the whole programme of management development.

Need and Importance of Executive Development

In this age of “professionalisation of management”, importance of executive development cannot be minimized. Executive talent is the most important asset of an organization. According to Peter Drucker, “ an institution that cannot produce its own managers will die. From an overall point of view the ability of an institution to produce managers is more important than its ability to produce goods efficiently and cheaply”. The need for executive development is felt because:

1. There is a shortage of trained managers. The organization has to develop the talented employees and maintain an inventory of executive skills to meet the future demands.
2. The performance of a company depends upon the quality of its managers. Executive development, therefore, is of paramount importance to have effective and desired managerial talents to meet the organizations demand.
3. Obsolescence of managerial skills is another factor, which calls for continuous executive development. A manager must continuously update himself to successfully meet new challenges as they occur.

Objectives of Executive Development

1. To ensure a steady source of competent people at all levels to meet organizational needs at all times.

2. To prevent managerial obsolescence by exposing the managers to new concepts and techniques in their respective fields of specialization.
3. To prepare the present employees for higher assignments so that they may be promoted from within.
4. To develop a second line of competent managers for future replacements.
5. To promote a high morale and good organizational climate.

Methods of Executive Development

Methods of executive development can be classified into two broad categories:

1. On-the-job methods and
2. Off-the-job methods

1. On-the-job Methods

- a) Coaching: On-the-job coaching is a procedure by which a superior teaches job knowledge and skills to a subordinate.
- b) Job Rotation: The trainee is periodically rotated from job to job so that he acquires a general background of different job.
- c) Special Projects: Under this method, a trainee is assigned to a project that is closely related to the objectives of his department. The trainee will study the problem and make recommendations upon it.
- d) Committee Assignments: Under this method, an adhoc committee is constituted and is assigned a subject to discuss and make recommendations. The committee will make a study of the problem and present its suggestion to the departmental head.

2. Off-the-Job Methods

- a) **Role-Playing:** Role-playing techniques are used for human relations and leadership training. Under this method, a conflict situation is artificially constructed and two or more trainees are assigned different parts to play. Its purpose is to give trainees an opportunity to learn human relations skills through practice and to develop insights into one's own behavior and its effect upon others.
- b) **Case Study:** Under this method, the trainees may be given a problem to discuss which is more or less related to the principles already taught. This method gives the trainee an opportunity to apply his knowledge to the solution of realistic problems.
- c) **Conference Training:** The trainee as a member can learn from others. The conference is ideally suited to learning about problems and issues and examining them from different angles.
- d) **Management Games:** A management game is a classroom exercise in which teams of students compete against each other to achieve common objectives. The game is designed to be a close representation of real-life conditions. .
- e) **Sensitivity Training or T Group Training:** it is an experience in interpersonal relationships, which results in change in feeling and attitudes towards oneself and others.
- f) **Special Courses:** The executives may be required to attend special courses, which are formally organized by the enterprise with the experts from educational institutions.

Steps in Training Programme

Training programme is a costly and time-consuming process. The training procedure discussed below is essentially an adoption of the job instruction-training course. The following steps are usually considered as necessary.

1. Discovering or identifying training needs.
2. Preparing the instructor or getting ready for the job
3. Preparing the trainee
4. Presenting the operation
5. Try out the trainees' performance
6. Follow-up or rewards and feedback

1. **Discovering or Identifying the Training Needs**

A training programme should be established only when it is felt that it would assist in the solution of specific problems. Identification of training needs must contain three types of analysis:

- (a) Organisational Analysis – determine the organisation's goals, its resources and the allocation of the resources as they relate to the organisational goals.
- (b) Operations analysis – focuses on the task or job regardless of the employee doing the job.
- (c) Man analysis – reviews the knowledge, attitudes and skills a person must acquire to contribute satisfactorily to the attainment of organisational objectives.

Armed with the knowledge of each trainee's specific training needs, programmes of improvement can be developed that are tailored to these needs. The training programme then follows a general sequence aimed at supplying the trainee with the opportunity to develop his skills and abilities.

2. **Preparing the Instructor**

The instructor is the key figure in the entire programme. He must know both the job to be taught and how to teach it. The job must be divided into logical parts so that each can be taught at a proper time without the trainee losing perspective of the whole. This becomes a lesson plan. For each part one should have in mind the desired technique of instruction, i.e., whether a particular point is best taught by illustration, demonstration or explanation.

3. Preparing the Trainee

This step consists of:

- (a) Putting the learner at ease
- (b) Stating the importance and ingredients of the job and its relationship to work flow;
- (c) Explaining why he is being taught
- (d) Creating interest and encouraging questions, finding out what the learner already knows about his job or other jobs.
- (e) Explaining the 'why' of the whole job and relating it to some job the worker already knows
- (f) Placing the learner as close to his normal position as possible and
- (g) Familiarizing him with the equipment, materials, tools and trade terms.

4. Presenting the Operations

This is the most important step in a training programme. The trainer should clearly tell, show, illustrate and question in order to put across the new knowledge and operations. There are various alternative ways of presenting the operation namely, explanation, demonstration etc. An instructor mostly uses the method of explanation. In addition one may illustrate various points through the use of pictures, charts, diagrams and other training aids.

Demonstration is an excellent device when the job is essentially physical in nature. The following sequence of training may be followed:

- (a) Explain the sequence of the entire job
- (b) Do the job step by step according to the procedure
- (c) Explain each step that he is performing
- (e) Have the trainee explain the entire job

Instructions should be given clearly, completely and patiently; there should be an emphasis on key points and one point should be explained at a time. The trainee should also be encouraged to ask questions in order to indicate that he really knows and understands the job.

5. Try out the Trainees' Performance

Under this, the trainee is asked to go through the job several times slowly, explaining each step. Mistakes are corrected, and if necessary, some complicated steps are done for the trainee the first time. Then the trainee is asked to do the job, gradually building up skill and speed. As soon as the trainee demonstrates that he can do the job in the right way, he is put on his own. The trainee, through repetitive practice, will acquire more skill.

6. Follow-Up

The final step in most training procedures is that of follow up. This step is undertaken with a view to testing the effectiveness of training efforts. The follow up system should provide feedback on training effectiveness and on total value of training system. It is worth remembering that if the learner hasn't learnt, the teacher hasn't taught.

MODULE - IV

COMPENSATION MANAGEMENT

Concept

The literal meaning of compensation is to counter –balance. In the case of human resource management, compensation is referred to as money and other benefits received by an employee for providing services to his employer. Money and benefits received may be in different forms – base compensation in money form and various benefits, which may be associated with employees services to the to the employer like provident fund, gratuity insurance scheme and any other payment which the employee receives or benefits he enjoys in lieu of such payment. Cascio has defined compensation as follows; “compensation includes direct cash payments, indirect payments in the form of employees to strive for higher levels of productivity.”

Compensation Policy compensation policy is derived from organisational strategy and its policy on overall human resource management. In order to make compensation management to work effectively, the organisation should clearly specify its compensation policy, which must include the basis for determining

base compensation, incentives and benefits and various types of perquisites to various levels of employees .The policy should be linked with organisational philosophy on human resources and strategy. Besides many external factors, which impinge on the policy, must also taken care of.

Job analysis and evaluation .Job analysis provides basis for defining job description and job specification with the former dealing with various characteristics and responsibilities involved in a job and dealing and the latter dealing with qualities and skills required in performer, job analysis also provides base for job evaluation which determines the relatives worth of various jobs in the organisation, The relative worth of various jobs determines the compensation packages attached with each job.

Analysis of Contingent Factors. Compensation plan is always formulated in the light of various factors, both external and internal, which affect the operation of human resource management system. Various external factors are conditions of human resource market, cost of living, level of economic development, social factors, pressure of trade unions and various labour laws dealing with compensation management. Various internal factors are organisation's ability to pay and employee's related factors such as work performance, seniority, skills, etc. These factors may be analysed through wage/salary survey.

Design and Implementation of Compensation Plan. After going through the above steps, the organisation maybe able to design its compensation plan incorporating base compensation with provision of wage/salary increase over the period of time, various incentive plans, benefits and perquisites. Sometimes, these are determined by external party, for example, pay commissions for Govt. employees as well as for public sector enterprises. After designing the compensation plan, it is implemented. Implementation of

compensation plan requires its communication to employees and putting this into practice.

Evaluation and Review. A compensation plan is not rigid and fixed one but is dynamic since it is affected by a variety of factors which are dynamic. Therefore, compensation management should have a provision for evaluating and reviewing the compensation plan. After implementation of the plan, it will generate results either in terms of intervening variables like employee satisfaction and morale or in terms of end-result variable like increase of productivity. However, this latter variable is more important. The evaluation of compensation plan must be done in this light. If it does not work as intended, there should be review of the plan necessitating a fresh look.

Job Evaluation

For fixing compensation to different jobs, it is essential that there is internal equity and consistency among different job holders. Job evaluation aims to provide this equity and consistency by defining the relative worth of different jobs in an organisation. Job evaluation is the process of determining the relative worth of different categories of jobs by analyzing their responsibilities and consequently, fixation of their remuneration. International Labour Organisation (ILO) has defined a job evaluation as follows:

“Job evaluation is an attempt to determine and compare demands which the normal performance of a particular job makes on normal workers without taking into account the individual performance of the workers concerned”.

The definition of job evaluation provided by ILO has been adopted by others. For example, French has defined job evaluation as follows:

“Job evaluation is a process of determining the relative worth of the various jobs within the organisation, so that differential wages may be paid to jobs of different worth. The relative worth of a job means relative value produced. The variables which are assumed to be related to value produced are such factors as responsibilities, skills, efforts and working conditions”.

Objectives of Job Evaluation

The basic objective of job evaluation is to determine the relative contributions that the performance of different jobs makes towards the realization of organisational objectives. This basic objective of job evaluation serves a number of purposes which may be grouped into three categories: wage and salary fixation, restructuring job hierarchy and overcoming anomalies.

Wage and Salary Fixation. The basic principle of wage and salary fixation is that it should be based on the relative contributions of different jobs and not on the basis of who the job holders are. If this principle is adopted, the first requirement is to identify the likely contributions of different jobs. This is what job evaluation precisely does. It provides the information about what is the worth of a job in terms of its contributions to the achievement of the organisational effectiveness. From equity point of view, this method is more appropriate.

Restructuring Job Hierarchy. Job evaluation helps in restructuring job hierarchy. Job hierarchy refers to arranging various types of jobs in the order of their importance either on ascending basis or descending basis. Sometimes, job hierarchy becomes too lengthy creating administrative problems and creating organisational problems by increasing the number of levels in the organisation. In today's context, more emphasis is being put on flat structure instead of tall

one. Job evaluation exercise can be undertaken to reduce the number of job levels by merging closely related jobs together. For example, successive Pay Commissions appointed by Govt. of India have recommended reduction in number of pay scales by merging two or more scales into one in order to reduce their number in job hierarchy.

Overcoming Anomalies. Job evaluation, if carried on periodically and objectively, helps in overcoming various anomalies which may develop in an organisation over the period of time with regard to compensation management. Knowles and Thompson have identified that there are following anomalies and evils which may develop in an organisation and may be overcome by job evaluation.

1. Payment of high wages and salaries to persons who hold jobs and positions not requiring great skill, effort and responsibility;
2. Paying beginners less than that they are entitled to receive in terms of what is required of them;
3. Giving a raise to persons whose performance does not justify the raise;
4. Deciding rates of pay on the basis of seniority rather than ability;
5. Payment of widely varied wages and salaries for the same or closely related jobs and positions; and
6. Payment of unequal wages and salaries on the basis of race, sex, religion, or political differences.

Problems in Job Evaluation

Like any other technique of human resource management, job evaluation is not free from certain shortcomings and limitations. Various problems involved in job evaluation may be grouped into two categories: technical and operational.

Technical Problems. There are some technical problems involved in effective job evaluation, which are of the following nature.

1. Job evaluation establishes hierarchy of jobs based on their worth. Though there are various methods developed for this purpose, these are not completely objective. For example, often the question is asked: 'Should grass-cutters (gardeners) get more than gas-cutters (welders)'? Similar such questions may be raised if there is lack of objectivity.
2. Another problem in establishing job hierarchy through job evaluation comes in the form of changing profile of job factors because of changes in environmental variables such as technology, social structure and processes, and international impact. Therefore, a job hierarchy, which may be workable at one point of time, may not work at another point of time. Thus, in order to make job evaluation effective, it should be undertaken at regular intervals.
3. Job evaluation is a costly and technical exercise. Therefore, many organisations do not prefer to take it in a formal way. Rather, they prefer to go through prevailing practices.

Operational Problems. Besides the technical problems, there are some operational problems too in job evaluation. These are of the following types:

1. Linking jobs, based on job evaluation, and wages and salaries is not completely possible because of the operation of several forces in the

environment. There are substantial differences between job factors and the factors emphasized by the human resource market. Often it has been observed that these external factors change with the time, e.g., previously, engineers were the highest earners but now the sequence is followed by medicos, MBAs and now information technology professionals in ascending order through over the period of time, their job factors have remained the same.

2. Job hierarchy created through job evaluation may create human problems in an organisation particularly if it has been taken for the first time and results into fundamental differences as compared to the existing system. In such a situation, job evaluation may face resistance from the employees.
3. Job evaluation is, generally, suited to large organisations where human resource management system has been formalized. In comparatively smaller organisations, this may not result in much advantages.

The existence of various problems in job evaluation does not mean that it should not be undertaken. In fact, this should be undertaken. The problems identified above indicate that suitable safeguards should be provided while undertaking job evaluation to make it more productive.

Job Evaluation and Performance Appraisal

Sometimes, a misplaced perception arises in which job evaluation is equated with performance appraisal. This happens because of the contribution of both in wage/salary determination. However, both are quite different concepts, use different methods and have different objectives as shows:

Comparison of Job Evaluation and Performance Appraisal

Job evaluation	Performance appraisal
1. It evaluates the job and not the job holder.	1. It evaluates the job holder on the basis of his job performance.
The job is evaluated before the job holder is appointed to perform the job.	2. Evaluation is done after the employee has performed the job.
3. Once job evaluation is done, it is applicable over a number of years.	3. Appraisal is a continuous process and is undertaken every year.
4. Evaluation is done by a committee consisting of specialists in the relevant areas.	4. Appraisal is done by the concerned superiors and other persons who know about the employees concerned.
5. Job evaluation is not adopted by all organisations, even the large ones. They may follow the generally accepted prevailing practices.	5. Appraisal is undertaken by all organisations in regular basis, either formally or informally.
6. The basic objective is to measure the relative worth of a job in comparison to other jobs.	6. There are many objectives of appraisal: wage/salary increase, promotion/demotion, transfer, assessing training needs.

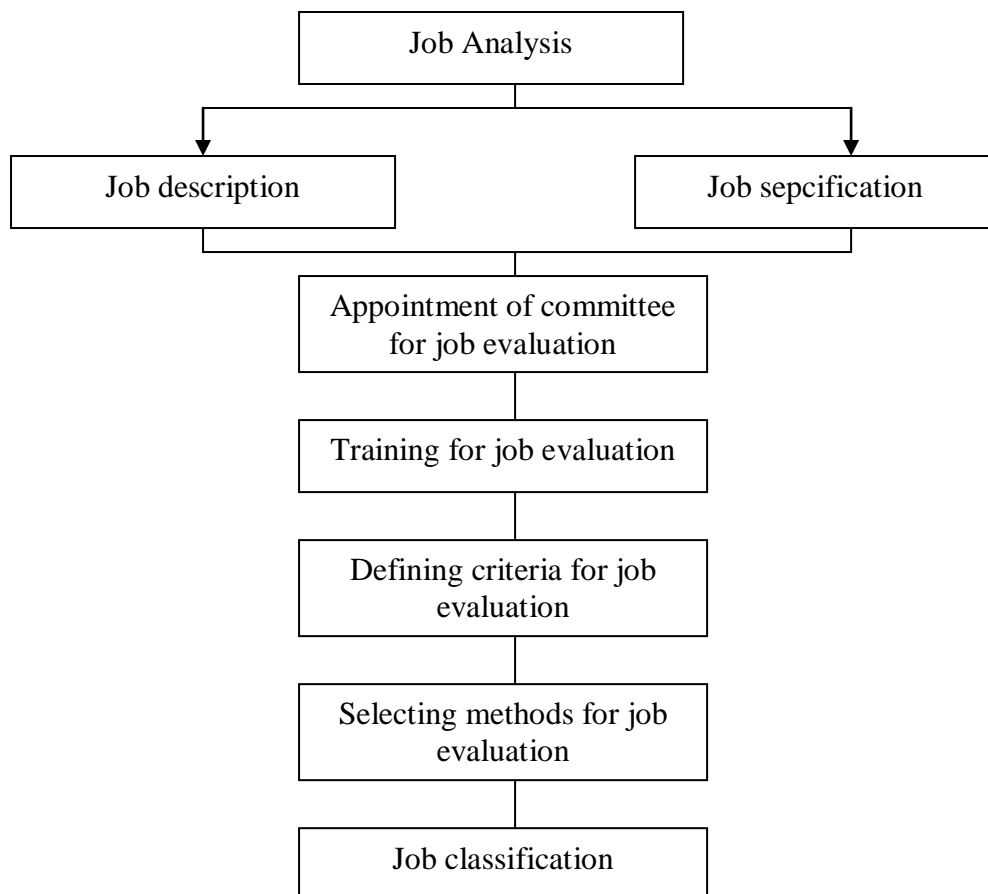
Process of Job Evaluation

Job evaluation is process consisting of several steps. National institute of Personnel Management has prescribed the following steps in job evaluation process:

1. Analyse and prepare job description
2. Select and prepare a job evaluation plan.
3. Classify jobs into different categories
4. Install the job evaluation programme, and

5. Maintain the programme.

A more comprehensive job evaluation process has been presented below:



Job Analysis

Job evaluation process starts with the base provided by job analysis. Job analysis identifies various dimensions of a job in two forms: job description and job specification. Job description provides responsibilities involved in the performance of the job while job specification provides attributes required in the job performer. Both these taken together provide information about various factors involved in different jobs.

PERSONNEL INFORMATION SYSTEMS

Introduction

The Personnel Information System (PIS) deals with the flow of information about people working in the organisation as well as about future personnel needs. In most organizations, the system is concerned primarily with the five basic sub-systems of the personnel functions: Recruiting, Placement, Training, Compensation and Maintenance.

The information systems basically are computer based information systems for planning and control for efficient use of Human Resource (HR) talent in organisations. The Personnel / HR information system is an effective tool for controlling cost and planning for the profit or returns in organisations by making proper use of HR in the production and operations, financial, marketing and other departments in organisations. To give an overview, the human resource system and other systems used are described in this module.

Human Resource Management (HRM)

Human Resource Management (HRM) as opposed to the traditional view of personnel function, and should be considered as a total system that interacts with the other major systems of organisation –marketing, production, finance and the external environment and to service these major systems. Forecasting and planning the personnel needs of an organisation, maintaining an adequate and satisfactory work force and controlling the personnel policies and programs of the company are the major responsibilities of HRM.

Human Resource Information Systems (HRIS) are the information systems that support human resource management activities such as recruitment, selection and hiring, job placement, performance appraisals, training and development.

HRM System

The business function emphasizes (1) Planning to meet the personnel needs of the business, (2) Development of employees to their full potential and (3) Control of all personnel policies and programs.

- (a) Employee skills inventory system uses the employee skills data from a personnel database to locate employees within a company who have the skills required for assignments.
- (b) Personnel record keeping system keeps track of additions, deletions and other changes to the records in a personnel database.
- (c) Personnel requirement forecasting is to assure a business an adequate supply of high quality human resources.

- (d) Computer based training programs and appraisals of employee job performance are available.
- (e) It can also help to analyse the range and distribution of employee compensation within a company.

Personnel Administration Data Systems (PADS)

These provide data needed to carry out the personnel administration responsibilities of an employer. As the government legislates additional protections and social programs, these responsibilities have increased and are growing. Affirmative action requirements in USA, health and safety regulations and pension plans regulation are many new sources of the employer's responsibilities.

Payroll and personnel planning data system (PPDS) are closely related to PADS, all using the employee master file. Not only accessing the file, but updating of file is often organized on a coordinated basis. Data items in the employee file are updated by the payroll system not for self but also for PADS and PPDS. Payroll provides the most effective way to capture the new data for this updating activity.

Three types of PADS

- (i) Personnel status reporting systems (Files used are Employee file, Job file).
- (ii) Personnel action systems (Files used are Employee file, Job file).
- (iii) Fringe benefit administration systems (Files used are Employee file, Insurance claims file, Insurance accidents file).

All the three data systems parallel the common administrative responsibilities of the personnel department in large organisations. There may be other administrative responsibilities differing from the above in some of the organisations which may give rise to other types of data system. Fringe benefit systems may include a variety of systems like:

- (i) Group insurance,
- (ii) Pension,
- (iii) Profit sharing,
- (iv) Credit union,
- (v) Educational programs etc.

It is assumed here that a DBMS is used to manage the files involved in the above systems. An integrated set of files is used by all the personnel administration systems.

There are several files, but all the three systems access the employee file. Putting at least a segment of the above files on a DASD is justified. The employee file should be accessible by employee name, department, skill, category, race, sex, other employee characteristics and the employee number (File key). Secondary key access to the file should be possible. The employee files have to be segmented in view of the cost of storing employee data as a result of increasing government regulation of the employment activity. The less activity data can be placed in a segment stored on tape/mass storage systems.

The real time features needed for the most cost effective personnel action and fringe benefit data system can be achieved by placing the jobs file, job applicant file and the insurance file on DASK.

Employee file

This file provides data relevant to many aspects of employee supervision and administration as well as for workforce planning. The data are grouped under 'seven' headings:

- (i) Identification Data
- (ii) Benefit Data
- (iii) Payroll Data
- (iv) Termination Data
- (v) Performance Data
- (vi) Skills Data
- (vii) Affirmative action Data

In some of the companies, these groups may differ according to their needs or convenience. Affirmative action data is not required in India.

Termination data is also of not much prominence in India.

Identification data items serve to identify and locate a particular employee. The data items that serve a significant business purpose is to be included. Employee name, address and telephone number are important. Employee number is the file key. To identify an employee in the organisation, whatever data items required are to be included. Social security number in countries like USA is required for tax purpose in the payroll data section of the record. Pointer to next record with the same job and location code is used to make record retrieval efficient in the personnel status reporting system.

Performance data items are used for supervisory and work force planning purposes. An employee review system is in operation means that the immediate supervisor reviews the employee's performance periodically, rates them according to an evaluation scheme and set goals for the next period. Job

performance statistics are to be maintained, concerning tardiness, unexcused absences, idle time and performance relative to the standard hours set for each piece of work.

Benefit data items are required to administer the employee benefit programs such as life insurance, health care insurance, pension plans etc.

Skills data items are mainly for employee promotion and project assignment purposes concerning the last position held prior to the employee's current position and the highest formal education level achieved. Additional detail on work history and education should be placed in a separate file with pointers to that file in the employee master file. Various skill codes can be used in the employee file to summarise the employee skills.

Affirmative action data items (in USA) are facts required to prepare a defense against charges of:

- (i) Unfair hiring
- (ii) Promotion and
- (iii) Termination practices

Access to these data items should be restricted to those responsible for preparing such defenses. Termination data is primarily of value in controlling unemployment insurance expenses. It has value in ad hoc workforce planning and strategic studies.

Employee file data items

Data	Data items
(i) Identification Data	Employee number (File key), name, addresses, telephone numbers, job code, location, shift, citizenship, pointer to next record with same job and location code.
(ii) Performance Data	Last review date, review type, rating, promotability date, next job, comment, next review date, days tardy, days absent without prior approval, idle time as percentage of total, earned hours as percentage of actual hours.
(iii) Benefit Data	Life insurance policy type, effective dates, coverage, pay roll deduction amount, health insurance policy type, effective dates, coverage, retirement plan type code, eligibility date, plan service date, vesting date, pension option date, projected retirement date, projected benefit payment.
(iii) Skills Data	Lost job title, location, reported to name and position, employer, last pay rate, date left position, reason, month in position, pointer to job history file, highest formal education level, year received highest degree, school major, pointer to education history file, language skill codes, technical skill codes, relocation constraint codes.
(iv) Payroll Data	See payroll system
(vi) Affirmative Action Data	Race, sex, age, religion
(vii) Termination Data	Position at the time of termination, department, part time, reported to name and position, pay rate, months in position, pointer to job history file, date of termination, date notice given, last day of work, termination type code (voluntary, misconduct etc.), specific reason code, rehire eligibility, exit interview, comments and codes, date claim protest lodged, date of response to protest and

	outcome, date of appeal.
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Job Data

A job or position exists independent of the employees filling it, authorized in a work force budget. It is usually defined by a job description that covers qualifications, duties and responsibilities. The same job may exist in several places in an organisation. Clerk-typist position may exist within many departments of an organisation. To define the job specifically, a location code and job code is usually required.

More than one employee may be required to perform a certain job in a particular location. Another important data item is number of full-time and part-time employees filling a particular job at a location.

The data items in this file are:

- (i) Identification Data
- (ii) Position description Data
- (iii) Budget Data and
- (iv) Performance Data

Location code, Job code and Shift form the file key.

The pointer to first employee record provides an efficient way to access the employee file for employment control reporting purposes.

The position description data is useful to the personnel department in advertising possible positions and screening applicants for those positions. The

cut-off data is the last date that the new application for an open position will be accepted.

The budget data is for work force and cost control purposes. The actual labour and labour related costs are compared to the budgeted figures, which are the work force budget set by the work force planning system. Travel expenses, fleet expenses and cost of operating supplies are the examples of labour related operating expenses. The budget data in this file provides supporting data for the labour and labour related expenses totals in the cost centre file. Pointers are used as 'pointer to job file and pointer to next job' in the same cost centre.

Performance data items include measurement of the productivity and idle time also, dated with a job as well as indications of job dissatisfaction and supervisory problems.

Data	Data items
Identification Data	Location code, job code, shift (all three are file keys), cost centre account number, job title, current number of employees, pointer to first employee record.
Position Description Data	Summary statement of duties, specific duties, experience, qualifications, educational qualifications, required references, supervisor (name, job code, location) pay range and scale, number of equivalent full time positions authorized, current unfilled positions, cut-off date.
Budget Data	Labour hours (budget and actual) (past, current future periods) Average labour cost/hour “ “ Average related expense/hour “ “ Total labour cost “ ” Total related expense “ “

	Pointer to next job in same cost centre
Performance Data	Turnover rate, tardiness, frequency, absenteeism in frequency

Job applicants' file

The items are in four groups:

- (i) Applicant identification data
- (ii) Work history data
- (iii) Education data and
- (iv) Application status data

Here also the data classifications etc vary from company to company.

The application status data records the actions taken on the application.

Data	Data items
Applicant Identification Data	Covers location code, shift, job code, applicant serial number (all in file keys) name, pointer to next name in alphabetical order, address, telephone.
Work History Data	Covers last job title, location, reported to name and position, employer (name, address, telephone), last pay rate, date terminated (or still on job?), months in position, months with the last employer, reason for leaving, relocation constraint code.
Education Data	Covers highest formal education level, year received highest degree, school, major, language skill code, technical skill code.
Application Status Data	Covers how was the applicant reached? Initial

	screening results, Interview (date, interview results), notification (date, notice sent, sender).
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Accident file

This file contains a record for each reportable accident. It is usually an event for which the organisation may be held responsible for damages (i) Either directly or (ii) Through worker's compensation insurance.

The data items are grouped into three categories:

- (i) Time and place data
- (ii) Characteristics data
- (iii) Effects data

The time and place data items define when and where the accident took place. The characteristics data item describes the accident. The effects data items record actions as a result of the accident and the costs incurred subsequently as a result of the accident.

Data	Data items
(i) Time and Place Data	Serial number (file key), date of accident, date reported, time of accident, day of week, physical location of accident, responsible cost centre, responsible supervisor.
(ii) Characteristics Data	Accident type code (preventable), hazzard condition code, unsafe act, mechanical failure, vehicle number (motor vehicle accident (MVA type), pavement condition (if MVA type), weather, pointer to claims

	and injury file.
(iii) Effects Data	Report made to government agencies, corrective actions taken. Total property damage, total medical expenses, total lost work time, other expenses.

Claims and injuries file

These may be insurance claims recorded by the organisation under insurance policies or they may be claimed by employees under group insurance policies managed by the organisation. Also, damages resulting from an accident for which no insurance claims can be made are recorded. These are organized although these are payment files of a claim. (The To data, From data, Basis data, When data, Amount data).

The Basis data describes the injury or other event that is the basis for the claim. Several claims must be set up to describe the events involved. Pointers are suggested to link this record to the record in the accident file to describe the accident and to link this claim to other claims arising from the same accident.

Data	Data items
(i) To-Data	Relation to organisation (employee, customer, etc), name (both are file keys), employee number (if any), address, telephone, social security number. (in USA)
(ii) From-Data	Payment by company, insurance policy involved, general ledger account.
(iii) Basis-Data	Claim type, injury or damage code, description of property damages, safeguards provided, safeguards used, pointer to accident file, pointer to next claim for

	same accident.
(iv) When-Data	Date claim filed, date of final settlement.
(v) Amount-Data	Expense type code, actual cost, insurance reimbursement amount.

Data privacy and integrity

The employee file should have this important database consideration. So also, the job applicant's file, job master and insurance claims files. Both the employer and employee are concerned about this data.

The privacy of pay-rate data is of concern to both the employer and employee. From the employer point, he wants to safeguard this information from other employees and competition (about the individual's earning or job's pay). So also, the employee may not want others to know his earnings or other data items such as medical reports. Both employer and employee may want access to this data strictly controlled.

Personnel Status Reporting System

These systems make available data in the employee and job's files for supervisory purposes. The systems are designed to leave the needs of at least four groups:

- (i) Employment control reporting system (for managers who may need facts about employees for a variety of reasons).

- (i) Employee profile (for employees who should be given an opportunity to review and update the data concerning them in the files).
- (ii) Personnel data retrieval (for the personnel department, to perform many of its functions, requires data concerning employees).
- (iii) Employment practice compliance reporting (for the government agencies that enforce equal opportunity, affirmative action, or other legislation and regulations pertaining to employees specially in the USA).

Personnel Action Systems

As the name itself specifies, this system supports the activity of the personnel department in taking actions on the following:

- (i) Filling job openings and
- (ii) Recording and reporting promotions, transfers, terminations and other employee status changes

Two systems involved are:

- (i) Placement data system and
- (ii) Personnel activity reporting system.

The details vary from organisation to organization.

Equal employment opportunity and affirmative action concerns in USA are making more extensive data systems necessary with respect to both the above systems.

There is a growing need to document the search procedure employed to job applicants and the decision procedure by which the new applicant is selected.

Promotions, transfers and termination need more justification than they were in the past.

Placement data system

Placement data procedures center around the development and use of more applicant files (generally more than one). Separate files are required for jobs that require a new type of data items on job applicants. Example: Files may be different for blue collar and white collar jobs. The applicant record in these files contain the data items on the job application form and also items that define the source and disposition of the application.

The applicant file is linked to jobs file by having the same file key, so that the list of applicants for a desired job can be quickly retrieved. In the jobs file, the available job openings are indicated by one or more data items to define how many openings are there and the cut-off date for receiving the applications. It also contains a description of job, experience, education pre-requisites, location, travel and any other special requirements.

When a manager needs an employee for an existing position or for a new position, he first fills out a job requisition form and sends it to the personnel department. If the status of an existing employee is changed due to promotion, transfer or termination, the action also should be reported to the personnel department for updating the employee file.

After receiving the requisitions and personnel action reports by the personnel department, the data is input to the jobs file and the employee file either through a remote on-line terminal in the personnel department or submission of the data to a key entry section.

Three more procedures may be carried out for job requisitions for the available position.

- (i) By advertising internally using an in house organisation newspaper or a special announcement procedure.
- (ii) By advertising externally in newspapers, private placement services, state employment agencies and other media.
- (iii) A skill search of the employee file may be performed to locate qualified candidates. This can be through DBMS that has a user-oriented retrieval language. Such language permits the user to define the characteristics required of an applicant for a specific job. The system examines each record of the employee and retrieves the outputs of those that matches with the requirements.

The personnel department reviews the applications received with regard to the advertisement. Any tests required to know the candidate's qualifications will be administered by them and recorded on the application. Depending on the volume of work, a special data system may be established for scoring and recording tests. The applications are then encoded and entered into the applicant file by the personnel department either on a remote data terminal or by sending the data to the processing department for key entry.

The manager who has sent the requisition is the final authority to decide which applicants to be interviewed. For those who were not qualified for interview, it should be stated in their application the reasons and these should be returned to personnel department for input of the reason into the applicant's file. The applicants identified by skill search or with recommendations from personnel department are to be interviewed. The input to the applicant's file includes these.

The conclusion of each interview with manager's recommendations should be recorded and entered in the applicant's file. A formal interview report is produced or evaluation may be included on the application form. This can be an input to the applicant's file in the personnel department.

The record of a successful applicant is used to establish an employee master record for the new employee. A procedure to do this can be programmed and stored in the database and activated by the personnel department, using a single command typed in at a remote on-line terminal and done as a batch procedure.

The records in an applicant file concerning a job which has been filled should be removed from the active applicant's file and placed in a history file, stored in a less expensive, newer storage medium-magnetic tape. History file provides a complete record as to how each job opening is filled, useful whenever changes of bias or inept management ever have to be answered.

The system should link the applicant file to the job's and the employee files and provide the data needed by the personnel department and management in carrying out recruitment programs and retain detailed recruitment activity records.

Personnel activity reporting system

This procedure set records changes an employee status and produce reports periodically (generally on a weekly basis), based on which the personnel department initiates follow up activities. The reports are produced from a file containing personnel transactions of the recent ones. Whenever a permanent data item in the master file record gets changed, the same is done through a

copy in the personnel transaction file, with a code indicating the type of change. Eg: New hire, promotion, transfer, change of address etc. The procedure for this can be programmed and automatically activated by DBMS or the file management system. The personnel transaction file is sorted periodically by the transaction code and the personnel activity reports are produced.

Compensation Systems

These are the primary mechanisms by which organisations endeavour to influence employees behaviour. Most compensations systems are developed with two broad goals in mind:

- (i) To produce the desired behaviours from employees and
- (ii) To accomplish the first goal within the limitations faced by the organisations.

The first goal includes motivating employees to join the organization, to remain with it and to perform well for it. The second goal focuses on the constraints or limitations faced by most organisations, including their ability to pay, legal constraints such as minimum wage regulations, labour unions and external labour markets. (compensation levels for the internal labour pool are greatly influenced by the market rate for similar jobs in the external market).

Compensation systems include more than just the rupees employers pay to employees for their work. They include an employee's wage or salary, benefits, non recurring financial rewards (such as special commissions, prizes or profit sharing) and non-economical rewards for working (such as a sense of accomplishment of power from one's job and the opportunity to socialize with

colleagues and peers). Its compensation system is a major way an organisation conveys to its employees what it wants to be done and how they should behave.

The Employee Recruitment/Selection Process

Recruitment begins, by specifying human resource requirements (numbers, skills mix, levels, time frame), which are the typical result of job analysis and human resource planning activities. Conceptually (and logically) job analysis precedes human resource planning, it is necessary to specify the work to be done (task requirements) and the personal characteristics necessary to do the work (knowledge, skills, abilities, and other characteristics) before one can specify the numbers and types of people needed to do the work. For example recruitment and selection strategies for new employees are likely to differ considerably depending on whether a companies objective in hiring; say a new sales people is to identify candidates who are able to execute “cold calls” for new customers as opposed to servicing, existing, long-term clientele.

The step followed in recruitment is initial screening, which is basically a rapid rough ‘selection’ process. 60 years ago, when line supervisors, hired factory workers outside the gates of a plant they simply looked over the candidates and then pointed to various people. You, you, and you—the rest of you come back on another day. That’s an example of initial screening and it was probably done only on the basis of physical characteristics. The selection process following initial screening is more rigorous. For example, physical characteristics alone do not provide many clues about a person’s potential for management or for any other kind of work for that matter. What are needed of course are samples of behaviour either through tests and personal interviews or through the testimony of others about a candidate as with reference checks.

Past the selection stage, we are no longer dealing with job candidates, we are dealing with new employees. Typically, the first step in the introduction to company policies, practices and benefits (technically this is called 'socialization') is an orientation program. Orientation may take up several hours or several weeks; it may be formal, informal, or some combination of the two.

Placement occurs after orientation; placement is assignment of individuals to jobs. In large firms, for example, individuals may be selected initially on the basis of their potential to succeed in general management. After they have been observed and assessed during an intensive management-training program, however, the organization is in a much better position to assign them to specific jobs within broader job families, such as marketing, production, or sales. (There are instances in which employees are selected specifically to fill certain positions; these are so-called "one-shot" selection placement program). The technical expertise and the resources necessary to implement optimal placement programs (select, orient, then place) are found mostly in very large organisations, such as the military.

Once new employees are selected, oriented, and placed, they can be trained to achieve a competent level of job performance.

Finally, performance appraisal provides feedback to employees regarding their past and present job performance proficiency, as well as a basis for improving performance in the future. The first time a new employee's performance is appraised, it is like pushing the button that starts a continuous loop, more precisely a continuous feedback loop comprising the employee's performance, the manager's appraisal of it, and the communication between the two about performance and appraisal.

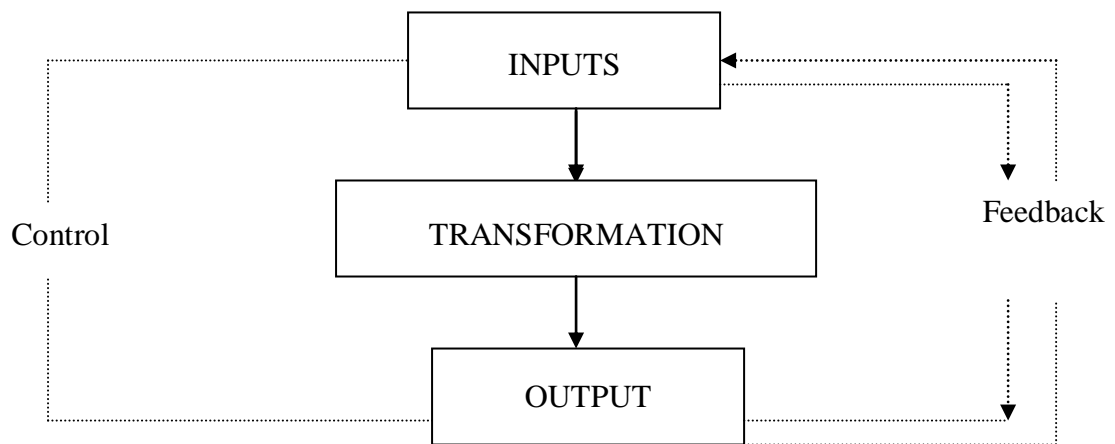
Of course, all the phases of recruiting and selecting employees are interrelated. But the final rest of all phases comes with the appraisal of job performance. There is no point in reporting that, say, 150 possible candidates were recruited and screened, that 90 offers were extended, and that 65 candidates were hired and trained if the first appraisal of their performance indicates that most were inept. You must always remember that when you evaluate the performance of new hires, you are doing so within the context of a system, a network of human resource activities, and you are really appraising recruitment, selection, and training, among other HRM activities.

Human Resource Information Systems (HRIS)

Human resource information system has become a part of all large organisations. It is a computerized system that aids in the processing of information relating to human resource management. It is a device, designed to fulfill the manpower information, needs of the organisation. HRIS helps managers in decision-making in respect of promotion, wage fixing, recruitment, training and development. The inputs of HRIS include the information relating to employees, their abilities, qualifications, potentialities, creative instincts, age, pay scales, various jobs in the organisation, their required skill and qualifications to do them, the number of employees and executives manning various positions, organisational objectives, policies and procedures etc. This information is loaded into the system. This data is processed into the most useful information required by the managers.

This HRIS is not only prepared for an industrial, service or government organisation but also for the entire city, district, state or country. In order to eliminate human resource problem of any kind, HRIS comes to the rescue and provides the services of hiring human resources, maintaining the complete

record of human resources. It can at any moment show the supply of human resources available. The figure below shows how the HRIS works.



Inputs: The input of HRIS includes information related to employees such as education, age, experience, training, present status, present salary, whether promoted or not, organisation's policy past and present, procedures past and present and other necessary detailed information relating to the human resources in the organisation. The computerized human resource information system in all respect superior to manual system, which is time consuming and not so cost effective. The most important benefit of the system is that the information is available immediately as and when required.

Transformation: The information fed to the computer can be transformed into more meaningful and necessary information that is exactly required by the organisation. This is the conversion stage of computerized HRIS. The information transformed into meaningful calculation is very useful to the managers and organisation as well. This works as a decision support system, which aids in making appropriate decisions.

Output: Output refers to the printouts of the transformed material from the computer printer like salary statement, report on performance of an employee, budget estimates, etc. All these can be had in the form of printouts, terminal screens etc. A well knit HRIS acts as a worthy decision support organism of a very high quality. The high quality output must be accurate, relevant, consistent, readable and comprehensive.

Feedback and Control: Whether the output obtained is relevant and useful or not must be known. The method of ensuring it is known as feedback. Feedback establishes control over the system.

Advantages of HRIS

1. It gives accurate information.
2. It does fast processing of information
3. It works as a valuable tool to strategic planning and its implementation
4. It acts as a decision support system
5. It is time efficient
6. It establishes strong management control
7. It is not very expensive

Lesson-1

Human Resource Information Systems

Introduction

Human Resource Information Systems (HRIS) is an effort towards speedy, effective and professionally handling of information on resources for efficient management of Human Resource function. HRIS is a computerized system used to acquire, store, analyze and distribute information regarding an organization's human services and to provide services in the form of information to the clients or users of the system.

Human Resource Information Systems (HRIS),. It merges HRM as a discipline and in particular its basic HR activities and processes with the information technology field,

Maintenance and updating of manual records system is a labor-intensive job and transfer of data from one record to another increases the chance of error which effects the accuracy and reliability of data held. The manual records cannot provide all data of an employ at a time, different information being stored in different files. It becomes difficult to provide a single comprehensive picture of an employee on one record. Here HRIS plays a competitive and comprehensive role to facilitate the user with the required information at their fingertips.

Thus HRIS is a system that enables storing of information of Human Resource in every aspect such as Personal, Academic, Qualification, Family, Medical, Career and Performance Evaluation, Training & Development & Wage and Salary of individuals. Unlike manual systems the HRIS enables availability of all such information in a single screen. Reports on various parameters can be generated with ease. Moreover reliability of such records is assured.

The difficulty in maintaining manual records and their inability to provide the 'complete picture' can be stated as the two basic reasons gave the evolution of HRIS. The voluminous data on employees, which is unfeasible to track manually, has become easier to update at frequent intervals. Updating and maintaining of manual records systems is labor intensive as well as costly process and at same time increases the chance of error. HRIS tracks all the aspects of employee administration perfectly while reducing chances of errors.

The Basic Need of HRIS is-

1. Efficiently storing each employee information and data for reference- personal data management, pay roll accounting, benefits management and planning.

2. Enabling informed decision making in day-to-day personnel issues, planning, budgeting, implementing and monitoring Human Resource function.

3. Providing data / returns to government and other public

4. Facilitating decision making in areas like promotion, transfer, nomination, settling employees provident funds, retirement, gratuity, LTC, and earned leave compensation.

5. Cutting costs.

6. Improving accuracy

HR functions were among the first to be automated maybe along with accounting. HRIS grew over the years to take the shape of Employee Relationship Management (ERM) tools, Knowledge Management portals & Employee Portals. HR self help, e Learning and knowledge sharing are some

of the early benefits being reaped out of the system. A greater sense of organizational bonding can achieve what traditional HR aimed at for ages - lower employee turnover, high morale, effective personalized training & skill retention.

Being the most implemented project in enterprises, the potential for these applications is huge & can be gauged from the fact that every large software vendor, be it in ERP or CRM is bringing out products in this segment. BEA Systems (Weblogic Portal), Oracle (My Oracle), SAP (mySAP Enterprise Portal), Siebel Systems (ERM group of applications), IBM (Websphere Portal), PeopleSoft (PeopleSoft & HRMS) & Microsoft (Business Portal) are some of the major players.

HRIS Management Process

HRIS system has three major functional components: Inputs, Data maintenance and Outputs. Each of these is discussed below as to its role in the overall system.

Input function:

The input function provides the capabilities needed to get human resource data into the HRIS. Some of the first things that must be established are the procedures and processes required to gather the necessary data. In other words, where, when and how will the data be collected? Once collected they must be entered into the system. Some information may require coding before entering.

Once the data have been input they must be validated to ensure that they are correct. Edit / validation tables can be used to determine if the data are

acceptable. These tables contain approved values against which the data are automatically checked. The system should have the capability to easily update and change the validation tables.

Data Maintenance function:

The data maintenance function is responsible for the actual updating the data stored in the various storage devices. As changes occur in human resource information, this information should be incorporated into the system, as new data are brought into the system it is often desirable to maintain the old data in the form of historical information.

Output Function:

The output function of an HRIS is the most visible and familiar one. The reason is that the majority of HRIS users are not involved with collating, editing / validating and updating human resource data; Rather they are concerned with information and reports to be used by the systems.

Most human resource reporting consists of the following:

1. Selecting a segment of the total population for further evaluation; the selection is based on the values of such items as exempt / non-exempt, salary grades/ classifications, age, sex, departments, continuous service and so on.
2. Performing some type of calculations using the population previously selected in item 1, such as calculating average salaries, average merit increases and so forth.
3. Providing a report containing specific information regarding the selected population and / or the calculation results.

The demand of the output function is the major factors determining the particular type of the software to be used.

In addition to being able to produce a specific report on request the output function should have the capability to provide and update a reports library. A report library basically stores the program and historical data necessary to generate reports that are periodically requested. This feature saves substantial time by automatically updating the data needed to produce the reports in the library.

Another desirable capability is they ability to generate turnaround documents. Turnaround documents basically are simple reports that show the current data values and provide a place to indicate any changes. They are used to help solicit updates to the data.

Naturally the specific inputs, frequency of updates and reports required for an organization HRIS will differ some what with each situation. However the basic components and capabilities just discussed should apply in all most all situations, regardless of size and complexity.

HR –MANAGEMENT PROCESS-II:

Today's organization is undergoing many structural changes that present challenges for human resource managers. Downsizing, outsourcing, rightsizing and reengineering cause some of these structural changes. Downsizing is the laying off of large numbers of managerial and other employees. As a result of downsizing, many companies are outsourcing

services that the human resource department previously provided. Outsourcing refers to subcontracting work to an outside company that specializes in that particular type of work. Some examples of services being outsourced include 401(k) plan administration and management development programs. Rightsizing is the continuous and proactive assessment of mission-critical work and its staffing requirements. Rightsizing differs from downsizing in that it is an ongoing planning process to determine the optimal number of employees in every area of the organization. Other companies are implementing reengineering programs. Reengineering programs. Reengineering refers to a fundamental rethinking and radical redesign of business process to achieve dramatic improvements in cost, quality, service, and speed. In essence reengineering usually results in sweeping changes in management and organization structures.

Evolution of HRIS:

The first computerized human resource application in business took place at General Electric in the early 1950s. A 1984 survey of 1000 personnel journal subscribers, which yielded 434 usable returns, revealed that 99.7% of the respondents used computers in one capacity or another in the human resource function. A similar survey conducted in 1988 found that 99.8% of the respondents had automated one or more Human resource function. This is quite

an evolution to have taken place in just a few decades. Undoubtedly computer usage has increased since this last survey.

First Generation:

The first generation of computerized HRIS is involved the conversion of manual information keeping system to computerized system. Often a large external service bureau ran the resulting systems. In the case of very large firms an in-house mainframe computer. Large, costly processor crunched pay roll and other data and end users had very limited access to the system. Data had moved from the file cabinet to a mysterious mainframe. Human resource data were now in the care of a computer group that was either in-house or contracted outside. Requests from human resource personnel for information had to be funneled through the computer group. This system did result in a significant decrease in the time required to produce most reports, but it also made Human Resource personnel feel depend on the computer group. Many Human resource managers regretted not having direct access to their own data. Some even longed for the old days of paper files.

Second Generation:

As the 1970 advanced, the second generation of the computerized HRIS was initiated with the introduction of the Mini-computer. Mini-computers handle a network of simultaneous uses and have multiple input and output device. Mini computer facilitated the transition form strictly batch processing to interactive processing.

The second generation of computerized HRIS was completed in the early 1980s with the arrival of the personal computer. The low cost stand alone pc moved data processing to the desktop. The Data Repository was moved to the human resource professional desktop. Software proliferated and before long the human resource record keeping function was within reach of every size of organization. At the same time mainframe and mini computer system were being made much more accessible and user-friendly. From a functional standpoint, however human resource managers were doing their job in the same basic manner they always had. The one major difference was that computerization allowed them to do more and to do it more rapidly.

Third Generation:

Moving the data repository from some mainframe or computer group to the desktop caused a great deal of excitement in the human resource field. Human resource professional began to see the possibility of new applications for the computers. Rather than merely computerizing what had been done manually, they visualized ways to use the computers to fundamentally changed the way they performed the job. The basic idea was to integrate many of the different human resource functions.

Software vendors observed the desires of human resource professional and began to develop systems to integrate the various areas within their applications. The result was the third generation of the computerized HRIS, a feature rich, broad based, self-contained HRIS. The third generation took system far beyond being mere data repositories and created tools with which human resource professional could do much more. The extent to which the organization has developed their HRIS varies from organization to organization.

DISCUSSED QUESTIONS:

- 1Q. Explain the concept of HRIS and its basic Needs?
- 2Q. Discuss the Management Process of HRIS?
- 3Q. Explain about the evolution of HRIS?

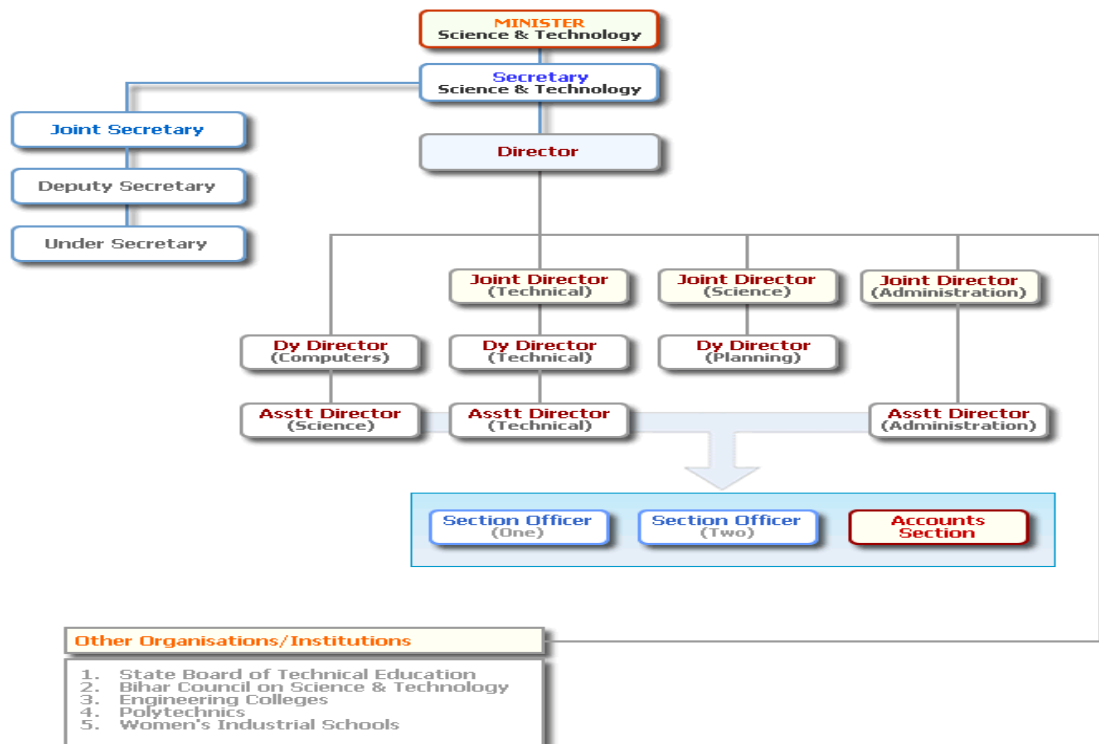
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Lesson-2

Flow of authority and responsibility



Communication process

The Flow of Communications at the Organizational:

Communication is much more than talking, speaking and reading. True communication takes place when an understanding has been transferred from

one party or source to another. Therefore, communication can be defined as the transfer of information that is meaningful to those involved.

In this light, each and every one of the human resource functions discussed requires some degree of effective communication to succeed. For example, think of the important role communication plays in career planning, recruiting and performance appraisal. In all too many instances, Human resource managers spend tremendous amounts of time developing very good programs, only to subsequently do a poor job of communicating them. The end result is often great programs that go largely unused.

The two dynamic systems of communication in business are internal **and External** communications. But the emphasis is quite distinct.

In **internal** communications, emphasis is in presenting and interpreting facts. In contrast, in **external** communications, emphasis is on promoting goodwill and future business.

Internal Communications

The following is an example of a hierarchy chart. It shows the positions of Superiors and subordinates in a company. All communication among the employees is INTERNAL because they are co-workers.

A human resource Manager's first step in becoming an effective communicator is to develop an appreciation for the importance of communication. The problem is not that human resource managers tend to belittle the importance of communication; rather, they often fail to think consciously about it.

ORGANISATIONAL CULTURE

Definition:

Organisational culture is defined as the shared values, norms and expectations that guide organization members in terms of how to approach their work and deal with each other and their customers.

Organisational Culture is a key determinant of staff satisfaction, intention to stay and whether staff recommends they're organizational to others as good place to work.

Role of HR

- Contributes to the development of and the accomplishment of the organization-wide business plan and objectives

- Plays an integral role in organizational success via his knowledge about and advocacy of people.

- Contributes to the organization by constantly assessing the effectiveness of the HR function and sponsors change in other departments.

Organization culture

Culture of the organization plays a key role in determining a structure that would suit. The organization stance towards participation and risk-taking will have an impact on the decision pertaining to number of levels and delegation of authority. Congruence between culture and structure is important. Lack of congruence can result in mixed signals across the organization. An example is where an organization states an intention of providing an environment of independence (autonomy)—and yet, has the most routine issues kicked up for a decision. Such lack of congruence can result in senior and middle management losing their effectiveness. To reiterate, it is important to ensure a match between the culture and the structure.

It is also important to factor competencies of existing people while making changes to structures. Can some of the existing people shoulder additional responsibilities? Do some of them have the versatility to move to other functions or divisions? Will the structural changes need hiring of people into key positions because existing people do not have the necessary competency?

This needs to be handled well to enable the organization to settle into the new structure and continue working with its objectives.

Changes in structure will result in changes in roles and responsibilities. The new roles need to be defined with clarity; so do the changes in interfaces. For example, let us consider the case of an organization that changes its customer support operation from a cost centre to a profit centre. This could affect the reporting relationships in the internal context and also the interfaces with the customer. The responsibility and authority of the head of customer support will change considerably. This could affect the systems and processes in the organization. This is a case where a change in strategy results in changes in the structure, systems and interfaces in the organization.

External factors

External factors need to be taken into account while evolving the structure. Some of these may have been taken into consideration during the creation of the business strategy. Aspects such as competition, duration of sales cycle, complexity of the sale, risk factors due to the environment, etc, will affect design of the structure.

All these aspects—internal and external—need to be taken into account while designing or changing the structure. It is important to remember that the structure is a means to achieving an end; the design of the structure is not an end in itself. The reasons for the change need to be communicated across the organization and people may need to be trained and coached. It takes time and energy to implement changes in structure. Therefore, ownership across the organization is necessary.

It does take a while for a new structure to settle down; however, the environment keeps changing, business requirements change and there are many factors (both internal and external) that can cause a misfit between the structure and the business need. Flexibility becomes key in implementing structure changes in a highly dynamic environment.

DATA CAPTURING FOR MONITORING & REVIEW

The Overriding purpose of any HRIS is to assist human resource managers and other top managers in making sound decisions. If this is to be accomplished, the HRIS must produce information that is useful to the organization. Unfortunately, many human resource information systems are disappointments to managers simply because they do not produce the types of information management values. The problem is often that the managers designing the HRIS do not have a thorough understanding of what constitutes quality information to the users of the information.

If the information provided: (1) Accuracy, (2) Significance and relevance, (3) Comprehensiveness, (4) Readability and visual impact, and (5) Consistency of format.

Producing information that is of quality to the user obviously requires an investment in time, effort and communication on the part of HRIS managers. However, this investment can result in an information system that wins the respect of top management and one it can depend on.

The evaluation should determine whether or not the HRIS has performed up to its expectations and if the HRIS is being used to its full advantage. Some basic performance issues can be addressed to help evaluate an HRIS.

!. Compare the time spent on data entry to the value of the reports generated. Is this time well spent?

2. Compare the system response time for data entry and inquiry. Does the screen come up immediately or is there a considerable delay?

3. Does the system have real-time, online and immediate update capability? If not, the system is antiquated by today's standards.

4. Is the HRIS interfaced or integrated with the payroll system? If the HRIS is a stand-alone system that has data entry elements that are duplicated and entered on the payroll system, the answer to this question is no.

6. Does the system have the capability to produce reports that provide answers to specific functional questions? For example, can an individual quickly receive information concerning the turnover rate in the finance department?

7. Does the system use inquiry rather than pulling employees' files to answer questions? If files must be pulled, the system inquiry capabilities have not been properly designed.

8. Does the system generate the proper type of information? A good HRIS should generate more ad hoc, on request reports than regular monthly-detailed reports.

9. Analyse the cost to implement and maintain the current system. This includes such things as machine and software costs, maintenance agreements, supplies and hourly salaries of data entry operators and programmers. How do these costs rate against the time saved by the system?

Addressing the preceding questions should indicate whether the organization has a useful HRIS and if the HRIS is being used to its full advantage. Such an evaluation may also reveal a need to show end users how to better utilize the system.

Discussion Questions:

- 1(Q). Explain the Flow of Authority and responsibility by depicting the chart?
- 2(Q) Explain the procedure of communication process?
- 3(Q) Define organizational culture and explain its role?
- 4(Q) Explain the concept of data capturing for monitoring and review?

Notes and Additional Readings:

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Lesson :3

Behaviour Patterns of HR & Other Managers:

The recent global economic slowdown and its impact on the Indian software industry, provides us with an opportunity to review the state of the Human Resources (HR) function in a highly people-intensive business. Looking back, one can clearly distinguish two phases of evolution in the HR function. The first

phase, which was dominated by the extraordinary decade-long growth in the Indian software industry, the HR function was primarily driven by the need to bridge the vast demand-supply gap of skilled software resources. This was accentuated by very high attrition rates, sometimes reaching as high as 40% p.a.! In these circumstances, it was natural that the recruitment aspect of HR was in the forefront. People-development and team-building initiatives were not successful in this uncertain environment, where there was a constant churn out of people. In retrospect, this phase neither helped the organization nor the people, as it hampered the steady growth of knowledge and skills technical, behavioral as well as managerial.

Today, high attrition rates have become history (hopefully forever)! This has been driven by the significantly reduced demand-supply gap, as well as a willingness of employees to build and invest in a relationship in their existing organizations. Software professionals are reviewing their career growth within their organizations and settling for stability instead of frequent job changes. This has become possible with several software organizations in India offering much more exciting opportunities coupled with increasing doubts about insecurity of overseas jobs. Aided by this relatively stable people situation, HR has entered a new phase in the Indian software industry. HR in the software industry needs to embrace strategies to sustain stability, develop people and improve productivity.

Strategies to enhance employee skills

To begin with let us look at the performance evaluation system. There is a great need to ensure that it covers every aspect of people development with a strong emphasis on behavioral traits such as:

- Teamwork

- Conflict resolution
- Responsiveness
- Sharing of knowledge and best practices.

It is worth noting that the behavior of individual employees and teams influence the overall culture of the organization, and can strengthen or dilute its core values.

The importance of assessing the behavioral patterns of individual employees increases as the employee climbs the career ladder. Once a person attains a people management level there is a need to critically evaluate the individual's behavioral traits.

Performance evaluation

While we always identify areas of growth and high performers in the organization, one must be conscious of those people who need improvement. Strategic plans must be in place to enhance the performance level of employees, which are below par. This may not just be due to skills mismatch. Many a time, the concerned person may not integrate well with the organization's culture, or simply not fit into the team; last but not the least, the employee could be a perpetual poor performer. Even when performance evaluation systems adequately cover the above aspects, the gaps need to be constantly identified and bridged.

In addition, a successful performance evaluation system will need a well-defined succession plan. This must be carefully prepared by evaluating the skill set of the incumbent based on which, managers have to make an assessment of the possible successor. Occasionally there will be gaps, which means that the identification of the successor within the organization is ruled out. In such

cases, the management will have to evaluate the intensity of such gaps and take a decision.

Rewards and Recognition

Let us move onto yet another critical HR tool -rewards and recognition. They are an important method of keeping employees focused on their long-term career goals. However, reward systems must undergo changes to be relevant and keep pace with the dynamism of people. They need to be exciting for people and have a substantial, positive impact on the organization's culture. Another important factor that will work to the advantage of the people and the organization is the nurturing of a unique culture that can bond, attract and retain talent. With people becoming more loyal to their organizations, there is a strong need to build and sustain people bonding with them. Various social, emotional and psychological factors that help in creating a community and a sense of belonging need to be addressed.

Knowledge Management: KM can be a key tool to facilitate bonding. The concept of sharing knowledge and providing “learning windows” apart from the normal training and skill enhancement programmes will go a long way in creating a unique culture in an organization developing “people through people”.

Empowerment: Increasing empowerment and encouraging employees to think, sharing ideas and providing freedom of enterprise can sustain retention of high performers.

Best Practices: Nurturing and developing unique organizational standards like Knowledge Development can contribute towards building its culture that will be a clear “competitive and strategic advantage”. Today the software industry is in

a state of flux, where fast changing business dynamics have transcended cultural and geographical boundaries. In this scenario, organizations must be alert and be in a position to anticipate change and develop strategies to counter change. Being pro-active and developing ownership at all organizational levels must be the new buzzwords of HR. It needs to nurture people who can adapt to changes in the organization structure, forms of work and the nature of work itself.

INFORMATION PROCESSING FOR DECISION MAKING

AS with any major change, Proper planning is an absolute necessity for successful implementation of an HRIS. The steps outlined below describe the

specific procedure involved in successfully developing and implementing an HRIS.

INCEPTION OF IDEA: The idea for having an HRIS must originate somewhere. The originator of the idea should prepare a preliminary report showing the need for and HRIA and what it can do for the organization. This preliminary report should be designed to get management's attention. The most critical part of this step is to clearly illustrate how an HRIA can assist management making certain decisions.

FEASIBILITY STUDY: The feasibility study evaluates the present system and details the benefits of HRIS. It evaluates the costs and benefits of an HRIS by showing the labor and material savings compared to the cost of the system. It also evaluates the intangible savings, such as increased accuracy and fewer errors. Of course, it is possible that the feasibility study would recommend against an HRIS.

SELECTING A PROJECT TEAM: Once the feasibility study has been accepted and the resources allocated, a project team should be selected. The project team should consist of a human resource functions and activities and about the organizations human resource functions and activities and about the organization itself and representatives from both management information systems and payrolls. As the project progresses, additional clerical people from the human resource department will need to be added.

DEFINING THE REQUIREMENTS: A statement of requirements specifies in detail exactly what the HRIS will do. A large part of the statement of requirements normally deals with the details of the reports that will be

produced. Naturally, the statement also describes other specific requirements. The typically includes written descriptions of how users collect and prepare data, obtain approvals, complete forms, retrieve data, and perform other no technical tasks associated with HRIS use. The key here is to make sure the mission of the HRIS truly matches management's needs for an HRIS.

VENDOR ANALYSIS: This step determines what hardware and software are available that will best meet the organizations needs for the lowest price. This is a difficult task. The best approach is usually not to ask vendors of a particular package can meet the organizations requirements but how it will meet those requirements. The results of this analysis will determine whether to purchase an "off-the-shelf" package or develop the system internally.

PACKAGE CONTRACT NEGOTIATION: after a vendor has been selected, the contract must be negotiated. The contract stipulates the vendors responsibilities with regard to software, installation service, maintenance, training, and documentation.

TRAINING training usually begins as soon as possible after the contract has been signed. First, the members of the project team are trained to use the HRIS. Toward the end of the implementation, the human resource representation will train managers from other departments in how to submit information to the HRIS and how to request information from it.

TAILORING THE SYSTEM this step involves making changes to the system to best fit the needs of the organization. A general rule of thumb is not to modify the vendor's package, because modifications frequently cause problems. An alternative approach is to develop programs that augment the vendors programmed ration than altering it.

COLLECTING THE DATA Prior to start-up of the system, data must be collected and entered into the system.

TESTING THE SYSTEM Once the system has been tailored to the organization need and the data entered, a period of testing follows. The purpose of the testing phase is to verify the output of the HRIS and to make sure it is doing what it is supposed to do. All reports should be critically analyzed for accuracy.

STARTING UP Start-up begins when all data and current actions are put into the system and reports are produced. It is wise to attempt start-up during a lull period so that as much time as possible can be devoted to the HRIS. Even though the system has been tested, some additional errors often surface during start-up.

RUNNING IN PARALLEL Even after the new HRIS has been tested; it is desirable to run the new system in parallel with the old system for a period of time. This allows for the outputs of both systems to be compared and examined for any inaccuracies.

MAINTENANCE It normally takes several weeks or even months for the human resource people to feel comfortable with the new system. During this stabilization period, any remaining errors and adjustments should be handled.

EVALUATE After HRIS has been in place for a reasonable length of time, the system should be evaluated. Is the HRIS right for the organization, and is it being properly used?.

DISCUSSION QUESTIONS:

- 1Q. Explain the behavior pattern of HR and other manager in the organization?
- 2Q. explain the steps for information processing for decision making?

NOTES AND ADDITIONAL READINGS

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UNIT -V

SECURITY, SIZE AND STYLES OF ORGANISATIONS & HRIS

INTRODUCTION

Peter Drucker remarks that 'the test of a healthy business is not the beauty, clarity or perfection of its organizational structure ... It is the performance of people'. Since people operate systems and effectively form part of them, good systems performance requires good people performance. And if the individuals operating a system do not perform well — through ignorance) indolence, negligence or ill- will — that system will be defective or max' even fail completely. The special needs and concerns of security systems make particular demands in regard to staff loyalty, efficiency and cohesion, and impose quite severe requirements for the planning, control and monitoring of the human input. These priorities must be addressed In' an organization's security managers and the related issues of team commitment and ethical behaviour must be seen to be important in its corporate culture.

THE PLANNING FRAMEWORK

Every person in a modern society has the right to protect his or her property, income, safety and security. Sometimes duties of protection are given to employers, but no matter what the law may require, all organizations have a direct interest in promoting security-based duties to protect not only their own capital and revenue, but also the safety and economic well-being of their employees. This arises because security is inevitably allied to profitability in the commercial sector, and to efficiency and cost accountability in the public sector. As well as laying down a policy on practical matters, each organization should also set the moral and ethical tone of the employment. This means that, wherever

relevant, certain minimum standards should be established for behaviour in situations where, for example, there may be:

- a conflict of interest
- an opportunity for insider dealing

- the abuse of confidential information, etc.

These standards should be effectively communicated to the employees, which means that the employees must be encouraged to meet those standards. Simply writing policies down cannot solve even the simplest security problems, but they are important in setting the ground rules and expectations of those involved. More detailed provisions allocating appropriate levels of professional and personal responsibility should therefore be included in all employees' contract of employment and/or job descriptions, and in any contracts with third parties where there is an identifiable element of risk.

SECURITY MANAGEMENT

When planning the administration of security matters, the organization should identify a specific individual who is to have the responsibility for advising on and maintaining security. This should be a senior management post, visibly supported by the most senior managers. The function should be to advise both horizontally and vertically within the organization, and to assume overall responsibility for the enforcement of obligations at all levels within the organization and against third parties. The creation and support of such a post will, in the event of subsequent legal action, show that the management was acting prudently. But the appointment must not be in a vacuum. It should be made with very specific responsibilities for the post holder in respect of the:

- organizational procedures for the screening and appointment of staff
- criteria of confidentiality for the classification and protection of information
- commercial and ethical screening of new investment opportunities both internal and external to the organization
- prevailing statutory and professional data protection standards

- strategies for contingency planning
- practice of incident reporting within the organization.

The depth and detail of these responsibilities will, of course, vary with the size and complexity of organization involved.

There also has to be significant commitment to education and training at every level within the organization so that the process of change can be properly managed. All those actually or likely to be affected by changes in working practices must understand the new systems and the problems of using them efficiently. Even after these changes have been introduced, employees who do not begin using the systems immediately will need refresher courses, and those who have regular practice should be shown how to consolidate and improve upon their skills and be updated in any amendments to the systems. It is a good policy to ensure that all relevant staff are well versed in the standard operating procedures. This will allow for covering if colleagues are absent from work for any reason, and for a good response in the event of an emergency when flexibility of response from employees may be the key to a successful recovery.

THE IMPORTANCE OF UNDERSTANDING THE SYSTEM

When planning the training of staff, it is important to consider face-to-face consultations, discussions and briefings between groups of employees and their managers. Although meetings can disrupt normal working schedules, the benefit lies in the opportunity for people to ask questions and to feel that they are, to some extent, in control of the process of change. Once the staff feels that they have some ownership of the concepts underlying the new systems, it is sensible either to prepare accessible documentation which assumes nothing and is regularly updated, or to provide computer-based training (CBT) systems

whether stand-alone, or embedded in the operating system or the resources themselves. In theory, staff will then be able to rapidly familiarize themselves with the relevant procedures. In practice, however, help-lines and readily available people to advise are essential if difficulties and prejudices are to be overcome.

This desire to train people and to produce flexible and effective employees must be seen against the need, in some organizations, to control and restrict general access to information about the operating procedures. If some procedures and facilities are sensitive, the answer is that all these procedures should be designed bearing in mind the level of security required in each aspect of the office environment. But the levels of security specified for the design must be realistic. Hence, levels of security appropriate to mainframe operations in a sensitive government establishment will not be appreciated nor be appropriate in a conventional commercial office. Moreover, whatever the overall system in operation and the level of security considered appropriate, the staff should understand why things are to be done, what policies underpin those procedures, and what the likely effects of applying those procedures will be to them. People are generally more supportive if they understand the reasons for the system. Finally, the organization will consolidate the loyalty of its staff if it is seen to meet the moral and statutory requirements of providing a working environment which is both healthy and safe.

SECURITY PLANNING FOR PEOPLE

To commit a computer fraud, the criminal must have access to the computer so both physical and logical access must be controlled, and planning must take

account of known vulnerabilities. Once access has been achieved, most frauds depend on the falsification of input.

Most frauds have obvious symptoms, and the principal detection strategies rely on noticing deviations from the norm. Once management suspicions have been raised, a good rule is to follow the asset and to ignore the apparent records.

Similarly, if documents are missing, the auditor should suspect the person who would have been suspected had incorrect documents been found. In the short term, the bonus expected from the investigation is recovering part or all the assets lost in the immediate fraud. But the main objective in prosecuting detected fraud is long-term deterrence. To that extent, being seen to engage in the investigative process is an aspect of the ongoing function of personnel management and it is intended to affect staff attitudes. It should not be seen to a mere by-product of standard auditing.

To give it the necessary independence and authority within the organization auditing is a function that requires separate resourcing. Once established, the auditor's first task is to identify and watch all the vulnerable points. This can usually be done discreetly, say by analysing historical trends or by testing reasonableness in comparisons between branches or with other similar companies. The aim should always be to avoid any prejudice to employer/employee relations. But checks can never be restricted to statistical methods. sampling checks should always be made on individual items, regardless of the possible threat to labour relations. Hopefully, if the auditing staff have properly trained, and the staff to be investigated have a constructive view of the process, there should be minimum friction arising from the disruption to the established routines.

THE CONDUCT OF THE AUDIT

Because all audits disrupt the normal working routines, they should be carefully planned to maintain a good level of staff morale and to avoid appearing either provocative or overly paranoid. In this, the manner and attitude of the auditing staff is a critical factor. Those recruited for the task should not be the regular employees in the area(s) under review. The expectation is that outsiders are more likely to be objective, to see through plausible excuses and to avoid friendships which might colour judgements. Once the team has been recruited and the audit planned, it is best to carry out checks by surprise even though this may introduce a confrontational element between the audit team and the affected employee. Further, the team should not examine too large a part of the organization over too long a period of time, because this may disrupt the operation of that area too much. But if a close supervision can produce a fraud-free period of operation, this will be a vital basis for later comparisons. Such audits are expensive and depend on the effectiveness of the auditing staff. A period of about 14 days is a useful target. There are a variety of reasons for this:

- thieves often live up to their incomes and may need to continue the fraud to meet newly acquired commitments
- they may be arrogant enough to believe that the fraud is not detectable
- they may consider the investigation a challenge and enjoy the game of continuing the fraud while under scrutiny
- they may recognize that if the fraud stops, the operational pattern will change, thus revealing the existence and method of the fraud.

Such factors may lead to catching the person in the act.

FRAUD POTENTIAL

One way of focusing the investigation is to recognize that each job in every organization has a different potential for fraud. The actual level will depend on factors such as:

- the ability of each member of staff to gain access to critical resources
- the skills of those involved
- the amount of time available to plan and execute the fraud.

OBSERVATION OF EMPLOYEE BEHAVIOUR

Security staff should then look for danger signs from the employees such as:

- sudden wealth which might show itself through high cash spending, gambling, drinking or drug abuse
- social connections with other organizations which might evidence possible conflicts of loyalty (an inferential sign may be the sudden effectiveness of competitors which might indicate one or more breaches of confidentiality or that there is commercial espionage)
- a general lack of loyalty to the organization may be seen in poor time keeping, disregard for instructions, dissatisfaction over lack of promotion or unreasonable self-importance.

If staff showing these danger signs or who do not conform to other operational norms are identified, the individuals should be observed and perhaps informally interviewed.

PROFESSIONALISM

One element in this review of employee function will be that some staff with access to high-risk procedures will be considered to have achieved a professional status. As professionals, staff owe a series of interconnected duties:

- to their employers — this will either be contractual or it will be governed by the common law duty of loyalty
- to their clients — staff may be employed to assist clients; again this relationship will either be contractual or it will be regulated by the professional standards in force at the time
- to fellow professionals in their capacity as professionals
- to society.

Whether or not staff have become professionals, the growth of all organizations depends on mutual trust. Trust is required both between staff members horizontally and vertically within the organization, and between the organization and peer organizations, customers or service-receivers. If computer professionals could not be trusted, the risks of system abuse would be so great that computers could not be widely used. Although employers could try to control matters through a contractual framework of disciplinary proceedings unthinking and routine resort to the legal big stick is always likely to sacrifice working relationships in the long run.

EXPECTATIONS OF CONDUCT

The burden is on the professional to establish and maintain quality in their decision making and credibility in their decision support. This requires that the professional remains faithful to the employer and does not breach confidentiality maintaining proper standards of professional integrity. This is particularly important during a computerization project. Most of those responsible for taking the final decision of whether to buy and install particular computer equipment will have little direct knowledge of what the operational problems are likely to be, yet the purchase may have a profound effect on their organization. Thus, if the organization buys a good management tool, it may

substantially improve profitability and/or efficiency. But if the organization acquires a system which is defective, it may inflict real damage before the likely effects of the faults are fully appreciated.

When it is obvious that the final decision-makers lack critical expertise, the issue is what it is fair to expect the computer designers and manufacturers, the marketing firms and the in-house computer managers to do. Between them, they have the ability to cause the decision-makers to take either a good, a bad or an indifferent decision. The senior managers will expect the in-house managers to take responsibility for advising on and installing the information system. Legally, these professionals may be responsible for any losses which are sustained if they have not used the state-of-the-art standards for their profession. This can be particularly important in deciding whether there should be litigation and, if so, who should be involved as parties. The general sale/supply relationship works well when the seller/supplier is honest with the customer during the precontractual negotiations. Honesty for these purposes means that reasonably accurate information is given which allows the buyer to take a properly informed decision on whether to enter into the contract. If problems arise in such a case, it will be because the in-house professional drew up the wrong specification at the design stage or made errors in the installation. This will usually justify dismissal but litigation is not generally appropriate because employed professionals rarely carry their own insurance cover and cannot pay any damages that might be awarded.

When selling, it is obvious that the seller/supplier should not attempt to deceive the customer, but it is not necessarily so clear how much of the truth should be told. Sales staff, particularly those paid on commission, can be economical with the truth. The in-house professional should have the experience and the

expertise to ask the important questions to protect the buyer's interests. If the seller/supplier continues to mislead the buyer and this induces the contract, the buyer will have a good case against the seller to recover damages (so long as the seller was insured or has sufficient assets to make it worth suing). However, too much information may be just as confusing to the inexperienced buyer, so the real legal issue is the degree of relevance and salience in the information given. If the professional cannot see the wood for the trees and so protect the decision-makers, the professional will be at fault and is likely to become personally involved in any case that follows.

SYSTEMS STAFF

Once the computer hardware is installed, the systems staff are in a particularly privileged position because their work gives them a detailed knowledge of many operational aspects critical to the organization. Moreover, they have considerable freedom of access to both physical and system resources, and become familiar with staff, data and procedures throughout the organization. All this knowledge and these relationships are essential if the professional staff are to work towards achieving full system synthesis. If the risk of threats from the designers or the systems staff to the emerging system are to be minimized, security must start during the design phase. The most common motives for staff disloyalty are greed, revenge and anger, but other factors like professional arrogance or ignorance can contribute. The results can be positive errors or omissions or general shortcomings in the design, poor documentation, etc. If there is poor control over staff and they are encouraged to work on their own or outside normal office hours, the dangers of both accidental or deliberate threats become more real. To keep proper control, organizational procedures should therefore separate systems staff from programming and operations staff in the

execution of their duties, so that each group will represent a check upon the other, and an intelligently administered supervisory regime is maintained.

OTHER INTERNAL STAFF

In addition to the systems staff, threats from within the organization by functions may be as follows:

- Applications programmers. As in the case of systems analysts and designers, there is a need to divide responsibilities, set standards and maintain effective authorization system. The possibility of errors or omissions passing through the development phase into the working programs must be reduced to acceptable levels. In this sense, the programmer is more vital than analyst. Detailed testing can help to reduce the risk but, following the detection of an error, any amendments to software while it is a formative state may cause unforeseen knock-on effects. Real supervision is therefore necessary to ensure that all the relevant amendment procedures are observed, and that proper records are maintained.

- Operating staff receive data for processing and are responsible for disseminating the results to the appropriate users. Any breach in security potentially prejudices data integrity and confidentiality and may result in the loss of availability of both services and data. One operator working unsupervised can accidentally or deliberately undermine the best security system. Further, the use of powerful system commands can mask the operator's activities so independent control must be exercised.

- Users will have a detailed knowledge of the business or operating procedures which could be manipulated to make fraud work, so their activities must carefully audited and controlled in the same way as operators.

EXTERNAL STAFF

Threats may also be posed by external staff:

- Independent contractors. Contract maintenance and cleaning staff can prejudice confidentiality and the availability of services. All externally employed staff should be supervised when they come on the premises as if they were internal staff. Security can be breached by maintenance and other engineers by substituting hardware components, by disabling control mechanisms or by using the powerful software tools on their diagnostic disks to read protected files. All their activities should be monitored by competent staff.
- Third-party action. There could be problems if, for example, the delivery of stationery were to be stopped by suppliers, say, during a strike. To minimize the risk of loss of system availability, the organization should maintain adequate stock of critical documentation. Similarly if the electricity supply was disrupted, the organization would discover whether it had invested in adequate generator back-up facilities.

PERSONNEL ISSUES

People represent a threat even if only through their inexperience, incompetence, negligence or curiosity. For these purposes, it is irrelevant that users and their managers may have been made explicitly responsible for maintaining security. If security systems are going to succeed, the active co-operation of all those involved is required at all times during the routine of the work. But people are always a weak link and even the most conscientious of employees may forget to

log-off or allow an unauthorized person through temporarily abandoning a terminal.

THE DYNAMICS OF CHANGE

The installation of an information system can represent a significant act of modernization for any organization. This can be good for morale if it is properly managed. In the best cases, employees draw great confidence from the fact that they are seen to be involved in a progressive organization, and this stimulates all those affected to be creative and productive. However, the prospect of change can also be demoralizing with staff afraid for their jobs. In the worst cases, this results in a lack of co-operation or even outright opposition to the proposed changes, so the first priority is to establish proper lines of communication with all the staff likely to be affected. The aim should be to agree a set of organizational goals, with plenty of opportunity built in for consultation and feedback. If staff feel that they are able to influence the outcomes in a real way, they are more likely to support the changes. From the goal-setting stage, the management team then moves to the planning stage where more detailed consultation with the prospective beneficiaries of change should lead to the creation of properly defined, costed and scheduled arrangements.

Once decisions have been taken, people will accept change more readily if it is implemented in a structured fashion, one step at a time, to allow each person to become familiar with each new phase of the operation before the next step is taken. Consequently, because change can affect many departments and third parties with whom the organization interacts, it is better for all personnel matters to be co-ordinated at a senior level. Adequate liaison with all interested parties during the creation and implementation of plans for change is essential, and because peer organizations may be affected, the active participation of senior managers is vital throughout the exercise.

HELPING NEW USERS

Everyone involved in the process of change needs to know who to ask about the risks involved. With a new system, there is a chance to get everything right from the start, so it is important to have a good, security-conscious person in charge during the development phase. To help users who may never have had to deal with computers before, there should be a help-line. This should also provide central record of the problems experienced and help to target training time. For this purpose, the computer services unit team should have a blend of computer and organization experience. If they have a reasonable level of experience, they should be able to dispel the usual fears and misconceptions. They should therefore be good communicators and be prepared to service the end users.

SECURITY ISSUES

No matter how good the training, the possibility of accidental error is a present, and this may allow major systems failures to arise. As a result, reasonable steps must be taken to protect the data. But it is uneconomic to protect all the data all the time except in the most sensitive application. Generally, human error is more common than dishonesty but, since error may conceal dishonesty, the reduction of error incidence is essential to maximize auditing effectiveness. It is a typical 'wood for the trees' problem. Thus, once it is acknowledged that all people-based threats cannot be prevented, designers should build in detection systems to allow rapid intervention to limit damage. All security design must be based on good psychology and sociology. This is borne out in the final analysis, security issues are not simple technical problems. It is inevitable that people will be vital component parts of the system, but cannot be programmed as if they were machines. In deciding what steps to planning teams must consider and reflect upon the fact that people:

- may be the source of risk
- may be at risk from others
- may need protection.

Planning needs to take account of the full range of threats that may be present in the working environment from full disasters to minor damage to integrity. The concept of employee protection should be sufficiently flexible to include all those factors which may affect the quality of work produced by workforce. This may include damage to health from causes as diverse as the air conditioning (Legionnaire's disease), and the ergonomics of the office layout. Staff are vital, if not irreplaceable assets to the organization, so all should be for. Good working conditions, supplemented by the communication of a structured plan for the protection of staff, help to reduce sickness, absenteeism, and staff turnover, and may also reduce industrial relations problems. Staff morale can also be affected by the intangible quality of the environment which includes the level of sensitivity with which staff are counseled, which security vetted. It also includes the way in which staff are treated if they make mistakes. The burden is therefore on the personnel department to cooperate in the production of a safe and paranoia-free workplace.

FUNCTIONAL SEPARATION AS A SECURITY CONTROL

Fortunately, most employees are honest, but a standard safeguard is that employees should not be allowed to gain exclusive control over vulnerable functions. The risks, as Baring's Bank found out to their cost in Singapore, are significant so, wherever possible, duties should be separated. This means that, at a practical level, the care of assets and of the records which describe and list those assets should be in different hands. Similarly, separation by function or by

transaction ensures that no one person has control over the whole of an administrative system (see Chapter 18). Indeed, any fraud is more likely to be discovered if jobs are performed jointly or there is some form of job covering or rotation. There are three separate strands of argument:

- 1 The health of the employee is important and this may be enhanced through rest or a change of activity.
- 2 Change in personnel helps to uncover frauds which may require continuity of activity or presence to maintain secrecy.
- 3 However, job rotation will be impractical in many cases because retraining may be uneconomic and inefficient.

Equally important is that staff should not be allowed to give up their holidays. Organizations should not be hypnotized by the appearance of conscientiousness and should not be tempted to let their 'star performer' work on. Toshihide Iguchi, the trader who concealed losses of \$1.1 billion from the Japanese Bank Daiwa, was famous for rushing back to work after only one or two days holiday. The fraud was discovered when US regulators demanded that the bank impose a mandatory two-week holiday on all staff. In the UK, the Midland Bank now requires staff to take at least two consecutive weeks, Lloyds/TSB have a similar system for all staff while UBS and BZW ask the same of staff who handle money. There is no sign that British regulators will follow the US line and require that holidays be taken but some insurers are now writing the requirement into their policies.

A STEPPED APPROACH

The best security controls to protect administrative systems divide sensitive tasks into a series of interdependent steps which must all be performed before

the task can be completed. If different people are responsible for each step, this increases the chances of an honest employee noticing the error. Before deciding how functions are to be separated, the security staff should first impose general practical controls. For example, authority limits can be imposed on the amounts which employees can manipulate. Then in sensitive environments, access to information can be restricted on a need-to-know basis, regardless of the status or rank of the staff members who ask for details. Further, it should be considered normal for a person designated as superior in the management hierarchy to supervise the work of subordinates so that each employee works under the continuous observation of a supervisor who knows the employee and who may be able to spot unusual behaviour.

Given a system incorporating these protections and good functional separation, any employee who wants to break into the whole system should find it impossible to do it alone and will be forced into collusion with other employees. This increases the chances of detection. But in any organization, there are always some people who must be trusted the security officer, say, or the senior systems analyst — and so there will always be people who can prejudice the system if they want to. Designs should take account of this fact. Designers should also recognize the difficulty of achieving satisfactory separations of duties in the small organization where only a limited number of people are employed. In such situations, urgent tasks are frequently undertaken by the ones with the time rather than by fixed role. Within sensible limits, therefore, all hands that may be called to the pumps must be trusted to do the jobs honestly.

USER DOCUMENTATION AND TRAINING

System manuals and both user and programming specifications can also be a weak link because a potential criminal can quickly discover how the

documented system is supposed to work. But without good documentation, serious difficulties can arise. Good and clear documentation and the use of checklists can:

- significantly reduce the number of errors and omissions which people make.¹
- ease communications between departments
- help to ensure operational continuity — a prime objective of security safe guards to deal with problems of equipment failure and personnel turnover.

If any documentation is considered sensitive, it should therefore be kept in a secure place and only made available to identified individuals on a need-to- and time-constrained basis. This requires the documentation to be written in discrete elements which match system functions and processes. In this way, organization can prevent its employees from gaining an overview of the system and, in parallel with the logical access system, each employee's security profile will dictate whether access may be made to any given documentation element. One problem which regularly faces the users of stand-alone micros is illness. If there are only a limited number of people trained to use the machines for each function, an prolonged period of absence may cause a serious disruption to that function. Training should therefore always include all those who might be called on to cover for absent colleagues. If only one or two staff have the expertise, should be taken to prevent them from either personalizing the system, choosing idiosyncratic places in which to store the back-up copies, unless is very good documentation of what they have done. Any failure to have accessible information of practice can cause chaos if those staff suddenly leave are ill, because those who are to replace them will have no idea how to make system work. Indeed, the irony is that without adequate documentation, really are irreplaceable.

Finally, training should persuade or condition everyone to respond to anything which is unusual as a security variance. But, if such events are not to be ignored, there must be a procedure for reporting suspicious incidents. It must be recognized that staff will not report things when their friends are involved. To encourage the proper response, it may therefore be advisable to permit reports to be made in confidence and with no stigma attached to the reporter, regardless of the outcome. All levels of employee must be encouraged to see themselves as security safeguards, the overall aim being to create a secure environment in which employees are aware of their responsibilities and are not tempted to misbehave.

DIRECT EMPLOYMENT POLICIES

As a priority, every organization should formulate a detailed policy for:

- recruitment and selection
- staff assessment and appraisal
- termination of employment.

It is well known that disgruntled and under-used employees are the most likely to breach security. Good personnel management is therefore essential to maintain morale and to produce effective training. This should include proper career progression so that people can achieve their legitimate aspirations within the organization. If staff are happy, with plenty of task variety and stimulation, they are likely to stay. But whatever the conditions under which people work, no employing organization can assume that its staff will remain loyal. People's attitudes change and, depending on the circumstances, they may leave, they may become susceptible to bribery or they may take information with a view to selling it to a competitor. Each organization should therefore consider a key person policy which decides how expertise is to be replaced, or how the

organization is to be restructured to compensate for its loss. Should it become necessary to terminate employment, adequate security procedures should be devised. The employees who are to be removed should be excluded from sensitive areas immediately. Arrangements should be made for the immediate return of security sensitive items such as manuals, keys, ID badges, and all passwords and logical access authorizations should be cancelled.

The key personnel issues may therefore be summarized as follows:

- tempered by job sensitivity analysis, the organization should have effective pre-employment screening and background checking to reduce the possibility of appointing an untrustworthy person into a post of responsibility
- all staff should be trained to recognize and act on deviations in behaviour seen in their colleagues which could be warning signs of likely fraudulent behaviour
- there should be strict guidelines following a dismissal or other termination to reduce the opportunity for vengeful behaviour by a disgruntled individual
- there should be a well-defined policy on non-disclosure of confidential information
- staff should be given well-defined channels to air their grievances, and there should be regular personnel reviews
- morale is maintained by having a safe and well-appointed environment in which to work.

AUDITING SYSTEM CONTROLS

Internal auditors should not be content with a yearly assessment of risk, but should review all record-keeping systems, including the computerized data store, on a regular basis to ensure the adequacy of the controls. In this, approved members of the audit management team can use the established management information system and decision support systems (DSSs) to manipulate the

sometimes large quantities of data through the technique of modelling to detect changes or suspicious trends in the whole. DSSs usually have good software tools with which to interact with the data and to prepare reports on the data environment. Such systems can easily be modified to support the auditing function. The resulting tests could be scheduled on a regular or routine basis, but there are dangers in being too predictable because this allows the criminals the chance to have the data in a good state by the time the known inspection is to be made. Equally, if the tests are too infrequent, they may fail to detect control degradation or the system violations which take place between tests. Alternatively, audit testing could be used to follow up an apparent failure in the controls by attempting to detect the cause or to ensure that previously detected deficiencies have been corrected.

ENSURING DATA SECURITY

Generally, auditors seek to ensure data security by:

- monitoring computer activity including the exception reports (unauthorized attempts to access files or procedures), console logs (to look for unusual activities), the system management facility which records which operations have been performed, and so on
- checking all changes to the system including additions to the system library as well as changes to source codes.

Application software is at the heart of the Information system. For this software to operate effectively, security controls are necessary within the software and at the interface between the software and other components of the information system. The security measures implemented must reflect the needs of that

system and be consistent with the sensitivity of the data processed by the system. The software most likely to be involved includes:

- the financial and asset management systems such as payroll and stock management
- those systems which provide process support for the organization's operations, such as CAD/CAM, CIM
- the automated decision-making systems, such as stock re-ordering maintenance scheduling, and so on.

In good design, security is built in from the outset. For this to be achieved a systematic approach to design is required (see Chapter 9). However, no matter how good the design may be on paper, an information system can only be secure if it is a part of an organization with a positive attitude towards security. It is therefore vital that those in a position of authority ensure that the standards and best practice are incorporated into the management of the organizational environment. The aim must be to make the optimum selection of security goals and strategies, and to design effective security safeguards. This requires a blend of foresight and experience, but the best results can only be achieved when decision making is based on a holistic view of the organization and its systems. Only an all-embracing overview allows the construction of appropriate security measures to meet the known vulnerabilities.

Finally, when taking design decisions, managers should recognize that there is a difficult balancing of factors to achieve, namely that although automated controls are less costly to operate and more consistently applied than their manual equivalents, the automated systems that fail to take account of the people who are to operate them are likely to be ignored or by-passed. More

often than not, a compromise will be required to accept slightly less than optimal security in return for a more friendly interface which the employees are likely to accept and operate.

AUDITORS AND THE ORGANIZATION

In organizational terms, the role of the auditor has become increasingly fundamental. Even applying ordinary common sense, the organization will be able to identify the most probable threats and vulnerabilities. Managers will be able to see that, if threatened by determined criminals, an automated system will be more vulnerable if it has been inadequately developed and incorporates a poor defensive design. The problems will grow in scale if access is to be made by many users, making the application of input controls difficult. So most organizations accept that there is a positive need for good auditing advice and facilities during the design and implementation phases. At its best, this will be based on a detailed mapping of the information system and of the human interfaces with it. At each human interface, the auditors should consider the likelihood and consequences of error. Not only can automated countermeasures be put in place, but the human resource development team can also be advised to devise training schedules that will improve the preparation of source data and promote individual accountability at each data flow interface.

Once the system has been installed, there will be dangers in all program modifications and file changes if poorly trained staff is allowed to make them, so it is up to the auditors to liaise with the systems analysts to ensure rigorous testing before any amended software is allowed into the working environment. Both static and dynamic testing should be encouraged. During the tests, the analysts should judge the extent of the program which has been exercised and attempt to judge whether the unexercised code is an unauthorized insertion such

as a program patch. In this way, the auditors give themselves the best chance of maintaining system integrity as the system develops.

RECIPROCAL AGREEMENTS AND CONTINGENCY CENTRES

A number of organizations near the larger towns may decide to pool their resources to save money. These reciprocal or mutual aid agreements work by allowing one member access to the hardware of another during an emergency, and they are likely to be particularly attractive in those industries which have

accepted common hardware standards. Both software and data must be portable between the different member's facilities, and in evaluating the practicality of the scheme, rehearsals can be helpful even though they can be expensive, and generate unwelcome disruptions to the back-up organization. But if tests are to be effective, the full critical applications must be put up and made to run realistically. It is difficult to make mutual aid agreements totally reliable. Few organizations have a guaranteed level of free machine capacity so the arrangement is usually only for short-term relief and often covers only a limited amount of processing. Changes in either system will jeopardize the practicality of the agreement, and changes in management policy may cause the withdrawal of one member without notice so it can be a high-risk strategy because participants may only discover that promised aid is not available when an emergency arises. For these reasons, mutual aid agreements have high risks attached to them and may not be practical in the real world.

Equipped contingency centres are relatively rare because they are capital-expensive to create and demand for the service is relatively low. If an organization proposes to use this strategy, it should first ensure hardware compatibility and check all the communications linkages. If the technical

problems are overcome, the organization pays a subscriber fee for the right to use the facility in an emergency. The cost of declaring an emergency may be great because, once the decision is taken to move to the back-up site, the hardware rental fees are payable. The organization should also carefully consider whether there are any security problems if other organizations are using the facility. The question of storing sensitive materials (whether on system or not) at the contingency centre should be discussed ii, say, trade competitors are likely to be using the same resources.

The organization should also consider the level of availability of the facilities at the centre for rehearsal. It is fundamentally important that the staff at both ends of the transfer are fully familiar with all the problems which are likely to occur, and detailed training schedules should be drawn up and executed to raise staff awareness to a proper level. Further, the centre itself should disclose the number of subscribers so that there can be an intelligent guess made as to the likely odds of another subscriber needing the facility at the same time. The logistics of transfer should then be calculated starting with simple factual matters such as the distance from the organization to the centre — recovery at the original site may be slowed if key personnel are too far removed in the back-up centre. Finally, as with the bureau system, the planners must recognize that membership of these schemes limits the development of home sites to those changes which are compatible with the back-up site.

OTHER EMERGENCY FACILITIES

Some organizations have constructed empty rooms or shells. This is called a cold stand-by scheme. In the event of a disaster, the client organization is allowed access to assemble a back-up system. The scheme is significantly less

expensive than the equipped room system, but suffers from the disadvantage that it is slower to start up. Co-operative interfirm provision of empty rooms, spreads the costs. As with the hot stand-by systems, there must be careful consideration of the number of clients likely to want access at any given time, but overall, such schemes represent a good system for less critical back-up because it is not essential to maintain full system compatibility. There are also firms which provide relocatable computer centres — these are prefabricated rooms with built in facilities but they can take time to erect. Planning is therefore essential to bridge the gap while the new working environment is created, so the hot stand by schemes are more effective in this respect. Obviously, for any of these schemes to work, copies of essential files and software must survive the disaster. Adequate back-up power systems should therefore be installed so that the in-house system can be archived and brought down gracefully in the event of a major loss of power during the disaster.

THE IN HARDWARE CONSIDERATIONS

The first question is whether there are manual fall-back systems which will allow the organization to operate during short disruptions and during the initial stages of a major disruption. For example, the organization should check to see whether there are any manual typewriters and a suitable stock of documentation for recording sales and accounting transactions. Hardware can be easily replaced if it is of recent manufacture or still in stock. Some manufacturers will give priority of supply to those affected by a disaster. However, different suppliers have different policies and it essential to discuss disaster recovery with the suppliers at an early stage. Some hardware suppliers will, for example, make demonstration computers available to bridge in the event of disaster. These are usually showcase computers, but they are likely to have poor security and it is possible that they have been constantly updated with the most recent

software releases, so system compatibility may be a problem. It will also be hard to replace customized hardware or hardware produced in small quantities or on demand. This will inevitably be the case if the manufacturer has discontinued the line or has ceased trading. If this fact is recognized during the lifetime of a contingency plan, it should be modified to allow time to find a second-hand system, or to recreate the system using new hardware. When drawing up and maintaining the contingency plan, adequate time should be allowed for the delivery, installation, testing and commissioning of the replacement processors. In this, the size and complexity of the communications network can be a major factor. Although the telephone system may be swiftly reconnected, the supply and fitting of modems and multiplexers may be time-consuming and there may be substantial systems work required to allow for the new configuration — for example, for access to become remote during repairs.

DATA AND DOCUMENTATION CONSIDERATIONS

With considering the data themselves, a whole series of decisions must be taken. The first and most serious possibility is that some or all of the source data have been destroyed. This may happen if there is disruption during processing. The organization should therefore decide:

- What kind of back-up files should be routinely created.
- How many generations of back-up are needed to ensure rapid recovery.
- How much data must be stored in geographically remote sites.

The organization must aim to produce data which are accurate, complete, timely and authorized; and to create a system whereby, with minimum effort, it is possible to reconstruct transactions from the relevant source documents. With

both these facilities, organizations should be able to make decisions based on the best information, to create a good audit trail and to recover quickly from disasters. The DP and user departments have joint responsibility in this respect. It is also vital to consider which functions are most important to the continuing operation of the business, and priority should be given to the restoration of those functions.

PLANNING DOCUMENT STORAGE

This should be undertaken alongside records retention analysis. In some cases, there will be legal requirements to retain documentary evidence of transactions, say, for the Inland Revenue and Customs & Excise. Similarly, there will be processing requirements, (e.g. to restart processing from source data if the computer malfunctions during processing), which require documents to be preserved. Each organization should analyse its documentation to identify which documents are critical. It is then advisable to microfilm, fiche or put on CD the most important and to store them on a remote site. Documents may be stored on different sites on a cyclical basis depending on their age so long as recovery can be made quickly to permit the recreation of the electronic data. Finally, user manuals tend to be kept in offices where fire damage may easily occur. Back-up copies should be stored at remote sites. Copies of the disaster plan itself should be distributed throughout the organization and should be easily available at protected locations. Some copies should be kept at the homes of the key personnel who will be contacted if the disaster occurs.

ORGANISATION STRUCTURE & HRIS

The activities of decision making, planning, communicating, performance monitoring and control occur extensively and continuously in almost every organization. We can differentiate these activities in a number of ways, commonly by reference to:

- the functions involved) for example marketing or financing
- the aspects of the operations to which the decisions relate, such as pricing or employee remuneration
- the time period concerned: short, medium or long term.

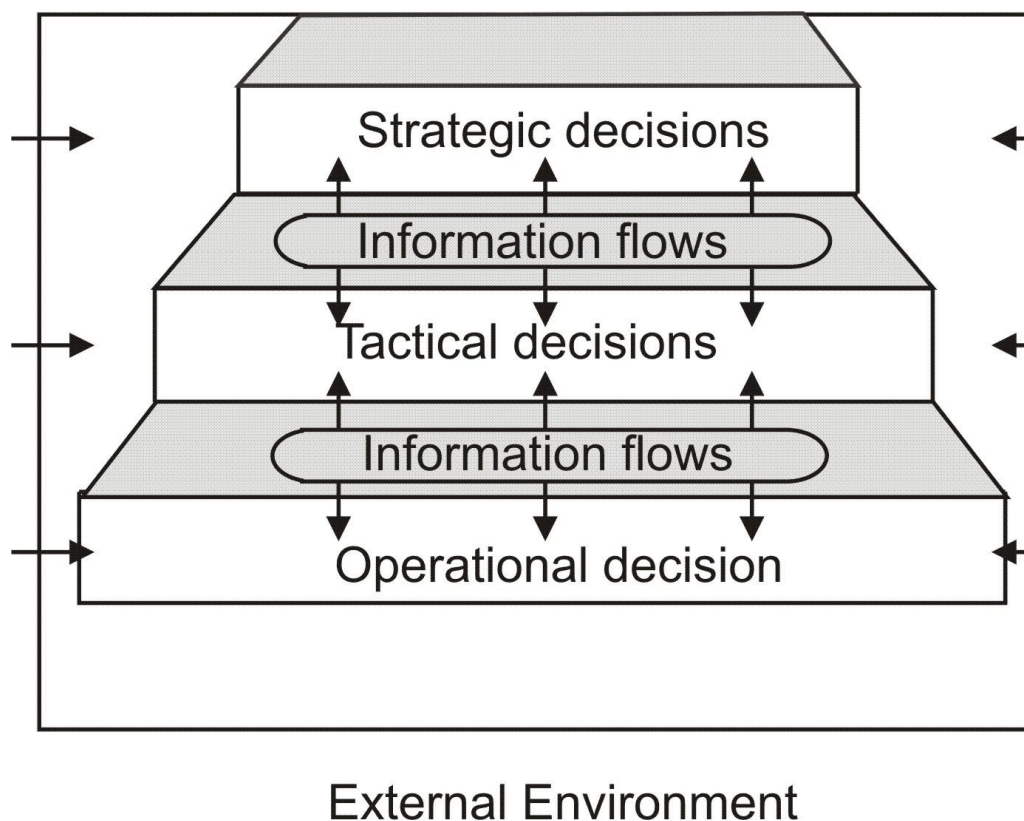
A further generally accepted division of the range of decision-making activities in an organization is illustrated in Figure 3.1.

DECISION-MAKING LEVELS

The three levels of decision making illustrated here reflect essential differences in the nature of the decisions being taken. Consequently the position of the potential decision-maker in the hierarchy gives rise to different information requirements to support the decisions. The differences in the type and quality of the information required for each of these levels are explained in more detail later in this chapter.

We can consider these decisions quantitatively — in terms of their volume or frequency or qualitatively in terms of their significance or consequences for the organization. The operational decisions are the most prevalent in an organization and the strategic decisions the least prevalent. Conversely, strategic decisions are potentially the most significant, while operational decisions have little potential impact on the organization as a whole.

The distinction between decisions at the operational and tactical levels on the one hand, and those at the tactical and strategic levels on the other, is often a matter of interpretation within a specific situation: it usually reflects the nature of the particular processes employed in managing the organization. The distinction between operational-level and strategic-level decisions is usually more clearly observable in practice. Let us now look at the nature of these three levels of decision making and provide some examples of the types of decisions involved in each of the groups. We shall keep discussion of the tactical level to the end, because it interacts significantly with the other two levels.



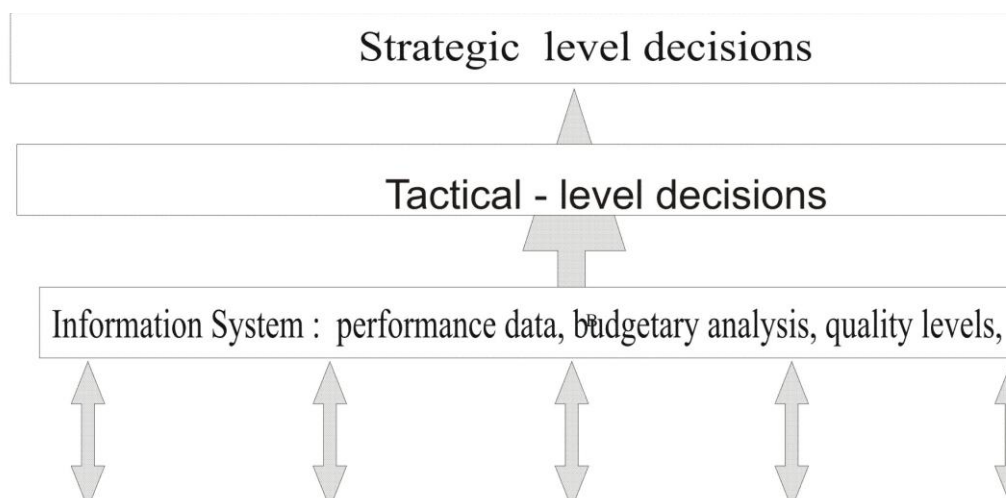
OPERATIONAL DECISIONS

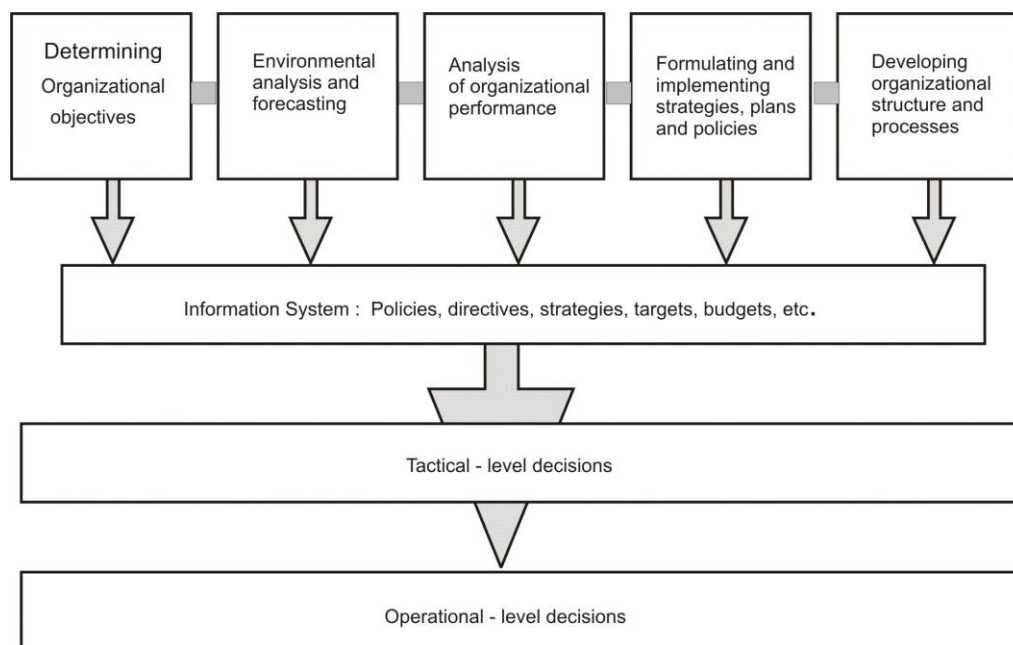
Operational decisions are concerned with the ongoing daily or routine operations of the organization, relating mainly to its primary activities. Figure 3.2 illustrates the main groups of primary activities and shows a few examples of the decisions associated with each of them. Our list of examples is not exhaustive and relates to a manufacturing organization, although some features would also be found in the operations of a service-sector organization, such as the sales ledger system.

Each of these groups represents a major sub-system in the organization's overall information system. The sequence of activities and decisions indicated in Figure 3.2 is not necessarily the order in which they would occur in practice. Indeed, many of the activities shown will take place simultaneously. Another important feature highlighted in the figure is the linkages between each of these primary sub-systems. They usually reflect some flow of data between them. The figure also indicates the two-way flow of data between the operational sub-systems and corresponding elements at the management level.

Operational decisions are concerned primarily with:

1. Short timescale and routine programmes to promote the effectiveness and efficiency of daily operations: sales and customer order taking, the acquisition and stocking of raw materials, production operations, delivery and installation of goods and services, and the subsequent invoicing and collection of payment for the goods and services.





STRATEGIC DECISIONS IN AN ORGANIZATION

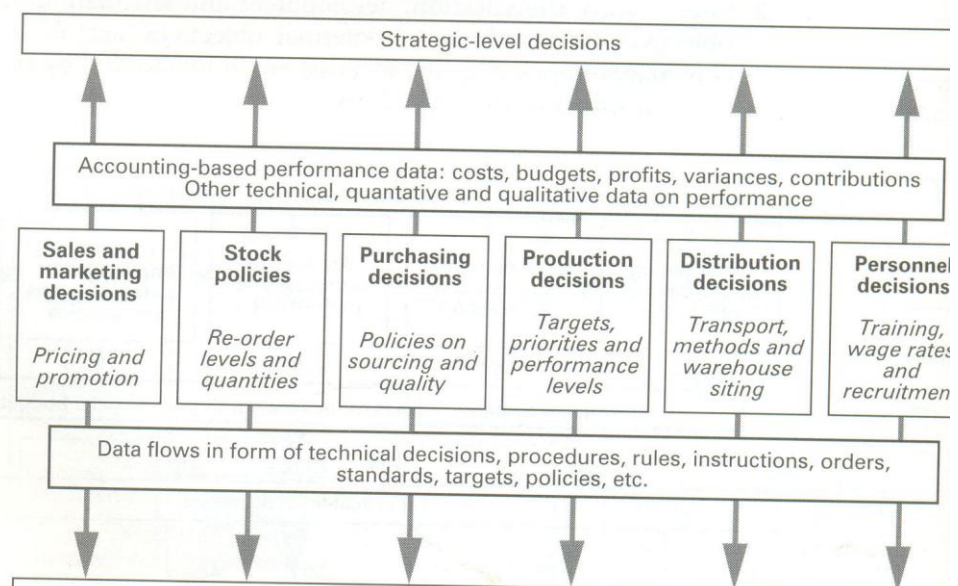
2. They tend to be highly unstructured or non-programmable, and are often novel to the organization and its decision-makers, with no guarantee that they will recur in a similar context.

3. They involve high levels of uncertainty and risk, requiring significant levels of personal and subjective analysis, appraisal and choice within the decisions.
4. The kinds of information needed to support them are not generally predictable, although certain types of external and internal information will be regularly processed for the decision-making group as a general part of the organization's need to develop good sources of intelligence and broad performance indicators.

TACTICAL DECISIONS

Tactical decision making may be considered as filling the centre spread in the spectrum of decision types between 'operational' at one extreme and 'strategic' at the other. This level shares a number of features with both the operational and strategic levels, and is considered last for this reason. Figure 3.4 indicates the broad areas of decision handled at this level.

The role of individual managers in this section of the decision hierarchy also needs to be recognized: in addition to decision making, this level of management also has the task of integrating and co-ordinating activity and communication between the strategic and operational levels. The function of these managers is to interpret, implement, monitor and control the strategic objectives, plans and policies established by the organization. This may involve developing plans, performance levels, guidelines, procedures and operating instructions for the operational levels in the organization.



TACTICAL DECISIONS IN AN ORGANIZATION

In addition to this enabling link from the strategic to the operational levels for implementation purposes, the tactical level also has a responsibility to monitor the operations of the organization and to feed back summarized performance data to the strategic level. This management role is arguably the most crucial element in the organization's operation, as it provides a vital interface between the long-term plans of the organization and their more immediate implementation and control.

Tactical level decisions may be characterized in terms of:

1. A practical concern with the short-, medium- and long-term perspectives of organizational performance, although the main emphasis will tend to be medium term.
2. The need to relate primarily to the functional elements in the organization while recognizing the overall strategic objectives, strategies and development proposals.
3. The involvement of moderate degrees of uncertainty and risk in appraising the decision options and the alternative solutions available.

4. The semi-structured nature of the problems encountered, since there will be some elements in each problem which may be relatively common, while other elements are novel both to the decision-maker and to the organization. A core of standard analytical techniques has been developed to provide some basic tools to tackle different problem situations. Examples include operational research methods such as linear programming or queuing algorithms, statistical methods, variance analysis methods in budgetary control, and spreadsheet software packages. The real skill at this level of decision making is the ability to structure the problem encountered into an appropriate form and to select the correct decision tools to assist in the analysis and selection of the best solution strategy).
5. Information requirements which are only partially predictable, such as the regular performance monitoring requirements and reports. (The unpredictable elements reflect the need for management to focus on particular novel issues and problems as they arise, and to use standard-purpose analytical tools to evaluate the alternatives and to take decisions.)

TYPES AND QUALITY OF INFORMATION

Our discussion of the levels of decision making in the organization indicated that the nature of the decisions taken at each level varies significantly. We suggested that the type and quality of the information required to support the three levels of decision making would also vary. The effective specification, design and operation of an organization's information system require a clear recognition and understanding of these differences, both in terms of the types and the qualitative dimensions of the information that will be required.

INFORMATION CLASSIFICATION BY TYPE

Several dimensions may be used as the basis on which to classify information.

These include:

- source — internally- or externally-generated information
- time frame — information relating to the historical, current or future situation
- communication media — presentation of information in either written or oral form
- functional orientation — relating the information to the primary functional area or activity affected — for example raw material costs and the purchasing function, or statistics on employee absenteeism and the personnel function
- decision level — relating information to its primary use at one or more of the operational, management or strategic levels.

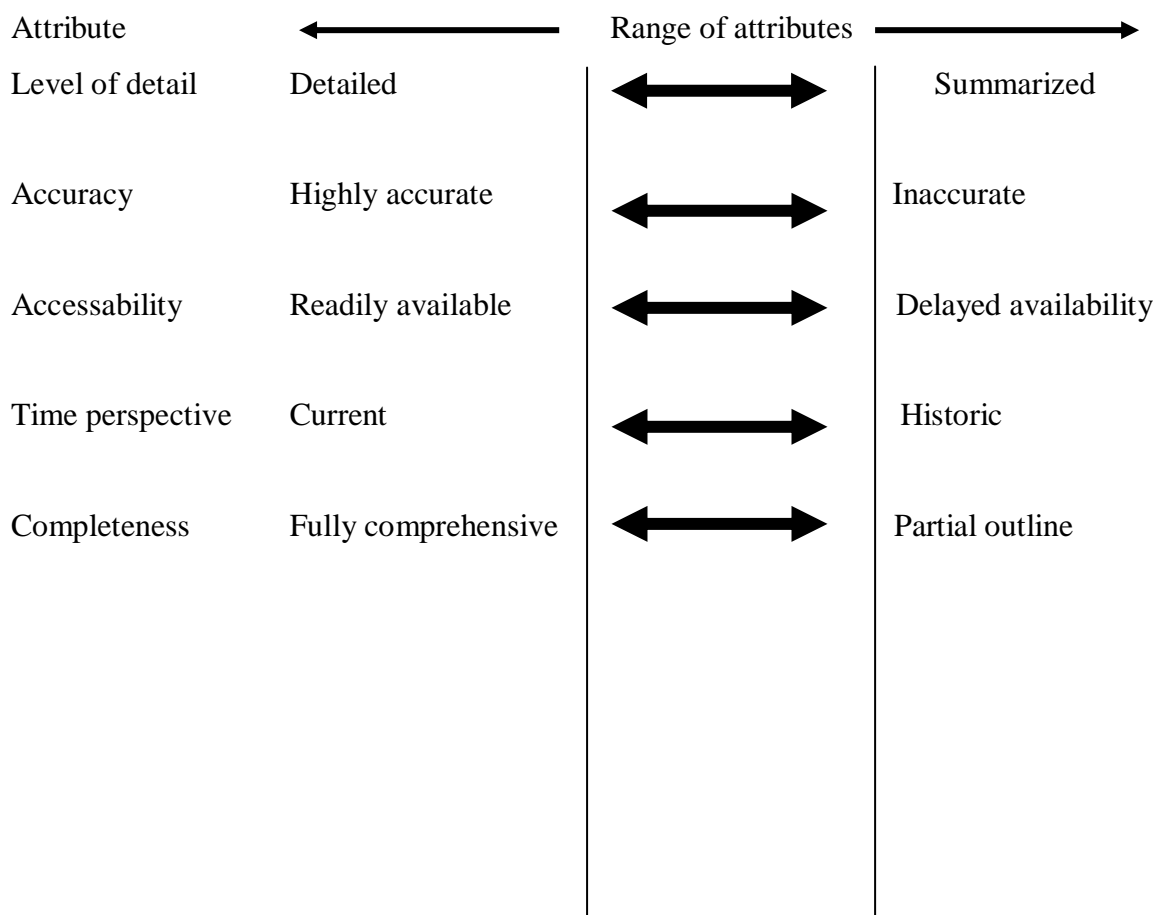
These classifications are not mutually exclusive; a particular item of information may be classified using each of these dimensions. For example, information on the sales achieved by a particular product in a given month may be classified as internally generated, historical, written and appropriate to management level decisions in the sales function — whereas forecasts of market demand for the product may be externally generated, futuristic, written and primarily for use in strategic-level decisions in the marketing function.

QUALITATIVE DIMENSIONS OF INFORMATION

In addition to classifying by type, we can also differentiate categories

information on the basis of quality. Four key points need to be stressed in relation to these quality dimensions:

- not all the dimensions will be relevant in any given decision situation
- each dimension may be represented by a range of potential levels of quality
- even where there are several relevant dimensions, certain dimensions may be more important than others. In the case of financial accounting information, for example, a high degree of accuracy may be more important than the' timeliness or currency of the information received
- the importance of a particular dimension in a given decision situation is a reflection of the decision situation, the nature of the problem faced, and the skills of individual decision-makers. In the case of a decision-maker with strong analytical abilities, the provision of detailed and comprehensive! information as opposed to summarized and partial information may enhance the decision taken. However, if the decision-maker's analytical abilities are less well developed, a more summarized version of the information may yield higher value.



Relevance	Appropriate to Current needs	↔	Inappropriate to current needs
Bias	Objective	↔	Subjective
Verifiable	Self- verifiable	↔	No means of checking
Quantifiable	Quantified	↔	Not ammeniable to Numeric expression
Degree of uncertainty	Certain	↔	Highly uncertain
Clarity	Clearly expressed	↔	Ambiguous

COSTS

The improvement of quality or the enhancement of the value received by the user from the information will normally necessitate additional information processing costs. Each of the qualitative dimensions listed has a cost associated with the improvement of the quality of the information in that particular dimension. Thus, if a production planning and control department operates on the basis of reports received at the end of each day, the proposal might be made to improve the timeliness of the information received by providing information on a real-time or 'immediate response' basis throughout the day. This will involve considerable investment in:

- the computer hardware and communications equipment needed to capture and transmit the data from the shopfloor
- the development or acquisition of appropriate software to process the information

- increased staff time, both in capturing the primary data and in accessing the resulting information

Systems designers therefore need to understand the needs of the user and translate these into the appropriate levels of information quality provision.

LIMITATIONS

While we can accept that additional expenditure on information processing may improve the quality of the information provided, we should recognize that there are limitations on the degree to which quality may be improved, apart from the cost limitations. The quality of the source data used will dictate the potential to improve the qualitative dimensions. For example, market survey data which failed to record the ages of respondents could not have this detail added later. Similarly, costing information recorded in units of hundreds pounds could not be provided in greater accuracy — say, in terms of pounds and pence.

Technical limitations may also restrict the potential improvements in quality as the ability to capture, store and process the volume of data necessary provide a comprehensive statement of the organization's markets may be limited.

Another important restricting factor is the cognitive capacity of the user. While it may be possible to improve the detail and comprehensiveness of the data provided, the capacity of the overworked user to use it effectively may be constrained by the sheer volume of information provided. So, enhancing inherent quality of the information does not necessarily add value to the user in the decision-making or control activities. Alternatively, no matter how much time is available, good-quality information on its own does not convert a decision-maker into a good decision-maker.

DECISION LEVELS AND INFORMATION NEEDS

Differences in the nature of the decisions at various levels in the organization be an important determinant of both the type of information required and its quality. Figure 3.6 illustrates the differential nature of type and quality for the three broad levels of decision making outlined earlier.

Strategic decisions are concerned primarily with positioning the organization in the environment to meet its targets and objectives most effectively, while planning to allow the organization to develop dynamically in response to changes in environment. Such decisions typically involve a higher proportion of externally generated data, often presented in a summarized form and relating more to future potential than to historical or current developments. The information required also generally be less accurate, in the pedantic sense, and incorporate more subjective valuations of future trends and developments. This will tend to make the contents less predictable, as the information needs will be largely dictated by developments in the external environment which, by definition, are largely outside the organization's control.

Operational decisions tend to be based on information originating primarily within the organization and relating to either historical or current activities. The conduct of the decision making at this level will also require detailed and accurate information, which is often predetermined by both the content and quality necessary to be incorporated into highly structured decisions.

Information Attributes	Operational	Tactical	Strategic
Orientation	Primarily internal	Internal and external	Greater orientation
Planning horizon	Immediate to next few days	Data utilized Short to medium Term (week and months)	To external data Medium to long term (months and years)
Performance focus	Focus on current activities	Historic and current activities	Focus on predictive rather than historic
Coverage	Relates to specific activities	Relates to group of activities within department/function	Coverage of total organization
Level of detail presented	Highly detailed	Mixture of detailed and summarized reports	Data typically in highly summarized form
Uncertainty levels	Low uncertainty levels	Moderate levels of uncertainty	High levels of uncertainty as
Degree of objectivity	Objectively measured data normally	Combination of objective and subjective data	focusing on longer term Data incorporate higher
Level of accuracy	High levels of accuracy usually	Moderate accuracy levels	proposition of subjective

accuracy required

valuations

Accuracy less
critical of
decisions at this
level

Tactical decisions are concerned with the tactical planning and control of the organization. A significant proportion of the information inputs to this level will comprise summaries of the operational performance of the organization's primary activities, usually on a periodic basis. In such cases, the information inputs will be highly structured and predictable in terms of the required content, detail and accuracy.

ORGANIZATION STRUCTURE AND INFORMATION REQUIREMENTS

All organizations are built up from standard resource-based components, but the individual motives, pressures and constraints which operate at the time of construction tend to produce strongly differentiated organizational structures even where the organizations to be compared seek to serve the same market. However, there are a number of 'common denominator' themes which emerge in the structuring period, regardless of whether the organization is taking decisions explicitly or implicitly. At a 'macro' level, the organization will seek to structure its human resources and operations in the most effective and efficient manner to achieve its objectives. To make these objectives operational, the organization must:

- formally identify and structure the available resources
- establish efficient information and communication systems
- create processes for effective decision making, planning and control.

PRIMARY ISSUES

The strength of any organization ultimately lies in its human resources. But if the best possible use of these resources is to be achieved, the organization must take key decisions to allocate authority and responsibility. Without properly defined roles and a career structure which is likely to develop and maintain staff morale, it will be difficult to make effective use of the other resources — no matter how easy it may actually be to exploit them — and management skills will fade. Success depends, in turn, on the development and communication of a personnel policy which can be perceived as co-ordinated with the more general policies of the organization. So training must be planned to introduce new skills and enhance the old, and a pathway of promotion must be set in place to allow each manager to gain experience and insight into the aims and methods of the organization.

MOTIVATION AND RESPONSIBILITY

The ways in which an organization may be controlled vary from the autocratic excesses of an aggressive entrepreneur to an open and democratic system of decision making. The power structures which will develop will come to represent the culture of the organization and will be a vital factor in setting the tone and feel of employment. Key factors in maintaining motivation are the extent to which each manager is allowed to participate in significant decision making and the degree of authority delegation. If a manager is trusted with specific responsibility and found to be competent, this reinforces the mutual

confider between manager and organization and should lead to better performance.

POWER AND POLITICAL STRUCTURE

But no organization can afford to accept success uncritically. The predicted outcomes may have arisen through circumstances entirely outside the control the organization — such as blind luck — and survival depends on recognizing that the current organizational structure is not necessarily the most effective efficient. Thus, structural appraisal and evaluation may lead the organization to propose changes to allow greater control or better decision making. But all change is a threat to established power structures, and where individuals have had responsibility and authority it can be difficult to make the change effective To that extent, all managements need to be aware of the political structure within the organization, so that the process of change can be steered through the matrix of entrenched self-interest. The political structure may map directly on to the formal decision-making structure, with power and influence controlled by the largest, the most productive or the most profitable departments. Sometimes the survival of power is an anachronism: the original managers of the first form of the organization retain influence, even though new parts of the business have long since outstripped them in performance terms. This inevitably means addressing the issues of the size of organization and its component elements. Empire building by one or two ambitious individuals can be a way of promoting rapid growth, but it does not necessarily lead to better management or to the right balance of activities.

FACTORS INFLUENCING ORGANIZATION STRUCTURE

Reflecting on the primary issues discussed in the previous paragraphs, we can identify a range of factors that will influence the structure of any organization. These include:

- the size of the organization: smaller organizations tend to have a less rigidly defined structure and fewer specialist functional units, and work on the basis that individuals or units may undertake a number of different functions or operations
- the nature of the product or service package provided, the methods used in its manufacture or provision and the means used to deliver, support and service the final consumers' needs
- the type of market in which the organization operates, the nature of consumer needs, and the types of competitive pressures encountered
- the strategy pursued, which will often determine the most appropriate structure for the organization. Growth through product or geographic diversification will usually require a structure based on common products and/or geographic areas, for example a European sales division or a special products division
- the nature of the environment and the rate at which key elements change, which may have to be reflected in the corporate structure: an organization faced with rapid change in its markets will need to develop systems which are equally responsive to changes in consumer preferences or in competitor strategies
- technological change will also influence the form of structure as the organization seeks to adapt to new products and/or manufacturing technologies and processes
- the history, background and previous developments in the organization, which will all influence the management's preference for a particular structure
- the style of management preferred, reflecting (for example) the degree of decentralization of authority and responsibility for decision making

- the power structure within the senior management, which will often provide an important barrier or stimulus to organizational change
- the culture of the organization: the organization's culture and structure are essentially interrelated, though the processes through which one influence the other are outside the scope of this present discussion.

It should be fairly evident from the nature of these factors that the range relative importance of each will vary from organization to organization. Indeed, each organization has a unique structure which may be said to reflect the unique set of influencing factors facing it. The management literature broadly accepts that there is no 'best structure' for all organizations and argues that a contingency approach is more appropriate for organizational design. At its simplest level, the contingency approach suggests that the appropriate design or structure for a particular organization should emerge as a response to the particular factors/issues facing the organization among those outlined in the previous paragraphs.

FORMAL AND INFORMAL ORGANIZATION STRUCTURE

Understanding the distinction between the formal and the informal organizational structure is essential, because it may have significant implications for the organization's information and communications systems.

The formal structure represents the agreed grouping and allocation of resources/activities, responsibilities and authority. In many respects, this structure will accommodate all the normal routine activities, linkages and processes in the organization outlined in Chapter

The informal structure represents a series of linkages or relationships between individuals or groups in the organization. The informal structure is unlikely to mirror the formal structure and evolves through workplace or social relationships and friendships, or through political associations within the organization.

A debate on the reasons for the development of informal structures and their implication for the organization is outside the scope of our present objectives. However, the informal organizational structure may represent an important element of the organization's total information and communications systems. One frequently hears reference to the speed or efficiency of the 'grapevine' in communicating information within an organization. Difficulties arise incorporating this element of the information system into any planned systems development, because the informal system is:

1. difficult to identify, as few members would admit to being part of an informal structure
2. transient and likely to change as members of the organization and their personal relationships change
3. only a partial system, catering primarily for the more sensational items of information as opposed to processing the more routine data
4. often inefficient in terms of the quality of the information communicated, as members in the communication channel may modify the basic data to suit their particular purposes
5. unpredictable in terms of when and how effectively it will operate in any situation — the absence of a particular member for a brief period may result in the total collapse of the system.

There are several reasons for not incorporating the Informal organization structure and its associated information system within the formal processes of information systems development. However, the fact that such systems exist in all organizations must be recognized and any implications should be reflected in the formal systems development process. Indeed, knowledge of the informal information system may aid the process by identifying possible problems or inefficiencies in the formal organization structure or information systems. Once the problems are identified, countermeasures may be devised which will lead to successful outcomes following implementation of the system.

ORGANIZATIONAL STRUCTURE AND INFORMATION SYSTEMS

Earlier in this and previous chapters we referred to the type and structure of the operations and activities undertaken within an organization. We distinguished between:

- different types of primary activities, for example inbound logistics or purchasing and marketing and sales activities
- these primary activities and the other commonly found support activities, such as management of human resources
- different levels of management activities: operational, tactical and strategic
- different types of management tasks within each of these broad activities (i.e. primary and support activities) and the different levels (i.e. operational, tactical and strategic).

These include the planning, decision-making, monitoring, evaluation and control tasks.

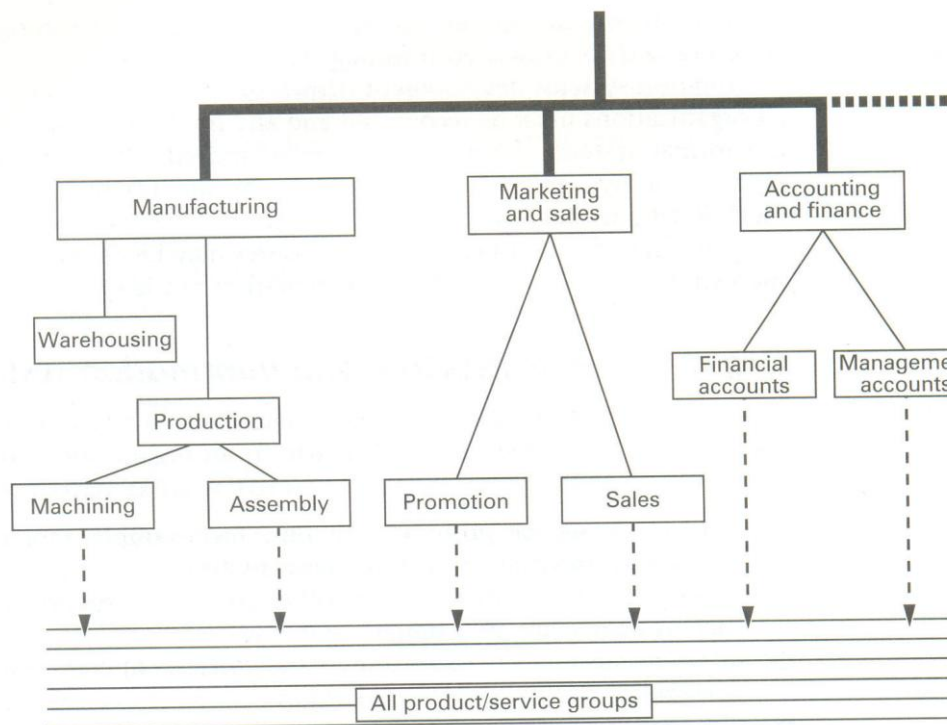
The generic models used in the earlier chapters were designed to illustrate these features and to show their implications for organizational information systems in general. However, each organization will develop a unique structure to undertake these activities and management tasks; the factors leading to this unique structure were outlined in the previous paragraphs.

There are a number of general principles or models which organizations use to guide the development of their particular organization structure. The following paragraphs outline two of these major models: the functional or line and staff model, and the matrix model. These two should suffice to illustrate the major implications for the organization's information systems.

FUNCTIONAL STRUCTURE

A simple model of a functionally structured organization is shown in Figure 3.7.

Key features of this form of structure include the following:



- The functional line activities and responsibilities are those directly associated with the manufacture of the product or the delivery of the service: handling receipt of raw materials, production operations, warehousing and distribution.
- The functional staff activities and responsibilities provide the specialist support to the line activities, such as financial services and human resource management services. These functions provide a service to the line functions, enabling them to conduct their operations effectively and efficiently. Some of these activities will be directed towards the customer (e.g. marketing, while others provide services to the organization as a whole (e.g. strategic planning).
- Implicit within this structure are the principles of hierarchy and division responsibility. The chain of command or authority rises vertically through successively higher levels within particular functions. Decisions of particular scale or disagreements between functions on particular decisions lower levels in the structure are resolved by referring the problem up the hierarchy of command to the appropriate level at which this may be resolved between the two functions.
- The division of responsibility means that a particular function has responsibility and authority to decide factors only within its sphere of responsibility. The marketing function may decide the appropriate means promote the product but, in general, it would have no influence over manufacturing methods used. In practice, this division of responsibility may not always be as evident as this might suggest, as the development personal relationships, working practices and the general culture of an organization may modify the outcome.

MATRIX ORGANIZATION STRUCTURE

The matrix type of organization structure provides an alternative form to the functional structure. A number of features are associated with the matrix form of structure:

- The organization is divided on two bases, as illustrated in Figure 3.8: a functional basis (e.g. marketing and manufacturing) and a product/service basis (where the components are often identified as separate business units or profit centres).
- Product/service units have responsibility for the total business operations, management and development of the specific range of products or services (including, for example, research and development, marketing, sales, manufacture, distribution and financial systems).
- The functional units contribute their specialist knowledge, skills and expertise to each of the business units as required. However, the functional resources are not owned by the product/service units but are in most cases hired by those units. The functional units have their own management structure with responsibilities for the management of all the staff and the services offered by the function.

MATRIX ORGANIZATION STRUCTURE

- The operation of a product/service unit involves a team of functional specialists, brought together to manage or develop the particular product or project. The composition of these teams may vary over time as the product passes through different stages in its life cycle, each one requiring different specialist inputs. Each functional unit will be involved simultaneously in a number of different products or projects and some individual members may also be involved in more than one project simultaneously.

The key advantage of this form of structure is that it can readily adapt to - demands, i.e. the development of new products or technologies, or the changing needs of existing products.

Other advantages claimed for the matrix structure are these:

- it is more efficient in allowing the exploitation of specialist functional resources
- employees have a more direct involvement and interest in particular products and hence are more motivated to achieve success
- it encourages a more market-oriented approach within each product/sent unit
- it improves communication and co-ordination between functions.

The matrix structure is also said to have a number of disadvantages, the more significant of which include the following:

- individuals experience personal problems, as they must often report to more than one manager, say, a functional manager and one or more product service managers
- co-ordination and communications across the total organization rather than within the particular product/service group may be less effective because the complex interrelationships of functions and product/service groups
- tensions may arise between the objectives and plans pursued by the product/service units and those pursued by the functional units.

We are not concerned here with an exhaustive evaluation of the alternative organization structures. Our aim is to use this discussion of the two alternatives

to clarify the structural issues that relate to planning improvements to information systems within the given structure.

THE EFFECT OF ORGANIZATIONAL STRUCTURE ON THE INFORMATION SYSTEM

The primary objective of any information system must be to provide an effective and efficient support service to all its users. To achieve this, the system should be

- capable of acting independently of the specific organizational structure at any particular point in time
- adaptable to the changing structure of the organization
- flexible enough to meet the changing needs of the organization
- independent of the organization's power structure.

Let us consider these four desirable attributes in more detail.

INDEPENDENT OPERATION

If the information system is tied too closely to the structure, local needs may be satisfied but organization-wide demands may be met less effectively. For example, the information system that is tailored to meet the structure and needs of the marketing function may prove less effective in providing the same data to other users elsewhere in the organization. On the other hand, there is considerable evidence to show that uncontrolled systems development often results in fragmented systems provision for each element in the organization, involving considerable duplication of effort and resources. So the development

of an effective system for the total organization's needs may require compromises in terms of meeting the needs of specific functions or users.

ADAPTABILITY TO CHANGE

Our earlier discussion of the functional and matrix organization structures highlighted the need for greater responsiveness from the information system in a matrix organization as new products/services emerge, the composition of existing teams alters or their information requirements change.

FLEXIBILITY

In the matrix structure, different business units may have differing information needs, reflecting the problems faced by the particular business at its stage of development. Thus, the provision of a standardized system to all product or service groups may prove totally inappropriate.

INDEPENDENCE FROM THE POWER STRUCTURE

The power structure may seek to influence the information system structure on the basis that exclusive knowledge of certain types of information provides the possessor with a degree of power. If the information system is used in this way, it will lose credibility with the other users or suppliers of data to the system.

Changes in strategy and, hence, in information needs may occur in advance of any significant changes in the structure of the organization. Research studies have established that changes in the strategy of an organization usually take

place before any change in the organizational structure. Indeed, organizations may seek to maintain their present structure for a number of years following a significant change in strategy, before being compelled to change the structure to ensure the effective management of the new strategy. The information system needs to adapt to the changing needs of the management as strategies change and the information to monitor and control these new strategies changes. Tying the information system too closely to the structure rather than to the needs of different levels of management would result in a failure to meet the objectives of the information system in any organization.

THE INFORMATION REQUIRED

Up to this point, we have assumed that the primary information requirements are to permit the organization to monitor and control the way in which its processing

systems work together to meet the demands of the external environment. Thus production must supply sufficient stock so that the sales force can confidently locate buyers and thereby generate revenue. The data required to build up a picture of these processes are limited in their potential information content. So when the production department supplies data on the number of units manufactured in each time period, the following data from a series of key questions would also be desirable:

1. Costing data. What volume of raw materials and consumables was used and what was the level of wastage? How many effort-hours were required to

produce the given level of output? What is the value of capital resource tied up in the plant and equipment used for this output?

2. Scheduling and production data. What is the percentage of productive capacity utilization, i.e. what is the level of plant and equipment reliability? How frequently does it break down? How long does it take to restore production? How long does it take to retool between different production runs? What are the shift arrangements? What is the accident record? Is there any record of sabotage?

3 Personnel data. What is the absenteeism record? In comparing the different manufacturing processes, where the equipment is comparable, are there significant differences in the output performance per man-hour? Are the staff prepared to work overtime? Are the staff prepared to engage in further training

4. Predictive data based on what if? questions. If particular work practices were modified, what would output be? If the scheduling was changed, would retooling times be reduced? If parts of the equipment were upgraded, what would output be?

Analysing these data would make it possible to draw a variety of conclusions.; Thus, it might appear that there is a high absenteeism rate in certain areas production. The plant may be old and temperamental, the wastage rates high and staff morale low. Improving the production environment and upgrading the equipment may provide an opportunity to improve performance. Should the plant be new, it is obvious that there may be a problem in training, or that the design of the human machine interface is defective. If it appears that either situation has been going on for some time, why have none of the operational or managerial level staff pressed for change?

Thus, the data may supply hard information in terms of real numbers which, can be processed or analysed. The data may also permit soft information to be inferred or deduced. This latter category is all the more important when a self critical appraisal of organizational structure is called for. Power brokers who play the political game will not freely give information showing man's inadequacy. The information requirement should therefore be specified to extract information which is either:

- evidential — positive data on actual performance; or
- inferential — data allowing the organization to appraise performance indirectly, for example through failure to supply evidence of performance or to take action, and so on.

By using both sets of data together, an information picture of the organizational structure can be built up which should reveal those issues which justify further examination by more direct methods of investigation.

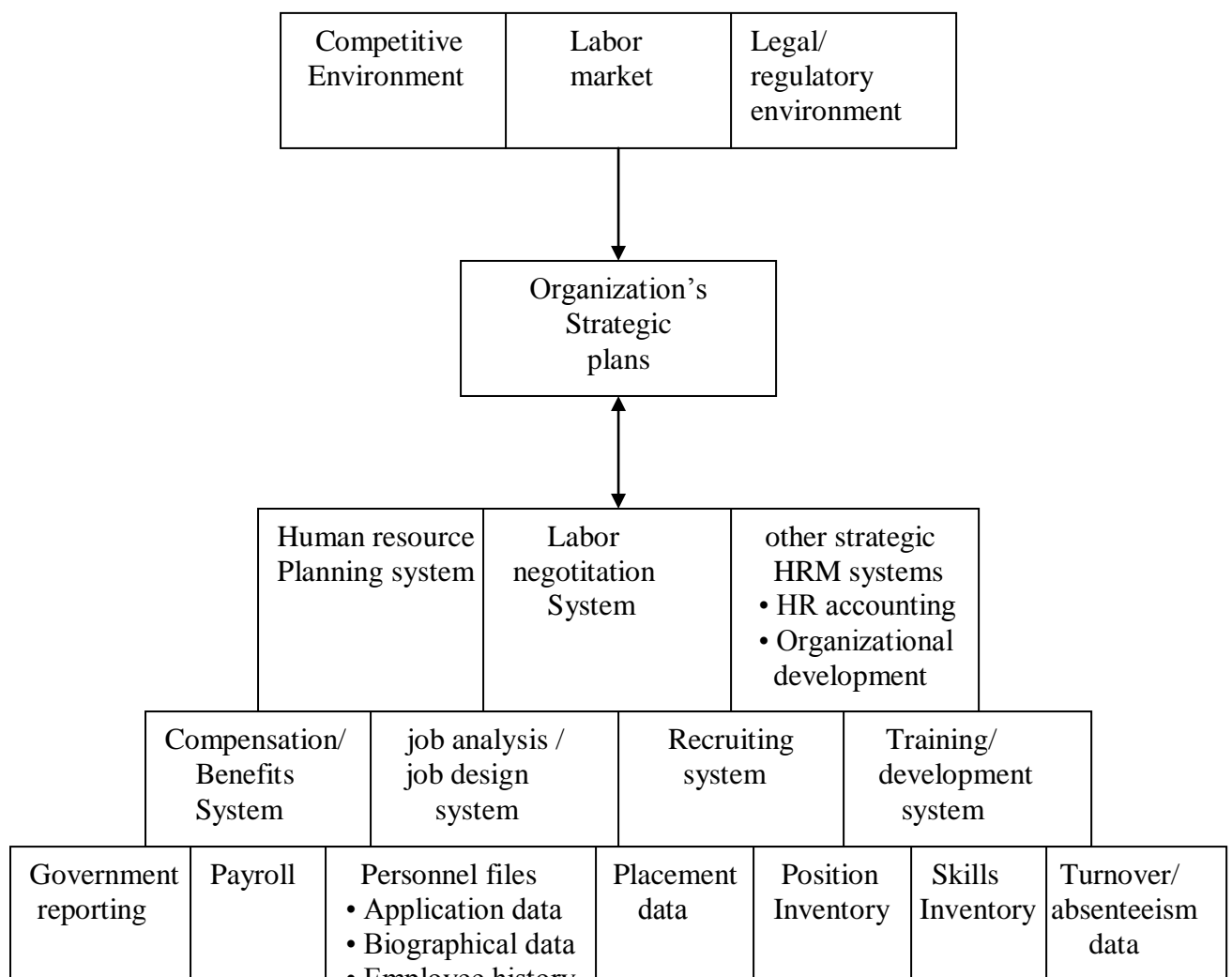
ANALYTICAL FRAME WORK OF HUMAN RESOURCE INFORMATION SYSTEMS (HRIS)

In most organizations, the human resource/personnel management area is a staff function that supports the activities of the firm's line subunits. The functions carried out by personnel administrators and other human resource managers usually impact all of the other functional areas of an organization.

Today, most organizations recognize their employees as their most important (and often most expensive) resource. Because of the changing structures in the U.S., the internationalization of many businesses, and an increasing

preponderance of federal, state, and local laws and regulations, the management of human resources is now much more complex than it was in the past.

Human resources managers or personnel administrators are typically responsible for human resource planning, staffing (recruiting, hiring, and placement), training and development, performance appraisal, and termination (for example, firing and outplacement) activities. They may also be responsible for developing the salary structure and benefit package for the organization, negotiating with unions, and ensuring compliance with EEO/AA (Equal Employment Opportunity/Affirmative Action) and OSHA (Occupational Safety and Health Administration) laws and regulations.



A Computer - based HRIS can help personnel/human resource management become more effective in keeping employee records and in pro ‘. It can also help organizations plan for the future by enabling staffing estimates and human resource plans that support the Figure Examples of human resources management (HAM) functions supported resources information systems (HAIS).

**TYPES OF SOFTWARE AVAILABLE TO SUPPORT HRM
ACTIVITIES**

Applicant tracking	Immigration reform
Attendance management	Job analysis
Benefits administration	Job description
Career development	Payroll
Compensation administration administration	Pension and profit-sharing
Compliance with Americans improvement/planning with Disabilities Act	Performance
Computer-based training	Performance monitoring
Data and survey analysis	Relocation software
Employee Assistance Administration Program	Stress management
Employee communications services	Substance abuse
Employee manuals and handbooks	Succession planning
Employment recruitment and assessment	Temporary services management
Equal Employment Opportunity/	Training administration and

Affirmative Action

Turnover analysis

Flexible benefits administration

Wellness programs

Human resources forecasting/planning

organization's strategic initiatives and tactical plans. Because of this, continual enhancements in available software support and external databases are likely.

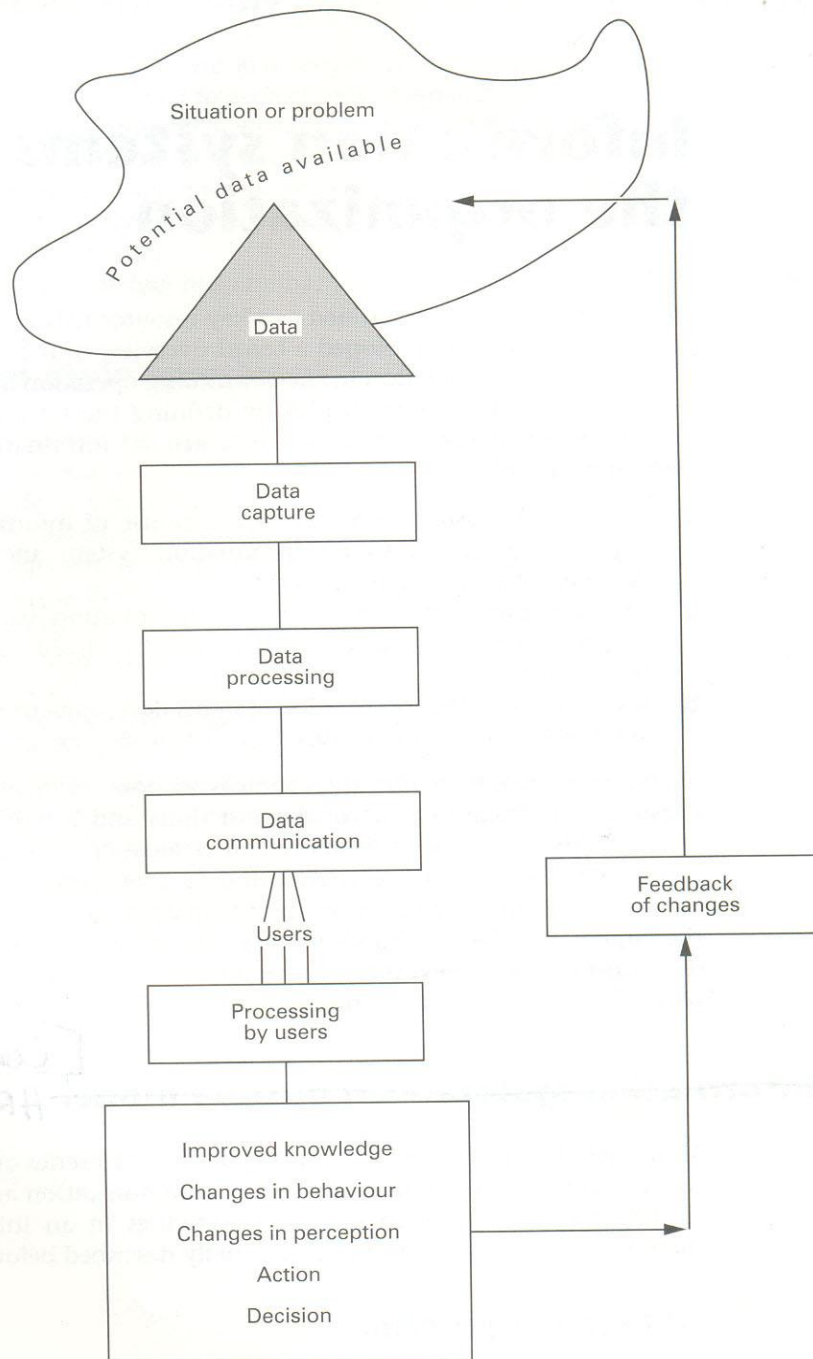
COIMBINATION OF HRM AND ITES

An information system maybe broadly defined as a series of interrelated activities concerned with the capture, processing, communication and conversion of data to information. The main groups of activities in an information system are shown in Figure 2.1 overleaf and are briefly described below.

SITUATION OR PROBLEM

An information system is typically concerned with providing data on a particular situation or problem of concern to the user or organization. Some systems will be

permanent systems, continuously and regularly collecting data relating to a particular situation: a sales order processing system, for example, will continually provide data on the organization's sales. Other systems, transient systems, may be established in response to particular needs of the organization or its users and will continue to operate only while that need remains, for example the collection of data on the effects of a disruption in the supply of key components due to an industrial dispute at the primary supplier.



THE INFORMATION SYSTEM : AN OUTLINE MODEL

A transient system may often be established on the basis of data provided by the permanent information system, which identifies a particular problem requiring more detailed data and investigation before a solution can be found. In many respects, it would be preferable to design a system which already contained all the necessary data for particular problems that arise. However, it is clearly not possible for an organization to identify in advance all the problems it is likely to face.

DATA

As we saw earlier, any situation will contain a wealth of data varying in its relevance to the user's particular needs and situation. An important element in the design of information systems is establishing clearly what the data needs are for each user and designing the system to segregate the most relevant data from the less relevant or the wholly irrelevant.

DATA CAPTURE

The term 'data capture' covers the processes of finding the relevant data, recording it and converting it into a suitable form for further processing and eventual communication to the user. For example, a doctor seeking to diagnose a patient's illness uses a variety of devices to measure and identify the symptoms: a thermometer, a sphygmomanometer (for blood pressure readings), and so on. The measurements are then converted to numeric values for further processing. Clearly, the quality of the measuring devices and the conversion processes used are crucial both to the quality of the data provided and to the consequent diagnoses and remedial actions. This is equally true in

organizations, where the problems of measurement and diagnosis are often as complex as those facing the medical practitioner

PROCESSING

This term encapsulates a range of actions which may be performed on the data to improve its usefulness to the users. These actions could include:

- summarizing — reducing the level of detail
- arranging or sorting into a more appropriate order — say, alphabetically or in order of size
- storing — collecting the data until an appropriate volume has been acquired prior to transmission to the user
- calculating — performing numerical calculations on the data, or converting them into more usable units — for example converting weights of inputs into monetary values
- selecting — providing only those data items or events which meet a particular requirement, such as details of all financial transactions exceeding £10,000.

COMMUNICATIONS

Communicating the processed data to the user is only part of the overall communications process within the system, as communications are effectively taking place between each stage identified in the diagram. However, communication with users is the area that can be most clearly identified in practice. It may be carried out by any of the human senses of sight, hearing, touch or smell, or a simultaneous combination of these senses. The more usual forms of communication are visual and aural, as these senses are more fully

developed and responsive in most individuals. However, individuals suffering sight or hearing handicaps often develop very responsive alternative senses to compensate for their loss.

USERS

Users are themselves a critical element in the overall information system. Not only are they the primary focus of the data processing activities outlined above, but they are the essential ingredient which converts data to information and information to action through the knowledge, understanding and skills which they bring to bear on the data provided. It is only at the level of the user that the information system actually provides benefit or value to the organization: prior to this the data processing has only been incurring costs.

USER PROCESSING

The users in any information system will themselves conduct further processing of the information received. In some cases, they will undertake the kind of processing activities that we outlined above: primary processing, i.e. calculating, sorting, selecting, and so on. In other cases, the processing activities will be related more to interpretation, application to the specific circumstances, judgement and reasoning: these can be termed secondary processing. A good information system ought to minimize the amount of primary information processing that users are required to undertake, allowing them to devote their skills and time to the secondary level. Developments in the field of so-called 'expert systems' are beginning to provide valuable support from the information

system for this second level of user processing, particularly in situations where users apply a logical sequence of rules or procedures in arriving at their decisions.

OUTCOMES

The end product of any information system must be represented in some form of outcome. The range of outcomes will vary and may include:

- actions or decisions
- change in a situation, or change in either individual or group behaviour
- improved knowledge and understanding
- a change in the users' perception of a situation.

Ideally, the value of an information system ought to be measured in terms of the value of these outcomes. However, it is difficult to quantify the benefits derived from improved knowledge and understanding: such intangible improvements may not appear to provide any immediate economic advantage but may be evidenced only by implication, through improved performance in future time periods.

FEEDBACK

In situations where the outcome of the information system is a specific action or decision, the user requires some means of assessing the effectiveness of the action or decision taken. This is achieved through the monitoring function of the information system, which feeds the results back to the user. This feedback activity provides the necessary loop back to the start of the outline model of the information system. The sequence of stages is continually repeated with the

capture, processing and communication of further data through the system, reflecting the changing situation and problems facing the organization and its users.

INFORMATION SYSTEMS DEVELOPMENT MODEL

INFORMATION SYSTEMS DEVELOPMENT MODEL

MARKET-LED

The primary purpose of any organization is to meet the needs of its market or clients. This applies both to profit-orientated and to not-for-profit-orientated organizations. The broad aim of all management is to optimize organization structure, resources and operations to achieve effectiveness and efficiency meeting market needs and in satisfying corporate purposes and objectives. The primary function of an information system in this context is to support I organization, its management and employees in meeting this broad aim.

It is important to note at this stage that the strategic development of information systems should be primarily dictated by the needs of the market, I organization's objectives and the requirements of users within the organization. The systems development strategy should not be dictated by developments in the information technologies themselves, as such developments may not be content with the needs of the market, the organization or its users. Many organizations have based their systems development strategies on current technological developments, only to find that they have performed less effectively and efficiently. In many cases this is because the technology has

been in advance of the capacity of the organization or its users to employ or apply the latest facilities effectively.

NON-INTEGRATED RESOURCES AND PROCESSES

An organization essentially comprises a series of resources, processes and structures:

- resources: finance, people, land, buildings, equipment, raw materials, and technical and professional services
- processes: a range of activities (classified in the previous chapter as primary and support activities) encompassing the production operations, decision making, planning and control. Organizations have developed a battery of procedures, tools and techniques to assist in these activities and in the general management of the processes and resources involved
- structures: organizations also develop a variety of structures to improve the effectiveness and efficiency of resource utilization and management of the processes. The more obvious of such structures are the division of the organization into specialist functions — marketing, finance, production, and so on, each responsible for managing particular aspects of the organization's resources and processes. Such structures may take a number of different forms, as we shall show in detail later in this chapter.

The key elements from these groups in terms of information systems development are:

- the needs of the primary and support activities
- the resources available: people, data, and so on
- management, control and decision-making requirements
- the information systems and the technology available.

INITIAL INTEGRATION PROCESSES

The initial stages in achieving organizational integration involve the development and design of the organization's information systems.

1. Identification and evaluation. Analysis of the organization's information requirements is the first stage in the integration process. It is important that this process is focused on the actual requirements of individual users or groups of users, as opposed to merely assessing their likely requirements. Indeed, the whole process of systems development needs to be orientated towards user requirements from the outset and should actively involve users in the overall process. This links to the key areas identified in the previous paragraph of understanding the needs of primary and support activities, management and control requirements, and the people in the organization.

2. Systems development. Generally, the systems development process is concerned with matching user requirements with the potential of the technology and the data available in the most effective and efficient manner possible.

3. Implementation, evaluation and follow-up. The inclusion of this stage in the integration process recognizes two priorities: the importance of the initial implementation of an information system or sub-system, and the need to continually review the effectiveness of the system once it is operational. In Chapter 1 we highlighted the dynamic nature of the environment in which organizations operate. In this situation it is likely that the issues and problems faced by the organization and its members will be subject to a process of continual change, resulting in changing information requirements.

4. Systems life cycle (SLC). The process of change in the situation, issues and problems facing the organization also suggests that an information system will

only have a limited life cycle. The SLC concept (discussed in detail in Chapter 8) reflects this aspect, suggesting that the value of the contribution made by an information system will change as time progresses and the organizational situation changes.

5. Facilitating integration. The development of information and communication systems within an organization provides the potential to achieve integration. These facilities create the opportunity for the effective exchange and flow of information between users and between the organization and its environment.

6. Managing integration. While such information and communication systems development facilitates integration, the realization of this potential requires that these systems are effectively managed. There is hence an important functional responsibility for the overall planning, development, co-ordination and maintenance of the systems. This relates not only to computer facilities and software but to the overall management of organizational data and information flows, to system security and to the training and support of users.

THE INTEGRATED ORGANIZATION

The outcome of the integration process based on information systems development will be an integrated organization, in which:

- problems and issues are identified at an early stage
- decisions can be taken quickly and effectively on the basis of high-quality information
- relevant information may be accessed easily and quickly to analyse decisions and decision-makers have the necessary decision support tools for this analysis
- effective communications structure permits the involvement of all appropriate people in the decision-making process
- decisions are communicated quickly and effectively in terms of new policies, guidelines, etc., allowing speedy responses to problems

- activities in diverse parts of the organization are co-ordinated more effectively with each other
- the organization is receptive and responsive to change: new systems, processes and structures may be developed and implemented rapidly and effectively in response to changing needs
- performance measurement systems are sufficiently responsive and accurate to identify early deviations from planned performance levels or objectives.

The key to achieving an integrated organization is effective information systems development, supported by continuing maintenance and sympathetic management. The achievement of this objective requires support and commitment from all members of the organization.

AN INTEGRATED VIEW OF HRIS

We now come to consider decision making in general terms, incorporating all the types and levels of decision in the organization.

The importance of information to the decision-making process cannot be overstated. Indeed, 'The entire decision-making process can be viewed as the acquisition and processing of information' (MacCrimmon, 1977). For these purposes, the term decision may be defined in a number of different ways, often reflecting the situation in which the decision is taking place. However, a broad definition of the term for the purposes of our current discussion would be:

A decision is a process or a sequence of activities undertaken by an individual or groups with a view to establishing and implementing a solution to an existing or potential problem.

Three features of this definition are worth stressing:

1 decision making is a process or a sequence of activities which will not always take place in a continuous or uninterrupted fashion

2 the taking of decisions is both an individual and a group activity, with the latter likely to be more common in most organizations

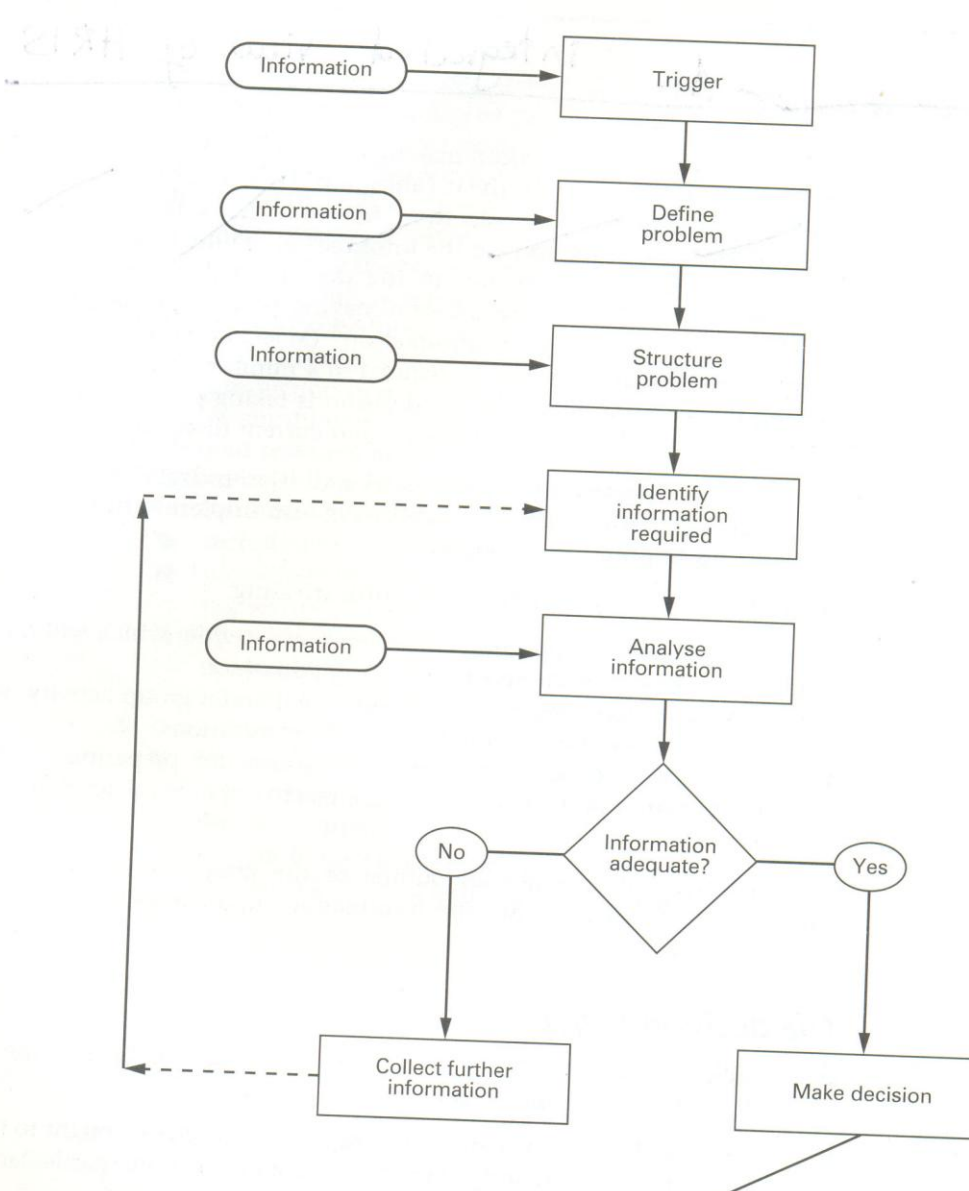
3 decisions may be taken in a proactive stance for preparing solutions to potential future problems, as well as a reactive stance for resolving existing problems.

Figure 2.5 overleaf provides an outline of the main stages in the decision-making process and identifies the information inputs associated with each of them.

THE DECISION TRIGGER

Every decision process requires some factor to trigger or initiate the process. Data/information is the most likely trigger. For example:

- information identifying defects in components purchased ought to trigger an examination of the quality standards maintained by the particular supplier and might lead to a decision to change suppliers
- information revealing increasingly high stock levels of certain finished goods may trigger an evaluation of market demands and production levels for the product, leading to future changes in pricing, promotional or production policies
- information on future changes may also initiate the decision process. Thus, a proposal to change the technology used to produce the organization's products may require decisions on financing the capital investment, on amending the marketing policies to reflect the modernization of plant and/or product, and on training the staff who will be associated with the new technology implementation.



- Planning
- Implementation
- Performance monitoring
- Performance evaluation

STAGES IN THE DECISION-MAKING PROCESS

PROBLEM DEFINITION

Having initiated the decision-making process, we may then need to define the cause of the problem. The important issue at this stage is to differentiate between cause and effect. While decision-makers may be only too aware of the effect of particular problems on the running of the organization, the effectiveness of their proposed solution will depend on how well they have identified and understood the root causal factors. For example, a reduction in the level of sales revenue may be caused by any number of factors, including changes in the total size of the market, changing consumer needs, competitors' actions influencing both price and quantity of sales, and an increase in customer dissatisfaction due to poor-quality products or support services.

The problems encountered in practice are typically complex, in the sense that there are usually several causal factors involved. Further, each factor is likely to interact with one or more of the others, making the effects of any individual factor difficult to assess. Time is also a vital variable, as the importance of individual factors may vary as the organization's situation changes. Thus, even as the decision-maker is defining the current problem, the nature of the problem may itself be changing owing to changes in the external environment. In the sales revenue example we gave earlier, the primary causal factors may have been established as the competitors' pricing policies and customer dissatisfaction with quality standards. Competitors' lower prices alone would

have some effect on sales revenues, but when these are combined with customer dissatisfaction the reduction in sales may be considerably greater than if the quality standards were high. Continual changes in competitors' prices will result in a dynamic as well as a complex problem situation. In these situations, decision-makers not only need the initial information to establish the relevant causal factors but require this information continually updated to reflect changes in the problem situation.

PROBLEM STRUCTURING

Defining the problem in terms of the primary causal factors provides the basis on which to structure the problem. This may take the form of constructing a model of the problem, highlighting the important dimensions, the scope of the analysis required and the possible types of solution. Continuing the sales revenue example above, and assuming that the problem is defined primarily as competitors' actions, we may structure the problem in terms of:

- which competitors to consider
- the parts of their activities which have some relevance to the problem
- the markets and products involved.

Once this has been done, it becomes easier to make decisions as to which techniques and tools are appropriate for analysing and resolving the situation. Two fundamental issues arise at this point.

MODELS

The term model as used in the context of problem structuring may be defined in a number of ways:

1 The physical model: a two-dimensional or three-dimensional drawing physical representation of the decision problem, for example a graph showing the sales revenues of competitors in the market over the last three years or a model of a proposed plant layout incorporating new technology features.

2 The symbolic model: a representation of the problem situation using symbols, equations or mathematical formulae. An example is the use of regression analysis methods to identify and express the trends in sales revenue.

3 The conceptual model: a representation of the situation in a less specific form, often in the mind of the decision-maker, and exploiting the available knowledge and experience of those involved. For example, the previous experience of the decision-maker may suggest the most likely reactions of the competitors to changes in price or to promotional activities undertaken by the organization. This experience may be difficult to capture in either a physical or symbolic type of model. However, as you will see later, many the developments in supporting decision-makers are increasingly focusing on methods to capture and represent such models in a form suitable for analytical appraisal. Advances in spreadsheet software packages have provided one such vehicle for these developments.

OBJECTIVES

A vital element in structuring the problem situation is a clear and explicit understanding of the objectives which the decision is seeking to achieve. The objectives may be expressed in a number of different ways for a given decision situation. For example, in the declining sales revenue case referred to earlier, the objectives may be expressed as:

- to prevent any further decline in sales revenue
- to redress the decline in sales revenue to previous levels
- to achieve a 5% increase on the previous levels of sales prior to the decline.

Each of these objectives may be further qualified in terms of, say, the requirement that the objective should be achieved without any reduction in the profit margins per unit, or within the current sales and marketing budgets. The objectives thus not only determine the broad parameters of the potential solutions and the criteria against which each potential solution should be judged but also indicate the type and quality of information required and the depth of analysis which must be performed to verify which of the proposed solutions is most likely to succeed.

INFORMATION REQUIREMENTS

The major by-product from the structuring of the problem is the identification (at least initially) of:

- the information required to analyse those aspects or dimensions of the problem that are seen as important
- the information required to evaluate possible alternative solutions to the situation.

To continue our sales revenue example, the decision-maker may identify the initial information required as:

- the sales patterns for the product over the last two years
- the market shares of the organization and of each major competitor
- the organization's pricing levels over this period
- the prices of, say, the three major competitors' products over a similar period
- the cost structure of the product and the resulting profit margins.

The key factor in this identification process is the definition of the type and quality of information that will be required to support the decision making. There are many possible dimensions to information quality, including variables such as the level of detail and the degree of accuracy and reliability in the initial data. In certain cases, detailed and accurate costs and other financial information may be required to support decisions on changes to product pricing structures, while in other cases broad estimates of costs and margins may prove sufficient. This aspect of the different qualitative dimensions of the information required for different decisions will be outlined in Chapter 3.

INFORMATION ANALYSIS

The analysis of the information specified is undertaken by the decision-maker. It will involve both quantitative and qualitative approaches.

Quantitative approaches may include statistical methods such as graphical trend plotting, regression analysis or correlation analysis. This process need not be automated, and the analysis may involve a series of manual data processing activities including the sorting, coding, selection and summarizing of the data available. Following this analysis, the decision-maker may apply predetermined criteria in evaluating the situation and/or undertake some degree of subjective evaluation of the results produced in relation to the situation.

ADEQUACY OF INFORMATION

An integral part of the process is an evaluation by those involved in taking the decision as to whether or not the information presently available is adequate to enable the decision to be made. If the decision-makers consider that the information is inadequate, they will specify the further information required and

arrange for its collection and subsequent analysis. This is represented by the loop (the dotted line) in Figure 2.5. Requests for further information may be the result of one or more of the following:

1. identifying a lack of data concerning certain dimensions of the problem. This may be due to poor initial problem specification, to inadequate information collection or to the subsequent appreciation of the importance of particular factors
2. the poor quality of the Information provided — an issue addressed more fully later in this chapter
3. recognizing the need to search for further information to support and confirm a tentative decision already taken
4. a deliberate action to delay the decision and its implementation pending reassessment of potential reactions internally and externally. This may involve the decision-makers in requesting additional information that is unlikely to influence the decision taken to any significant extent.

This assessment of whether the available information is adequate should also be considered in cost—benefit terms. The decision-makers should assess the likely costs and the feasibility of collecting further information against the potential benefits arising from the above list. However, it is most unlikely in practice that the decision-makers will ever achieve the state in which there is perfect information about all the relevant dimensions of the problem situation. The primary difficulty in practice is that the greater the level of information quality specific: by the decision-maker, the greater the cost of producing it is likely to be. When it comes to justifying this high level of cost, it will be recognized that it is difficult to assess the potential benefits of the additional information. Decision-making commonly make subjective approximations, asserting that the additional information may be useful. But it will usually be impossible to

quantify this value of usefulness in advance, and it may not even be possible to do so after receiving the information. The reason for this difficulty is that additional information will probably only have a marginal effect, often doing no more than providing confirmation of the decision already taken. So, while it may be argued that decision-makers ought to continue to collect and additional information until the marginal benefit derived from the last item of information received equates to the cost of providing that information, decision-makers are in practice unable to achieve this through their inability to quantify the marginal costs and benefits.

DECISION TAKING

At some stage in this process, the decision-maker will proceed to the decision taking stage. Arrival at this moment may be at the natural conclusion of an exhaustive analytical process, or it may be more premature. Decisions are often hurried because:

- a deadline has been set, or the decision-maker is reacting to other less form time pressures which make it expedient to produce a solution, even though it is known to be less than perfect
- there may be no further information or analytical methods easily available
- the decision-maker may be too tired to continue
- more pressing problems may require attention.

Sadly, in these more competitive times, the premature rather than the exhaustive response is likely to be the norm in practical business. The concluding decisions are taken because it is considered inexpedient and uneconomic to take no decision. They may be a positive response in terms of a particular action proposed, or a more negative or passive response, by deciding not to take any action.

In summary, information contributes to the decision-making process as:

- a trigger to initiate the process
- a resource to facilitate the definition and structuring of the problem situation
- a resource to aid the evaluation of the proposed decision
- a vehicle to communicate the decision to others and to provide a basis for implementing the decision
- a bask for feeding back the results of a decision to facilitate performance monitoring and control during the implementation and subsequent running of the planned responses.

PROGRAMMABLE AND NON-PROGRAMMABLE DECISIONS

A further distinction has important implications for an organization's information requirements. Decisions may be classified as either programmable, highly structured decisions, or non-programmable, highly unstructured decisions. In the case of programmable decisions, the problem situations are generally predictable and so the decision-making activities of problem definition, structuring, analysis and resolution may be specified or programmed in advance. The solution will normally depend on the application of algorithms. Programmable decisions are usually those which:

- occur relatively frequently
- require the consideration of only a few factors which may be incorporated in a predetermined structure
- display relatively simple interrelationships between the various factors
- have a limited and predictable range of possible solutions

- have decision criteria that may be explicitly stated and easily applied to selecting the most appropriate solution from the limited range.

Examples of programmable decisions include:

- the credit rating of new customers
- quality control inspection
- equipment maintenance
- delivery scheduling.

If the organization is able to develop suitable algorithms (i.e. formalistic rules for each general decision-making situation, the information requirements will be readily identifiable in advance and, given the frequency with which such decisions are likely to occur, the organization would probably incorporate the collection of the necessary information as part of the routine transaction information system outlined earlier in this chapter. An alternative term for programmable decisions is routine decisions.

Non-programmable decisions are usually less routine and less predictable in at least one of the stages of the decision process. They may, for example, require novel approaches to defining, structuring or analysing the problem situation, require the decision-maker to develop and formulate the criteria to be used selecting the best solution strategy. This involves the application of heuristics (system of making choices using non-linear methods). Examples of such decisions include:

- fixing the pricing policy for a new product
- selecting the best location for a new warehouse and distribution outlet

- evaluating a proposal to acquire another organization to provide the capacity to expand market share and production capacity.

Each of these decisions will have one or more unique features: for exam the prospective sites for creating a new warehouse will all have different attributes, some of which, on investigation, will prove to be advantageous, others disadvantageous. Although it would be possible to lay down general information requirement guidelines in advance, the decision-makers are only able to specify the actual information requirements for each decision when the preliminary problem analysis has taken place. This means that the information system must have a degree of flexibility in its design and operation to enable it to respond to the variable information demands of the non-programmable decisions. An alternative term for non-programmable decisions is non-rol decisions.

This distinction between programmable and non-programmable decisions and their information requirements will be developed in Chapter 3.

PLANNING AND IMPLEMENTATION

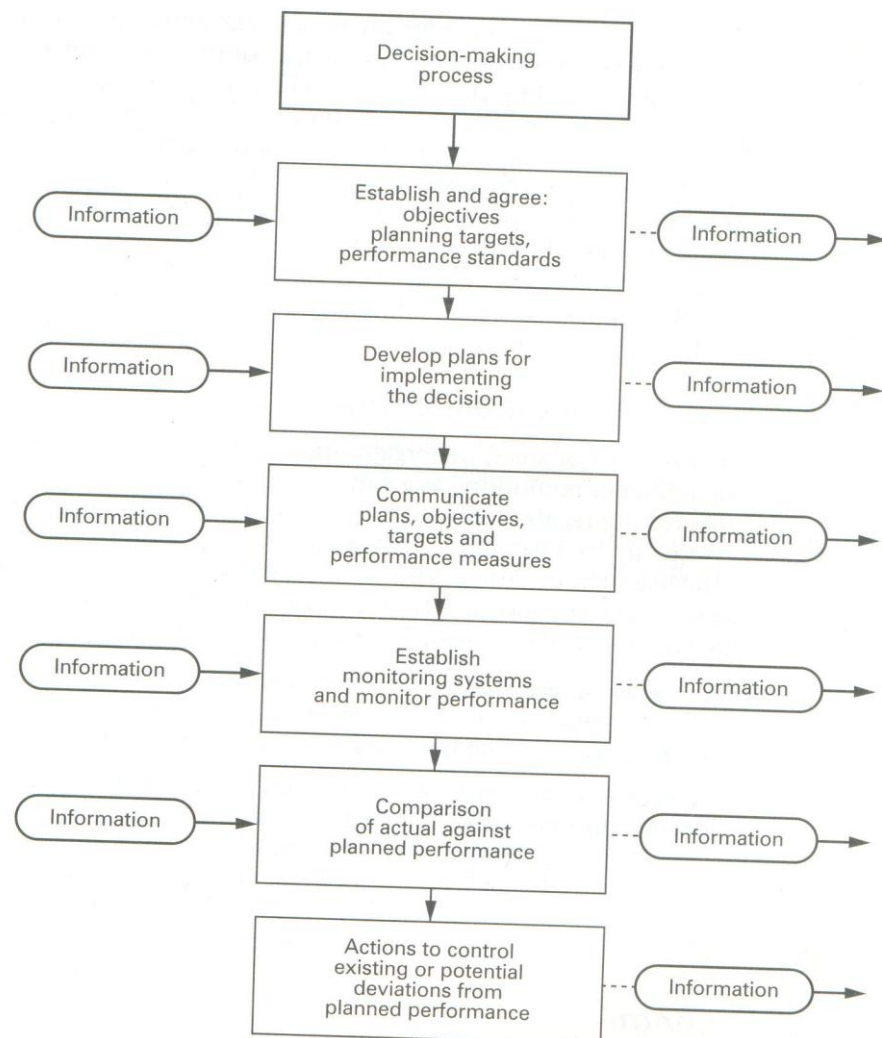
Having selected what appears to be the appropriate solution strategy for particular problem situation, we approach the next stage in the decision process planning and implementing the necessary steps to make the decision effective. Figure 2.6 illustrates the main stages in this planning and implementation phase.

Planning involves:

- determining the sequence (logical or otherwise) of action and/or inction which will be required
- establishing the dates or times required for the completion of each step in plan

- estimating the resources which will be required for, and the durations of, the individual steps
- scheduling the programme of necessary activities.

Although planning and implementation are concerned with the detail of putting a decision into practice, the process itself incorporates a series of second-order decisions involving, for example, establishing priorities of resource usage with the organization as a whole and making commercial judgements as to the timing of the implementation. A more detailed treatment of the issues and methods involved is provided in a later discussion of project management.



STAGES IN PLANNING, IMPLEMENTATION AND CONTROL

PERFORMANCE MEASUREMENT, EVALUATION, MONITORING AND CONTROL

The final stage in the decision-making process, as illustrated in Figure 2.6, involves measuring the levels of performance achieved against those set as the justification for the project in the decision-making and planning stages. The measurement of actual performance against planned or budgeted performance is a fairly common technique which is used in most of the standard planning approaches. Performance measures may include timescales, target completion dates, resource usage, costs incurred, or other similar measures of efficiency and effectiveness. The original decision-maker, or those subsequently responsible and accountable for implementing the decision, will continuously monitor the performance levels achieved both during the implementation phase and in its initial and subsequent operation. For these purposes, the monitoring may be directed towards the assessment of both effectiveness and efficiency. Since commercial organizations depend on the efficiency of their systems to maintain or enhance profitability, a considerable proportion of any organization's information processing activities is necessarily devoted to supporting performance measurement and monitoring. These activities may be related either to specific projects or to the ongoing operations of the primary and support activities.

PERFORMANCE MONITORING

In a number of areas, the organization will incorporate a continuous process at performance monitoring as a part of the transaction processing system. This may involve the regular recording of costs, revenues, time spent, resources used, and so on, in its operations. A prerequisite of performance measurement is the establishment of clearly defined objectives or targets which can be related to the desired performance levels as the key parameters (for example, profit level budgets or standard costs). These may be established follows:

- 1 the actual levels of performance required will be explicitly stated
- 2 some minimum acceptable levels of performance may be indicated
- 3 the targets may be implicit rather than explicitly stated.

Irrespective of the method adopted for setting performance requirements, the information received will be used to indicate whether performance is adhering to planned targets or deviating from those targets. The scale of any deviation detected will influence both the degree of urgency perceived necessary and the scope of any corrective action to keep the operation under control — that is, within the planned performance parameters.

CONTROL

The control process is a consequence of performance monitoring and involves taking actions either to prevent anticipated deviations from planned performance or to correct deviations after they have occurred. Control will

encompass decision-making elements together with planning elements, and may involve:

- applying corrective action to existing operations or to stages in the planned implementation
- modifying future plans to reflect changes in present circumstances or current performance levels
- re-appraising objectives and performance targets in the light of current performance.

REACTIVE AND PROACTIVE APPROACHES

It is important to recognize the distinction between the reactive and the proactive approaches to control, as these have differing implications for the organization's information system.

In the former approach, the organization's management responds to existing deviations from the planned activities or performance levels. Managers will act to correct the deviations, or to prevent those deviations from damaging the future interests of the organization.

In the proactive approach, management consciously explores the potential sources of future deviations with a view to instituting the necessary avoidance or damage limitation measures in advance. The implications for the information system of a proactive approach are that the information requirements will be oriented more to future events, and the decision support tools and software will be directed more towards forecasting, model building and sensitivity analysis, providing the management with assessments which will help to answer the what if? type of question.

Reactive approaches will rely more heavily on historical data, although, again, the management will require decision support tools to underpin the analysis of alternative solutions and their implications.

It is likely that both approaches will co-exist in most organizations. This reflects the fact that the development of paranoia in management is not a viable strategy:

if an organization continually plans on the basis of the worst possible case and seeks to predict ever potential deviation in advance, a substantial amount of redundant activity and expenditure will be achieved. Responsible management acknowledges that the organization must be able to respond flexibly to existing, realistically predictable and unpredicted problems. The result is that the emphasis in management development and training is moving strongly towards the need to adopt a more proactive approach, and this trend is being increasingly supported and facilitated by developments in information technologies.

The ability to control a situation depends largely on the receipt of timely and good-quality performance information. Should symptoms of the deviation from planned or anticipated performance targets not be clearly signalled in time, the necessary trigger to initiate the decision-making activities within the control process will not arise. One of the difficulties in designing an effective control system is the potential volume of information which may be generated on the organization's activities. The greater the volume, the greater the level of resources that must be devoted to analysing and reviewing it. An important principle adopted by main organizations is therefore that of exception reporting or management by exception'. This operates on the presumption that actual performance levels either matching or closely matching the planned levels are under control and do not require special attention. Thus, management requires information only on those areas of performance that are failing to meet the planned levels by a significant margin, as these may be considered to be out of

control and to require attention. This principle has important implications for the design and operation of management information systems.

COMMUNICATIONS

The communications system in any organization is essentially concerned with the movement of data between one area or element and another. It should be considered as the system of veins and arteries which carries the life blood of data to all parts of the organization. In the strategic brain of the organization decisions are made which must be circulated to all sections and units. But to function efficiently, the brain must be refreshed by the oxygen' of data drawn from the external and internal monitoring senses. To that extent, the communications system is the heart of the organization's information system providing channels for the effective and efficient transfer of data to the right person in the right place, so that quality information may be transmitted.

The

communication of information in an organization may be classified into two broad forms:

1. Hard communications, where there is some physical, tangible or hard copy of the information being transmitted — a written memorandum or left minutes of a meeting, a tape recording of a telephone conversation, or electronic recording on a computer's magnetic disk. In each of these cases there is a tangible record of the information which may be passed to receiver and, if required, provide a permanent record of that information.
2. Soft communications, where the information is transmitted in a less tangible form: the tone of voice, the facial expression or other mannerisms used while orally transmitting the information, or the general atmosphere in which the

communication takes place. These less tangible features may particularly important for the correct interpretation of the information, 'In may equally be responsible for incorrect interpretation of the information b, the receiver, by giving undue weight to certain dimensions or elements.

Both types of communication co-exist in almost every organization. From the information systems development and design point of view, however, the emphasis tends to centre on mechanisms for delivering the hard forms of the organization's information. This is mainly because economical methods have been developed to capture, store, process and transmit this type of information by using the electronic media. The development of cost-effective processing methods for the soft elements is less readily available This would take the form I of teleconferencing systems incorporating live CCIV links, and electronic messaging systems that convert video images into electronic media prior storage and re-convert then when they are required. There is little doubt that the handling of these soft elements is technically feasible, and that the are likely to become increasingly cost-effective (and hence useful) in the future.

IT ADOPTION EFFORTS & OVERCOMING PROBLEMS

NEW DECISION MAKING SCENARIO

Today's business manager finds his job more challenging than ever before in view of the present day dynamic business environment. The dynamism in the environment (both external and internal) is all pervasive affecting each of the functional areas of business management. The external environment is characterised by, among others, increased competition, rapidly changing technologies and higher pace of globalisation of business. On the other hand,

the internal environment is subject to varying degrees of centralisation/decentralisation of operations, flattening of organisation structures, mergers/acquisitions and disinvestments leading to diversification of business including the product mix. As a consequence, the decision making scenario is changing rapidly and significantly. The new decision making environment is characterised by increasing:

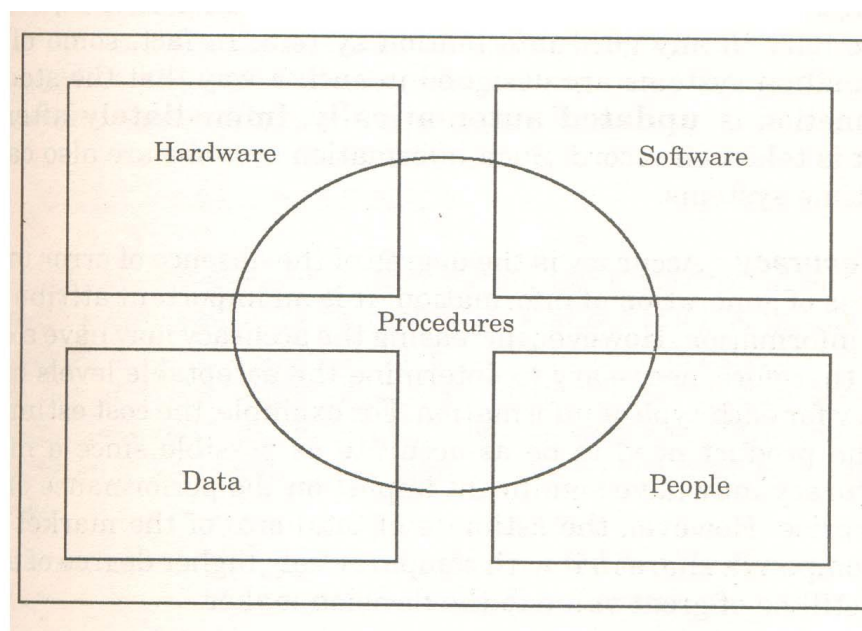
- cost of lost opportunities per unit of time taken in decision making,
- frequency of occurrence of events/developments in internal and external environments,
- sensitivity of enterprises to developments in the external environment, and
- multiplicity of factors and their changing influences.

Business managers have to make numerous decisions in order to achieve the goals of the organisation. These decisions should be rational. The rationality of a decision constitutes consideration of information about all the possible factors and the circumstances having a bearing on the decision. It is, thus, imperative for a successful manager to be concerned about the availability of information required for taking decisions.

ELEMENTS OF INFORMATION SYSTEMS

As the quality of information generated through the IT infrastructure depends, to a great extent, on the IT resources, they are also sometimes termed as elements of information systems. Some authors add one more element to this list — that is procedures. These procedures include the operational and control procedures for the use of IT infrastructure. The procedures play an important role in the smooth and effective utilisation of information resource. They also

protect the information resource and maintain its quality. Thus, the procedures as element of information system refer to the instructions to users regarding the use of IT infrastructure for normal day-to-day activity and also for handling special situations such as systems failures and crashes. They include user access permissions and disaster recovery procedures as well. These elements of information system are represented in Fig. 1.6.



ELEMENTS OF AN INFORMATION SYSTEM

QUALITY OF INFORMATION — ADDING VALUE TO INFORMATION

There are many attributes that are associated with good quality information. Each of these attributes adds value to information. The process of generation of information must focus on the quality of information by aiming at improving the degree of each of these attributes. Any compromise made regarding the

quality of information due to the technical, physical or economic constraints must be made known to the user of information, at the time of communicating the information.

Following attributes add value to the quality of information:

(a) **Promptness in availability and updation** Decision is to be taken within a time frame and therefore, information must be available within the desired time frame. It is well said 'Information delayed is information denied.' Some types of information is required periodically and should be made available to the user regularly and timely so as to avoid delay in decision making. The other types of information needs are sudden and irregular. Such needs arise as and when a business opportunity or threat is perceived. Such information, if provided promptly can help manager make quicker decision to minimise loss of opportunity or mitigate the possible loss due to business threat. Updating of information is, thus, a regular activity in any good information system. In fact, some of the information systems are designed in such a way that the stock of information is updated automatically, immediately after an event is taken on record. Such information systems are also called real time systems.

(b) **Accuracy** Accuracy is the degree of the absence of error in the process of generation of information. It is an important attribute of good information. However, increasing the accuracy may have a cost It is, therefore, necessary to determine the acceptable levels of accuracy for each type of information. For example, the cost estimate for the product need to be as accurate as possible since a minor inaccuracy may have significant impact on the performance of the enterprise. However, the estimate of total size of the market and the company's share in it with comparatively higher degree of error - may still be of great value to the decision maker.

(c) Precision is an important virtue of good quality information. Too much of information sometimes results in dumping of important information in the heap of details that may not be required at a particular point of time. Excessive detail of information results in information overload causing what is now being termed as Information Fatigue Syndrome. Only precise information is respected and used by managers. Unnecessary details are just filed.

(d) Completeness Information communicated to a manager should be complete and meet all his needs. Incomplete information can be misleading and may result in wrong decisions. That is why, a manager must insist on his involvement in defining the information that shall be made available to him. In case, providing comprehensive information is not feasible for one or the other reason, the manager must be made aware of this fact, so that the incomplete information is used with caution.

(e) Unambiguity Clarity of information is an important attribute of good information. Information must be unambiguous and should be communicated in such a way that it conveys the same meaning to different users. Modern data bases maintain data dictionaries that clearly define the variable used in the information in order to standardise the terminology used in reports.

In addition, there are other attributes such as quantifiability, verifiability, unbiasedness, etc. that one may attempt to incorporate to improve the quality of information. To what extent the quality of information can be maintained, it shall depend upon the cost considerations, nature and source of information, time available for generating information and such other factors.