Assignment hint

The expression “technology measures” just means “technology actions” (or strategies)

Example: a company, like Hang Seng Bank becomes more complex e.g. more product lines: insurance, superannuation, stock market service etc.

HSB might need these technology measures:
- New or improved networks,
- Shared database systems for transaction processing
- Better intra-organisational communication facilities
- EIS to give divisional managers info they need

Determinants of Organisational Structure
- Strategy
- Organisation size
- Technology
- Environment
- Power-control

Organisational Structure

Organisational Designs:
- Design options
- Bureaucracy
- Adhocracy

Applications:
- Managing the environment
- Managing organisational change
- Managing organisational culture
- Managing organisational evolution
- Managing gender

Organisational Effectiveness

1 Determinants of Organisational Structure II
Technology, Environment & Power-Control

- To understand the technology-structure imperative
- To understand and explain the various technology-structure approaches
- To be able to identify the information technology impact on structure

Outline

- Technology-Structure Debate
- Landmark Studies
- Technology and Information Processing
- What is IT Value?
### What is organisation structure?

- Organisation structure defines how tasks are to be allocated, who reports to whom, and the formal coordinating mechanisms and interaction patterns that will be followed.

### Technology

**What is technology?**

- Technology refers to information, equipment, techniques and processes required to transform inputs into outputs in an organisation.

**Landmark Studies**

Advanced Information Technologies and effect on structure

### Technology-structure debate

- Difficulty in measuring technology
  - Dependent on size of the firm
  - Dependent on the type of firm
  - Primary vs secondary vs tertiary industry
  - Level of analysis (job vs work unit)
  - Dependent on our definition of ‘technology’ (work process vs high-tech)
Four Landmark Studies on the Technology Imperative

- Woodward (mid 60s)
  - Research focused on production technology
  - Focused heavily on manufacturing firms
- Perrow
  - The notion of “knowledge technology”
  - Task variability & routine technologies
- Thompson
  - Technology uncertainty
- Gailbraith
  - Task uncertainty

Relationship Between Technological Complexity and Structure (Woodward)

<table>
<thead>
<tr>
<th>Structural Characteristic</th>
<th>Low Tech</th>
<th>Medium Tech</th>
<th>High Tech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Vertical Levels</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Supervisor’s Span of Control</td>
<td>24</td>
<td>48</td>
<td>14</td>
</tr>
<tr>
<td>Manager/total employee ratio</td>
<td>1:25</td>
<td>1:16</td>
<td>1:14</td>
</tr>
<tr>
<td>Proportion of skilled workers</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Overall complexity</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Formalisation</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Centralisation</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
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</tbody>
</table>

Perrow’s Technology Classification

- Task Variability
  - Few Exceptions
  - Many Exceptions

- Problem Analysability
  - Well-defined
  - Ill-defined

<table>
<thead>
<tr>
<th>Technology</th>
<th>Engineering</th>
<th>Routine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craft</td>
<td>Non-routine</td>
<td>Routine</td>
</tr>
<tr>
<td>Engineering</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Craft</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Non-routine</td>
<td>Low</td>
<td>Moderate</td>
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</table>

Perrow’s Technology-Structure Predictions

<table>
<thead>
<tr>
<th>Cell Technology</th>
<th>Formalisation</th>
<th>Centralisation</th>
<th>Span of Control</th>
<th>Coordination and Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine</td>
<td>High</td>
<td>High</td>
<td>Wide</td>
<td>Planning and rigid rules</td>
</tr>
<tr>
<td>Engineering</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
<td>Reports and meetings</td>
</tr>
<tr>
<td>Craft</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate-wide</td>
<td>Training and meetings</td>
</tr>
<tr>
<td>Non-routine</td>
<td>Low</td>
<td>Low</td>
<td>Moderate-narrow</td>
<td>Group norms and group meetings</td>
</tr>
</tbody>
</table>
Thompson’s technology classification

- Long-linked technology (sequential interdependence)
  - Input: A → B → C → D → Output

- Mediating technology (pooled interdependence)
  - Client A → Transformation → Process → Client B

- Intensive technology (reciprocal interdependence)
  - Resources: A, B, C, D → Transformation → Process → Output

Gailbraith’s Organisation Design Strategies

1. Rules and programs
2. Hierarchical referral
3. Goal setting
4. Creation of slack resources
5. Creation of self-contained tasks
6. Investment in vertical information systems
7. Creation of lateral relations

Comparing the technology-structure approaches

<table>
<thead>
<tr>
<th>Contributor</th>
<th>Routine Technology</th>
<th>Non-Routine Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodward</td>
<td>Mass, process</td>
<td>Unit</td>
</tr>
<tr>
<td>Perrow</td>
<td>Routine, engineering</td>
<td>Craft, non-routine</td>
</tr>
<tr>
<td>Thompson</td>
<td>Long-linked, mediating</td>
<td>Intensive</td>
</tr>
<tr>
<td>Galbraith</td>
<td>Low uncertainty, low info. processing</td>
<td>High uncertainty, high info. processing</td>
</tr>
</tbody>
</table>

Technology and Information Processing

- Advanced information technologies (AIT):
  - Day-to-day operations
  - Improve communications
  - Control systems
  - Decision support systems
  - Inter-organisational systems
- AIT Impacts Structure
  - Middle management, decision-making, communications, department structure
What is IT Value?

The Value of IT

<table>
<thead>
<tr>
<th>Real</th>
<th>The Role of IT</th>
<th>Perceived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of IT operations</td>
<td>IT is supporting the business</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Contribution to the business</td>
<td>It is acting like a business</td>
<td>Ability to enable</td>
</tr>
<tr>
<td>Market value of IT</td>
<td>It is acting like the business</td>
<td>Ability to drive the business</td>
</tr>
</tbody>
</table>

Environment - outcomes

- To understand how changes in the environment can impact on the organisation structure
- To have the ability to identify recent environmental changes
- The ability to view organisation structural change as a political process

Environment - Outline

- What is the Organisational Environment?
- Landmark Contributions on Environment Structure
- Major Environment Changes
- Population-Ecology View
- What is Power Control?

What is the Organisational Environment?

- General environment
  - Encompasses conditions that may have an impact on the organisation
- Specific environment
  - Is that part of the environment that is directly relevant to the organisation achieving its goals
- Domain
  - Is the “space” in which the organisation “plays”
  - Change in domain = change in environment
**Landmark Contributions in Environment-Structure**

- Burns and Stalker
  - Mechanistic vs organic structures
- Emery and Trist
  - 4 kinds of environments any organisation might find itself in
- Lawrence and Lorsch
  - Differentiation & integration
  - Match internal environment to external

**Emery & Trist: 4 Kinds of Environment**

- Placid-randomised environment
  - Relatively unchanging; Demands are distributed randomly and changes take place slowly over time
- Placid-clustered environment
  - Threats to the organisation are clustered rather than random
  - Forces in the environment are linked with one another
- Disturbed-reactive environment
  - Many competitors seeking similar ends
  - One or more organisations are large enough to exert influence over their own environment; large firms can dominate
- Turbulent-field environment
  - Most dynamic and highest uncertainty; Change is ever present and elements in the environment are increasingly interrelated

**Major Environment Changes in Recent Years**

- Technological
  - Intro. of PCs (even wireless PDAs)
  - Intro. of networks (even broadband access)
  - Worldwide telephone direct dialing (even fax)
- Social
  - Women’s movement (e.g. workforce)
  - Concern for physical health, fitness
- Economic
  - Deregulation of various industries (even privatisation)
- Political
  - Rise of the “green” movement (e.g. sustainable yield notion)
  - Rights of the child/worker

**Assessing the Environment**

- Capacity of an environment
  - Is the degree to which it can support growth
- Volatility
  - The degree of instability in an environment
- Complexity
  - The degree of heterogeneity and concentration among environmental elements
  - Simple environments are homogeneous and fairly concentrated
The Environment Imperative

Population-ecology View

- Last decade has seen the growth and development of what stands as an environmental-imperative position.
- Survival-of-the-fittest type view
- Organisational forms must either fit their environmental niche or fail
- The notion of natural selection

Other factors affecting structure

- The four factors: strategy, size, technology and environment do not, individually explain organisational structure. Even in combination they only explain about half of the variation we observe.
- Other possible factors are the strategic choices of powerful members of the organisation

Other factors

- Child’s Strategic Choice
- Power-control Model
Child’s Strategic Choice I

1. decision makers have more autonomy than that implied by those arguing for the dominance of environmental, technological, or other forces
2. organization effectiveness should be construed as a range instead of a point or an absolute optimum
   - Managers aim to satisfy a set of minimum criteria e.g. profit, autonomy, stability etc, rather than to achieve the highest possible effectiveness.

Child’s Strategic Choice II

3. Organizations occasionally have the power to manipulate and control their environments (see later)
4. People’s perceptions and interpretations of events affect the way they make decisions about the real environment and the actions of organisation
   - e.g. dot.com – many managers misunderstood reality – they thought “bricks and mortar” were finished but they weren’t

What is Power-control?

- Power-control view states that an organisation’s structure, at any given time, is to a large extent the result of those in power selecting a structure that will, to the maximum degree possible, maintain and enhance their control.

Flaws in the contingency perspective i.e. size, strategy etc. determine structure

- The contingency perspective assumes:
  - decision makers agree on the nature of the problem, a structure is rationally chosen from a range of possibilities, based on evidence
  - Decisions are carried through to completion.
  - Decisions are made by the “dominant coalition” who are also the top management
  - Decision makers share a common goal of “doing the best” for the company
Power Control says:
- Non-rational processes are often used (gut feeling)
- Decisions may not be consistent or maximise value
- Dominant coalition may not be top managers but other groupings
- Dominant coalition may have divergent interests
- Power
  – authority, control resources, network centrality

Structural Decisions as a Political Process
- Resource allocation
- Position in the hierarchy
- Interdepartmental coordination
- Structure change
- Building coalitions
- Defining the nature of the problem
- Enhancing legitimacy and expertise
- Make preference explicit, but keep power implicit
- Expanding networks of influence

Power-control Model

Decision-making
- The decision will be made by the dominant coalition
- The criteria and preferences in the decision will reflect the self-interest of the dominant coalition

Constraints
- Strategy, Size, Technology, Environment
- "Satisficing" Level of Organisational Effectiveness
- Structural Alternatives
- Emergent Structure

2 Managing new technologies:
- Knowledge Management (KM)
- E-Commerce
- Customer relations management (CRM)
- Business Intelligence (BI)
- Enterprise Resource Planning (ERP)
- Supply Chain Management
Knowledge Management:

- What is it
- Why is it important
- How is it acquired
- Application factors for success

Knowledge

- Data – Set of discrete, objective facts
- Information – Data which the receiver feels informs or adds value to the data
- Knowledge – Information, combined with experience. In the mix, there may be more information, or more experience, but either ingredient has a synergistic effect on the other, to increase knowledge

Knowledge

- Experience implies a correct response when action (decision) is required
- Experience suggests the person has made these choices before i.e. decisions made when facing a new situation, will be based on the experience of previous situations

Knowledge vs Information

- Organisations hire for experience more often than for intelligence, or education.
- When a difficult decision needs to be made, the person making the decision will seek out someone with knowledge rather than seek an answer in a database
Intellectual Capital (or Corporate Knowledge) includes:

- The skills that an organisation has developed in relation to its goods and services.
- The employees whose knowledge is deemed critical to a company’s continued success.
- The aggregation of documents about processes, customers, research results, and other information that might have value for a competitor that is not common knowledge.

(Intellectual Capital) includes:

- Intellectual Capital is becoming THE most expensive resource, replacing natural resources.
- This is because the only competitive advantage to organisations on the same enterprise tier, is Intellectual Capital. (This is what keeps Microsoft and IBM at the forefront of their industry sector).
- Organisations must protect and safeguard their Intellectual Capital, and probably more importantly, must maximise the potential of that asset, by implementing a Knowledge Management System.

Knowledge Management

- All other things being equal, organisations who manage their Human Resources better than their competitors, will outperform their competitors.
- However, management of the human resource, brings with it a complex and difficult set of issues.

Knowledge Management

- The issue of Knowledge is also closely linked to training and (increasing knowledge). Organisations go to great lengths to ensure that knowledge gained (on the job), remains on the job.
- Organisations may also be reticent to invest in too much training, because the human resource may be acquired by the opposition before the investment has been repaid.
Knowledge Management

- This has been a genuine problem for Enterprise level organisations, who could not see any satisfactory solution.
  - Buying in the skills was very costly.
  - Increasing the skills of in-house personnel could mean losing skills before they were used
- Currently a number of possible solutions are being tried out in the marketplace.

Knowledge Management

- Organisations are moving ‘off shore’ to develop new technology. The level of knowledge may not be as high, but then neither are the costs
- Organisations are moving to treat human resources in a more human way
  - Flexible work hours
  - Flexible work sites
  - On site Child Minding facilities
  - Paid study leave
  - Flexible income packages

One novel approach

- Some organisations are testing a “transfer system”, which rates the employee on entry into the organisation against a knowledge scale. Via contract with the employee, a career path is planned which includes:
  - Education
  - Training
  - Research opportunities
  - Mentoring etc.
- On exit, the new employer or the old employee (or both) pay a transfer fee to the old employer as ‘return on investment’

Implementation

Knowledge Management:
- Must be linked to the strategic direction of the enterprise to ensure that the intellectual capital is managed and leveraged in support of the overall business strategy
- Requires an organisational culture acceptance that promotes and supports knowledge sharing, collaboration across and among employees/business units, and a drive toward innovation.
Implementation components

A database containing the empirical knowledge, with accompanying search engine:
- Competencies
- Skill set
- Attitudes
- Location

- Good example is the Resume data model

Implementation components

A Knowledge map containing the location of tacit (unspoken) knowledge
- A more abstract query method
- Linked to the empirical database
- Linked to an A.I. Engine (possibly)
- Linked to a GIS system to provide physical characteristics (possibly)

Implementation components

Provide employees with access to the KM system, and an interface to deposit tacit knowledge and register empirical knowledge

These systems are now being used by organisations to innovatively grow the business

Innovative enterprises are extending the enterprise's explicit knowledge base by codifying experience, insight or judgment into a form that can be reused by others. (Davenport)

In this case, the Knowledge Management system is integrated enterprise wide, and proactively adopted by all employees
Another method is to select appropriate business units and implement the Knowledge Management system as a complementary process to the business unit, with a longer term, staging of integration.

For example, HP has a worldwide KM system being used to provide ‘how to’ information about the repair of photocopiers. This is generating large scale savings in service turnaround time, particularly in 2nd and third world countries. This is also beneficial in organisations where enterprise adoption is either not appropriate or not being culturally well accepted.

Collaboration (internal/external) and Work Management Practices are another area where KM is being maximised:

- Enterprises depend on the optimum interaction between human resources.
- Requirements for implementing e-business are the availability of knowledge that enables electronic decision-making.
- Also the capabilities for applications, people and extended chains to electronically communicate, exchange information and cooperate.

Benefits of Corporate Intelligence

- A knowledge enabled enterprise is more agile, poised for change, and better able to manage change.
- Enterprise IQ (EIQ) is a composite view and formal assessment of the enterprise's capabilities in:
  - Competitive intelligence (CI)
  - Business intelligence (BI)
  - Internal intelligence (II)

Competitive intelligence (CI)

- Focuses on the external marketplace to enable the enterprise to understand market dynamics, position itself in the marketplace and allocate internal resources (markets, industries, products or business processes).
- Includes market intelligence, competitive benchmarking, competitor intelligence and competitive analysis.
**Business intelligence (BI)**

- Represents the enterprise's capability to access, explore and analyse domain-specific, structured information. Typically stored in a data warehouse.
- Used to develop insights and understanding, leading to improved, informed decision making.
- Techniques may be applied to internal product and customer data as well as to external market or competitor data.

**Internal Intelligence (II)**

- Focuses on internal competencies and the ability to identify and assemble knowledge and expertise rapidly.
- Collaborate, innovate, add insight, and apply knowledge to problems and opportunities.
- Is an enterprise's skill in managing and leveraging its intellectual assets (i.e., people, processes, and digitalised information).

**Factors for success (Davenport)**

- A knowledge oriented culture
- Technical and organisational infrastructure
- Senior management support
- A link to the value chain
- Process orientation
- Vision and language
- Motivational support
- A knowledge structure
- Multiple channels for knowledge transfer

**Knowledge oriented culture**

- The organisation needs to foster a culture within the organisation that allows employees to freedom to chase and investigate knowledge within and outside the organisation.
- Support a positive orientation towards the sharing of knowledge, for the benefit of both the organisations and the employees.
Technical and organisational infrastructure

- The organisation must take advantage of technology to provide a means of acquiring, storing and sharing knowledge. The Web, network access to data and knowledge repositories, seminars and talkfests
- Setting up internal procedures, and roles to facilitate the transfer of knowledge between the people using and communicating the knowledge

Senior management support

- Strong support from executives and senior managers is fundamental to the success of KM implementations
- Provide funding for cultural acceptance
- Incorporating the KM concept into the organisational vision
- Managers themselves, proactively adopting the KM concept

Link to the value chain

- KM will always provide ‘indirect’ benefits, but steps should be taken to determine a metric for review.
- Because the KM concept is in itself difficult to quantify, the organisation needs to find ways to imbed the cost/benefits of KM in the value chain of the organisation.

Process orientation

- The Implementation process should be treated like any other project carried out by the organisation:
  - Clearly stated goals and objectives
  - Resource requirements
  - Functional Requirements
  - Systems Analysis/Design
  - Task and Implementation schedules, including Metrics and review periods
Vision and language

- Everyone in the organisation needs to be working towards a common ‘knowledge’ goal.
- In order to make sure that everyone is working towards that goal, a clear and unambiguous statement of what constitutes knowledge needs to be available.
- The organisation must instill these statements into all levels of the documentational structure, i.e. from vision/mission statement to operational procedures.

Motivational support

- Human nature is not geared naturally to sharing, an atmosphere which promotes the sharing of knowledge must be fostered within the organisation.
- Sometimes motivational, and incentive measures (prizes, promotions, cash etc.) may need to be implemented to generate a knowledge sharing culture within the organisation.

Knowledge structure

- In order to be effective, KM users must know how to input knowledge, and how to extract it (an interface), and this method of I/O will be constantly evolving, also.
- The interface may not be the same for all users within the organisation and may need to be tailored for the specific needs of some classes of users.
- Users will need to be continually updated on the evolving structure of the KM system.

Channels for knowledge transfer

- The organisation must provide facilities to allow knowledge to be transferred through multiple channels of communication:
  - Access to the KM repository
  - Telephone
  - Face to face meetings
  - Conferences
  - Seminars
  - Publications
  - Multi Media
Assignment hints

The expression “technology measures” just means “technology actions” (or strategies)

Example: a company, like DBS Bank becomes more complex e.g. more product lines: insurance, superannuation, stock market service etc.

DBS Bank might need these technology measures:

- New or improved networks,
- Shared database systems for transaction processing
- Better intra-organisational communication facilities
- EIS to give divisional managers info they need

For your chosen company, describe:

a) The company itself: say 100 words,

b) the changes that have occurred to the company over the last 4 or 5 years: say 200 – 300 words

c) the changes to the companies structure that have occurred as a result. Provide 200 – 300 words on each of the headings: a) complexity b) formalisation c) centralisation.

d) Describe the technological changes that MIGHT have been made to facilitate these changes. This will be mainly your own thinking about the problems being faced. 200 – 300 words is enough.

Access (internal and external)

More and more these days, the Human Computer Interface model is the Browser. This means the presentation layer is common, for any core system application, not just Web applications, with issues such as:

- Authentication/Authority
- Security
- Quality of Service

Target specific (for the class of user)

- The company can be ANY global IT company. It doesn’t have to be one you work in or one from the list. Any global IT company is OK and you don’t need any further approval from me or Calvin

- Make sure that the company has
  a) undergone a number of changes in the last few years
  b) Modified its structure to some extent.

- If a company you are interested in has NOT undergone BOTH of these phenomena, do NOT use it for assignment

- Your target company must have experienced both types of changes or it’s no good.
Application Integration/Enterprise Integration

- Internally, the enterprise/organisation may be made up of many autonomous units, all managing their own data. Once these internal (Islands of Information) are integrated, the Internal Value Chain is maximised. Organisations may then take advantage of eBusinesses processes within the Transaction Management System, to facilitate integrating applications outside the enterprise.
- The integration of the Extended Value Chain (suppliers, customers, other entities who have a stake in the supply chain) is called Enterprise Integration.

External

- Enterprise partners, and distributed users within the Enterprise are now using sophisticated methods to protect their data, and communication transmissions:
  - Encryption, Digital Certificates and Signatures
  - Virtual Private Networks
  - Secure Socket Layers and Access Control Lists
- At the same time, Enterprise Management are encouraging openness by flattening the management hierarchy and making managers more available, and as a result, more information is available.

External

- Most large scale organisations do not sell their products to the public. While they do have customers, product is moved to Distributors, Wholesalers or Export Agents.
- If the organisation is part of a supply chain, then interest is focused on both sides of the chain.
- The focus is on making sure these transactions are efficiently handled, with a high Quality of Service (QOS).

External

- With the rapid growth of both electronic commerce and data networks, the acceptance and use of standards is even more relevant. Two major bodies working on standards and communication protocols:
  - UN/CEFACT (http://www.uncefact.org)
  - The World Wide Web Consortium (W3C) (http://www.w3.org)
UN/CEFACT (http://www.uncefact.org) is the United Nations body whose mandate covers worldwide policy and technical development in the area of trade facilitation and electronic business. The body has developed and promoted many tools for the facilitation of global business processes, the most notable being the international EDI standard.

The World Wide Web Consortium (W3C) is the international, non profit consortium that advances electronic standards by promoting open, collaborative development of interoperability specifications. W3C is sponsored by many organisations, including Adobe Systems, BEA Systems, Boeing, Defense Information Services Agency, IBM, Microsoft, SAP and Sun Microsystems.

While the two bodies are focused in separate areas, convergence of the standards is well underway, with the UN/CEFACT providing steerage facilities and OASIS ([http://www.oasis-open.org], the W3C’s standards arm) providing the standards for the technology and architecture.

Both UN/CEFACT and the W3C are seeking to develop an exchange set which meets the needs of both established International Trading Organisations and the small startup SME (Small to Medium Enterprises).

OASIS is putting standards forward which are based on leading edge technology, are well regarded, understood and accepted in the IT markets.

The resulting situation is a win/win for both standards makers and users of standards.

UN/CEFACT
– History – methodology, controls and implementation experience

OASIS
– Distributed communications technology and architecture.
There are a number of recent additions to the internal users’ interface requirements which are a direct result of the technology made available to organisations using the World Wide Web. Email, Search Engines, Browser model, Data Warehousing, Voice activated Servers, Hand Helds, Wap, GIS…

Foremost is email, which has made arguably the biggest change to the culture of the new business models being implemented by large organisations.

Many organisations do not allow employees to receive external mail, yet provision of sophisticated internal communication software is normally high on the requirement list of these companies.

Extranets and Intranets mean that much of the corporate and Enterprise data is made available for internal use by providing URL links and pointers to relevant data, allowing users to locate the data without having to know the file structure or the physical storage details.

Data Warehousing is not new to large organisations, but access and availability at the public level is. It is becoming quite common now, because of the acceptance of the World Wide Web (and underlying) Internet as a communications transport facility.

Governments have led the way in terms of Information Access, and issues relating to access, have become so common place, that most Governments have legislated and set standards.

- Pre 1997, large scale organisations relied on an Intranet (leased private line) to provide the network layer.
  - This was very expensive to maintain, but users who demonstrated a genuine need (which could be cost justified) were given access.
  - While the network cost today is often amortised over the entire organisation, bandwidth costs (which include public access) mean that the cost is ongoing.
The IT function is now seen as a service department within the organisation. Service is typically provided by way of data access, however, there are other resources of the organisation, which must also be managed in the most efficient manner by the IT unit.

Until recently
- Many organisations focused primarily on manufacture: the flow of materials and processes which produced goods.
So
- There was a clear distinction between the manufacturer, the wholesaler, retailer and the end customer
- The information which was used to track the production process was only used by the production department
- Order taking/filling data was used by the Order department
- Sales were important to Management and the Sales force

Even today, many companies find it difficult to move reliable information quickly from source to user. For example, stock levels, availability, forecasts etc. may not be as useful or as accessible in a timely manner to all parts of an Enterprise (multi national organisations, and large organisations, let alone to dependent business partners.
- With the Enterprise, came the first steps in managing, and making valuable use of the information flow around the manufacturing process (circa 1960), when materials requirement planning (MRP) software became available.

Later releases were better able to generate information based on a more realistic set of assumptions, using sophisticated marketing and production models. The result was manufacturing resource planning (MRPII) software, which eventually (circa 1990) led to Enterprise Resource Planning (ERP), encompassing a complete set of applications capable of linking all internal transactions.
Data

IT departments then, have been managing corporate (enterprise) information for 40 or so years, and so from a data perspective, the emerging Web-based technologies only pose a security and access problem for the IT department.

The data itself was already being held in large repositories, with internal access paths already established for transactional data, strategic Management data, and production data.

Technology

- Today’s technology savvy Enterprise promotes a knowledge based strategic focus, and uses a more market-driven model, taking advantage of increasing markets throughout the world.
- These markets are further bolstered by deregulation of financial markets, globalisation and digitisation.
- Global networks facilitate inter-business communications and trading, allowing organisations to optimise and leverage the use of technology by adding value to the business interests of the organisation.

The vast number of integrated or co-operating web components which make up the technology tool set of the IT professional is mind boggling, and goes by the name of Distributed Architecture and Related Web Technology.

Technology

- HTML and Style Sheets
- Scripting Languages
- XML
- XHTML
- HTTP
- TCP/IP
- Cookies
- Active Server Pages
- ColdFusion
- Java Applets/Servlets
- CORBA
- Enterprise Java Beans
- CGI
- OO Methodologies – UML
- Extreme Programming
- Mobile Technologies – WAP,
- BlueTooth, Voice XML
- Wearable Technology (SMOD)
While it may be argued that personal communication technology is a marketing success. Businesses (large and small) are taking advantage of the relatively low cost of bandwidth. While services are being outsourced, the end client (customer) is not being disadvantaged (unless the share price drops).

In brief, the main problems in IT Resource Management are:
- Organisations need to modify their business models to suit those of the ASP, and in many cases, lose control over their data.
- Some internal staff (sometimes more than one), must be allocated to liaise with the ASP, which adds to the cost of outsourcing, and reduces the effectiveness.

The availability of so many new technologies, coupled with the increased reliance of enterprises on purchased packages, has made it virtually impossible to achieve consistent data formats and semantics across all the different applications. For many organisations, Enterprise computing is a patchwork of applications that are built at different times by different internal and external development groups, often with each group operating without knowledge of the others' choices of tools and designs.

Those wishing to survive have developed an integration strategy to deal with:
- 10-year-old, in-house mainframe applications
- Multiple, newer independent software vendors (ISV’s)
- Third Party Application packages, provided by external suppliers or customers.
- Constantly changing User requirements, which are a reaction to a constantly changing market (customers).
Technology

Since there is no practical way to
− eliminate duplication of logic and data,
− incorporate technology changes and
− cater for market forces,
many organisations have accepted that they are operating a state of perpetual transition, and have incorporated this concept into the culture of the organisation and developed complex and detailed Change Management practices to deal with the situation.

Repeatable Patterns cont.

5. Hub-and-Spoke (Informational)

6. Remote Access
Remote access represents the externalisation of core application patterns to employees outside the corporate LAN/WAN environment.

7. E-Business
E-business patterns represent the externalisation of core application patterns across business boundaries.