An Introduction to the Management of Information Systems - Lecture notes - MIS 1

An Introduction to the Management of Information Systems (University of Reading)

TO GET AN A (implication/application of what we've done; advantages and disadvantages for the future, add something and suggest something forward/solution)

L1 – Information System in Business + (p.34-69)

- Successful firms are the ones that learn how to use new technologies
- Globalization has a massive impact on management information systems
  - firms get redesigned and adapted to new technological changes → create fully digital firms
- **digital firm** = one in which nearly all of the organisation's *significant business relationships* with customers, suppliers, and employees are digitally enabled and mediated
- **business processes** = set of logically related tasks and behaviours that organizations develop over time to produce specific business results and the unique manner in which these activities are organised and coordinated
  - ex. developing new product, creating a marketing plan, hiring an employee etc…
  - the ways a company accomplishes it's business processes can be a source of competitive advantage
- *key corporate assets* = intellectual property, core competencies, and financial and human assets (these are all managed through digital means)
- Digital firms respond to their environments far more rapidly than traditional firms, giving them more flexibility to survive in turbulent times
- digital firms are *time shifting* and *space shifting* (business conducted 24/7; work takes place in a global workshop as well as wlin national boundaries

What is an information system?

- A computer **Information System** (**IS**) is a system composed of people and computers that processes or interprets information. The term is also sometimes used in more restricted senses to refer to only the software used to run a computerized database or to refer to only a computer system.
- Information system is an academic study of systems with a specific reference to information and the complementary networks of hardware and software that people and organizations use to **collect**, **filter**, **process**, **create** and also **distribute** data.
  - **Data** are streams of raw facts representing events occurring in organisations or the physical environment before they have been organised and arranged into form that people can understand and use
- An emphasis is placed on an Information System having a definitive BOUNDARY, USERS, PROCESSORS, STORES, INPUTS, OUTPUTS and the aforementioned COMMUNICATION NETWORKS.
- An information system is any organized system for the **collection**, **organization**, **storage** and **communication** of information.
- Such a system may be as simple as a 3x5 card catalog system on a desk, a Rolodex, a desktop calendar, or a Daytimer. or, it may be as complicated as a multi-node computer database system used to manage vast quantities of related information.
- Entire sectors of the economy are nearly inconceivable without substantial investments in info systems *(eg. Amazon, eBay, Google, E*Trade…)*
- there is a growing interdependence between a firm's ability to use information technology and its ability to implement corporate strategies and achieve corporate goals
- increasing market share, becoming the high-quality or low-cost producer, developing new products, increasing employee productivity depend more and more on the kinds and quality of IS in the org → the more you understand about this relationship, the more valuable you will be as a manager

The cross-discipline of computing
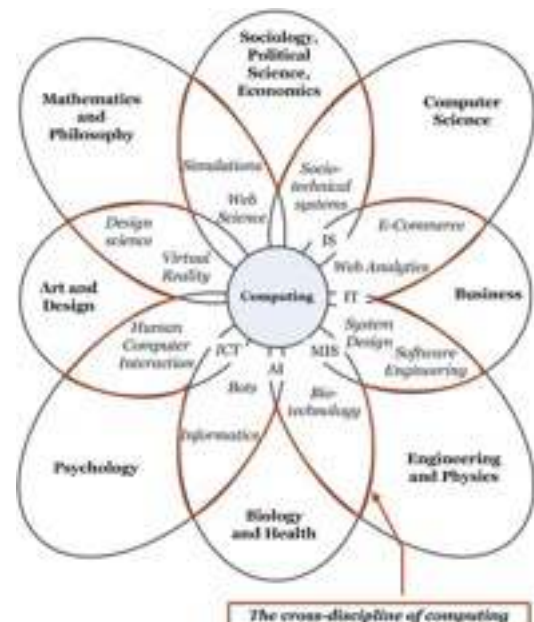
- Most failure has to due with behaviour and acceptance of people in the system

- Information and data is different. The context gives the data meaning. (ex. 17 is a number (data only) but if you say 17 is the degrees in Reading, then it becomes information)
- Humans are information systems (so it doesn't necessarily mean we need a computer or that an information system comprises a computer)
- It's a lot bigger than turning on a computer…. IT'S A BIG PROCESS

Contemporary approaches to Information Systems
- The study of Information Systems is a multidisciplinary field
  1. **Technical approach**
     • Emphasises mathematically based models to study information systems, as well as the physical technology and formal capabilities of these systems
  2. **Behavioural approach**
     • Strategic business integration, design, implementation, utilisation, and management
  3. **Sociotechnical systems**
     • Combines the two approaches above

Sociotechnical View
- **Sociotechnical systems** (**STS**) in organizational development is an approach to complex organizational work design that recognizes the interaction between people and technology in workplaces.
- The term also refers to the interaction between society's complex infrastructures and human behaviour. In this sense, society itself, and most of its substructures, are complex sociotechnical systems.
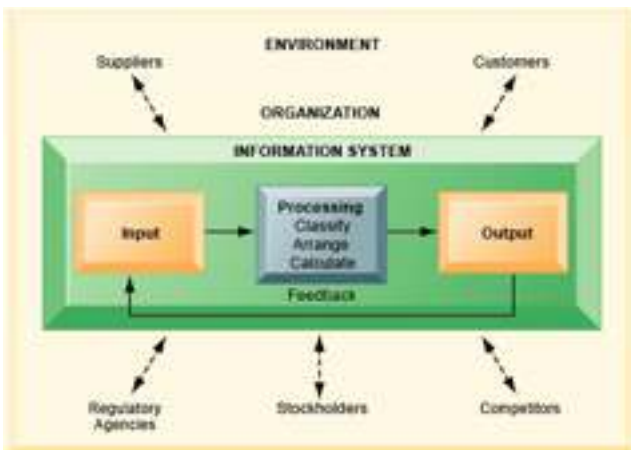
3 activities that produce information (get data and add value to give it meaning)
1.INPUT → captures raw data from organisation or external environment
2.PROCESSING →converts raw data into meaningful form
3.OUTPUT → transfers processed information to people or activities that use it
(4)**FEEDBACK** → (important because if you have a poor output, you are able to spot the problem and learn/correct input stage)

-Suppliers, customers, regulatory agencies, stockholders, competitors all interact with the organisation and its IS
  • *eg. a house is built with hammers, nails, and wood, but these do not make the house. The architecture, design, setting, landscaping, and all of the decisions that can lead to the creation of these features are part of the house and crucial for solving the problem of putting a roof over one's head*
- All systems have a **boundary** (defines what information is captured and the value of the output. The process happens within a specific area)

- To fully understand Information Systems, you must understand the broader organisation, management, and information technology dimensions of systems and there are power to provide solutions to challenges and problems in the business environment
- We refer to this broader understanding of information systems, which encompasses understanding that the management and organisational dimensions of systems as well as the tactical dimensions of systems, as **Information Systems literacy**
- **Computer illiteracy** focuses primarily on knowledge and information technology
- The field of **Management Information Systems (MIS)** tries to achieve this broader information system literacy
  • Deals with behavioural issues as well as technical issues surrounding the development, use and impact of Information Systems used by managers and employees in the firm

3 dimensions of IS

1. ORGANISATIONAL
2. MANAGEMENT
3. TECHNOLOGY

1. ORGANISATIONAL

- Organisations have a structure: authority and responsibility in a business firm is organised as a hierarchy, or a pyramid structure. The upper levels of the hierarchy consist of managerial, professional and technical employees, whereas the lower levels consist of operational personnel
- **Senior management** = makes a longer range strategic decisions about products and services as well as insurance financial performance of the firm (unstructured)
- **Middle management** = carries out the programs and plans of senior management (semi-structured)
- **Operational management** = responsible for monitoring the daily activities of the business (structured)
- **Knowledge workers** = (engineers, scientists, or architects) design products or services and creating new knowledge for the firm, whereas
- **Data workers** = (secretaries or clerks) assist with scheduling and communications at all levels of the firm
- **Production or service workers** = produce the products and deliver the service
- The major **business functions** (tasks performed by business organisations) consist of the sales and marketing, manufacturing and production, finance and accounting, and human resources
  - *Web 2.0 applications are widely adopted by firms – employees **interact** on online communities like blogs, e-mail and instant messaging services*
  - *Telework gains momentum in the workplace – iPads, iPhones, Blackberries, notebooks help people work away from the office*
  - *co-creation of business value – customers help firms define new products and services*

2. MANAGEMENT

- Management's job is to make sense out of the many situations faced by organisations, make decisions, formulate action plans to solve organisational problems
- Manager is perceived business challenges in the environment; they set the organisational strategy for responding to those challenges; and they allocate the human and financial resources to coordinate the work and achieve success
- Managers must do more than manage what already exists → they must also create new products and services and even recreate the organisation from time to time
- managers adopt online collaboration and social networking software to improve coordination, collaboration, and knowledge sharing
- business intelligence applications accelerate – more powerful data analytics and interactive dashboards provide real-time performance info to managers to enhance decision making
- virtual meeting proliferate

3. TECHNOLOGY

- **Computer hardware** = physical equipment used for input, processing, and output activities in an IS
- **Computer software** = detailed, preprogrammed instructions that control and coordinate the computer hardware components in an information system
- **Data management technology** = software governing the organisation of data on physical storage media
- **Networking** and **telecommunications technology** = consisting of both the physical devices and software, links to various pieces of hardware and transfers data from one physical location to another
- A **network** links two or more computers to share data or resources, such as a printer
  - The world's largest and most widely used network is the **Internet**
  - Internal corporate networks based on Internet technology called **intranets**
  - Private internets extended it to authorised users outside the organisation are called **extranets** (firms use them to coordinate their activities with other firms for making processes, collaborating on design, and other interorganizational work

- The **World Wide Web** is a service provided by the Internet that uses universally accepted standards for storing, retrieving, formatting, and displaying information on the page format on the Internet
- All of these technologies, along with the people required it with run and manager then, represent resources that can be shared throughout the organisation and constitute the firm's **information technology (IT) infrastructure**
- growth of online software as a service – business applications are delivered online
- the growth of "cloud computing" where more and more business software runs over the Internet
- emerging mobile digital platform to compete with PC as a business system – iPhone software and Application Store on iTunes

Role of Information Systems in Business Today

- Business firms invest heavily in information systems to achieve 6 strategic business objectives:
  1. **Operational excellence**
     - businesses seek to improve the efficiency of their operations in order to achieve a higher profitability
     - IS and technologies are some of the most important tools are available to managers for achieving higher levels of efficiency and productivity in business operations
     - *eg. Walmart achieve the $408 billion insecure–nearly one-tenth of retail sales in the United States– in large part because of its retail link assistant, which digital links its suppliers to everyone of Walmart stores*
  2. **New products, services, and business models**
     - *eg. Apple Inc. transformed an old business model of music distribution based on vinyl records, tapes, and CDs into an online, legal distribution model based on its own iPod technology platform*
  3. **Customer and supplier intimacy and**
     - when a business really knows its customers, and serves them well, the customers generally responded by returning and purchasing more (raises revenues and profits)
     - the more business engages its suppliers, the better the suppliers can provide vital inputs (this lowers costs)
  4. **Improved decision making**
     - managers relying on forecasts, best guesses, and luck. The result is all over and under production of goods and services, misallocation of resources and poor response times (raise costs, lose customers)
       - → IS and technologies have made it possible for managers to use real-time data from the marketplace when taking decisions
  5. **Competitive advantage**
     - when firms and she is at one or more of the business objectives above, chances are they have already achieved a competitive advantage (eg. Walmart, Apple Inc, UBS)
  6. **Survival**
     - businesses need to get IS and technologies because they want to survive (eg. all banks needs to have ATMs and international ATM network in order to survive in the retail banking business)

Complementary assets: organisational capital and the right Business Model

- Investing in information technology does not by itself guarantee good returns
  - → ANSWER = complementary assets!!!
- Firms fail because they don't adopt the right business model that suits the new technology, or seek to preserve an old business model that is doomed by new technology
- **Complementary assets** = assets required to derive value from a primary investment (eg. to realise value from automobiles requires substantial complimentary investments in highways, roads, gasoline stations, repair facilities and a legal regulatory structure to set standards and control drivers)
  - Ford example, can't go up hill → changed road rules around the technology
- **Organizational** and **management capital** = investments in complementary assets, such as new business models, new business processes, management behaviour, organisational culture or training

Complementary social, managerial, and organisational assets required to optimise returns from information technology investments:
- **Organisational assets**
  - Supportive organisational culture that values efficiency and effectiveness

- Appropriate business model
- Efficient business processes
- Decentralised authority
- Distributed decision-making rights
- Stronger IS development team

- **Managerial assets**
  - Strong senior management support for a large investment and change
  - Incentives are for management innovation
  - Teamwork and collaborative work environments
  - Training programs to enhance management decision skills
  - Management culture that values flexibility and knowledge-based decision-making presentation
- **Social assets**
  - The Internet and telecommunication infrastructure
  - IT-enriched educational program raising labor force computer literacy
  - Standards (both government and private sector)
  - Laws and regulations creating fair, stable market environments
  - Technology and service firms in adjacent markets to assist implementation

Business Information Value Chain

- Every business has an information value chain
- From a Business perspective, information systems are applied in a series of value adding activities for acquiring, transforming, and distributing information that managers can use to improve decision-making, enhance organisational performance and increase firm profitability

L2 – Business Processes and Information Systems + (p.72-88)

- TELUS example
- In order to operate, businesses must deal with many different pieces of information about suppliers, customers, employees, invoices, and payments, and of course the products and services
- They must organise work activities that use this information to operate efficiently and enhance the overall performance of the firm
- Information Systems make it possible for firms to manage on their information, make better decisions, improve the execution of their business processes
- Information Systems automate many steps in business processes that were formerly performed manually, such as checking clients credit, or generating an invoice and shipping order
- By analysing business processes, you can achieve a very clear understanding of how business actually works

Systems from a FUNCTIONAL PERSPECTIVE

- Referred to the manner in which workers organised, coordinated, and focused to produce a valuable product or service
- Collection of activities required to produce a product or service position these activities are supported by source of material, information and knowledge among the participants in business processes
- Performance of a business firm depends on how well its business processes are designed and co-ordinated
  - Can be a form of competitive strength or liability
- Every business can be seen as a collection of business processes, some of which are part of a little larger encompassing processes
  - Uses of mentoring, wikis, blogs and videos are all part of the overall knowledge management process
- Many business processes are tied to a specific functional area (**FUNCTIONAL BUSINESS PROCESSES**)
  - *eg. sales and marketing* function is responsible for identifying customers; **human resources** function is responsible for hiring employees
- Other business processes across many different functional areas and require coordination across departments (**ORDER FULFILMENT PROCESSES**)
  - *eg. FedEx or UPS*
  - The required information must flow rapidly both within the firm from one decision-maker to another; with the business partners, such as delivery firms; and with the customer

Systems from a CONSTITUENCY PERSPECTIVE
### (Systems for different management of groups)

- **Transaction processing systems (TPS)**   **OPERATIONAL MANAGERS**
  - System that keeps track on the elementary activities and transactions of the organisation (*sales, receipts, cash deposits, payroll, credit and decisions, flow of materials in factory*)
  - Computerised system that performance and records daily routine transactions in necessary to conduct a business (*eg. Sales order entry, hotel reservations, payroll, employee record keeping, shipping*)
  - At the operational level, tasks, resources, and goals are predefined and highly structured
  - Managers need TPS to monitor the status of internal operations and the firm's relations with the external environment
  - TPS are also major producers of information for the other systems and business functions

- Transaction processing systems are often so central to a business that a TPS failure for a few hours can lead to a firm's demise and perhaps that of other firms linked to it

- **Management information systems (MIS)**   **MIDDLE MANAGERS**
  - System for business intelligence
    - contemporary term for data and software tools for organising, analysing, and providing access to data to help managers and other enterprise users make more informed decisions)
    - business intelligence addresses the decision-making needs of all levels of management
  - Provide middle managers with reports on the organisation's current performance
  - This information is used to monitor and control the business and predict future performance
  - Summarise and report on the company's basic operations using data supplied by transaction processing systems
  - Typically provide answers to routine questions that have been specified in advance and have a predefined procedure for answering them (*eg. report listing of total pounds of lettuce used this quarter by a fast-food chain*)
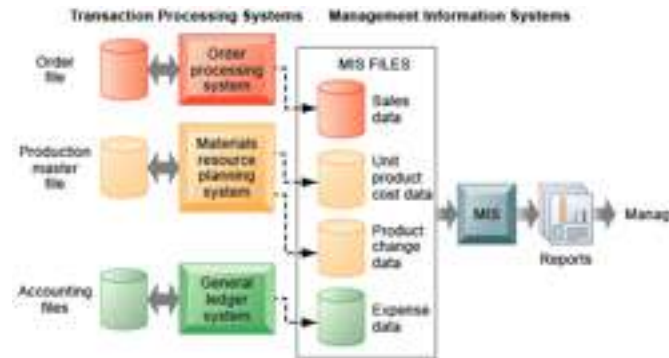
- **Decision support systems (DDS)**   **MIDDLE MANAGERS**
  - System for business intelligence
  - For more non-routine decision-making
  - Focus on problems that are unique and rapidly changing, for which the procedure for arriving at the solution may not be predefined in advance
  - Answer questions like *eg. what would be the impact on production schedules if we were to double seals in the month of December?*
  - DSS use internal information from TPS and MIS **BUT** they often bring information from external sources, such as current stock prices or product prices of competitors
  - These systems are employed by "superuser" managers and business analysts, who want to use sophisticated analytics and models to analyse data
  - **Voyage-estimating system:** interesting, small, powerful DDS system of a large global shipping company that transports bulk cargoes of coal, oil, ores, and finished products
    - Calculates financial and technical voyage details
    - Financial calculations in include ship/time costs (fuel, labour, capital), freight rates for various types of cargo, and port expenses
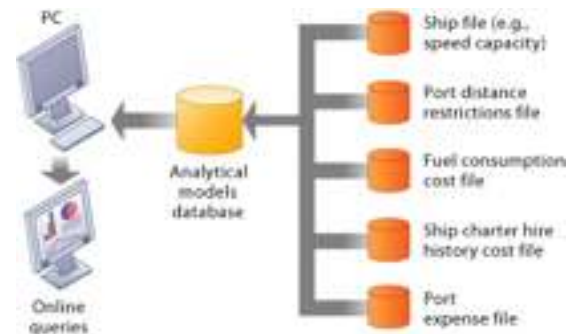
- **Executive support systems (ESS)**   **SENIOR MANAGERS**
  - System for business intelligence
  - Help senior management to make decisions on strategic issues and long-term trends, both in the firm and in the external environment
    - *What to world employment levels be in five years? What are the long term industry cost trends? What product should we be making in five years?*
  - Address in non-routine decisions requiring judgement, evaluation, and insight because there is no and agreed-on procedure for arriving at a solution
  - The information is delivered to senior executives through a **portal**, which uses a web interface to present integrated personalised business content
  - ESS are designed to incorporate data from many sources, such as new tax laws or competitors, but they also draw summarised information from internal MIS and DSS
  - The filter, compressed, and tack critical data, displaying the data of greatest importance to senior managers

Systems for linking the enterprise –

Relationship of Systems to One Another

In modern-day digital firms, the different types of systems are closely linked to one another. This is the ideal. In traditional firms these systems tend to be isolated from one another, and information does not flow seamlessly from one end of the organization to the other. Efficiency and business value tend to suffer greatly in these traditional firms 2.13

Figure 2-10

ENTERPRISE APPLICATIONS

- *How can a business manage all the information in these different systems (mentioned above)? How can these different systems share information and how can managers and employees coordinate their work?*
- **Enterprise applications =** Systems that span functional areas, focused on executing a business processes across the business firm, include all levels of management
- Help the business become more flexible and productive by coordinating their business processes more closely and integrating groups of processes so they focus on efficient management of resources and customer service
- Each of the following enterprise applications integrate a related set of functions and business processes to enhance the performance of the organisation as a whole

1. **Enterprise resource planning (ERP) (or Enterprise Systems)**
   - Used it to integrated business processes in manufacturing and production, finance and accounting, sales and marketing, and human resources into a single software system
   - *eg. when customer places an order, they order data flow automatically to other parts of the company that are affected by them*

2. **Supply chain management systems (SCM)**
   - Type of <u>interorganisational system</u> because it automates the flow of information across organisational boundaries
   - Helps suppliers, purchasing firms, distributors, and logistics companies share information about orders, production, inventory levels, and delivery of products and services so they can source, produce, and deliver goods and services efficiently
   - Ultimate objective: get right amount of products from the source to the point of consumption in the least amount of time under the lowest cost

3. **Customer relationship management system (CRM)**
   - Provide information to coordinate all of the business processes that deal with customers in sales, marketing, and service to optimise revenue, customer satisfaction, and customer retention
   - Helps firms identify, attract, retain the most profitable customers; provide a better service to existing customers; increase sales

4. **Knowledge management system (KMS)**
   - Enables organisations to better manage processes for capturing and applying knowledge and expertise
   - These systems collect all relevant knowledge and experience in the firm, and make it available wherever and whenever it is needed to improve the business processes and management decisions
   - Also links with the firm to external sources of knowledge
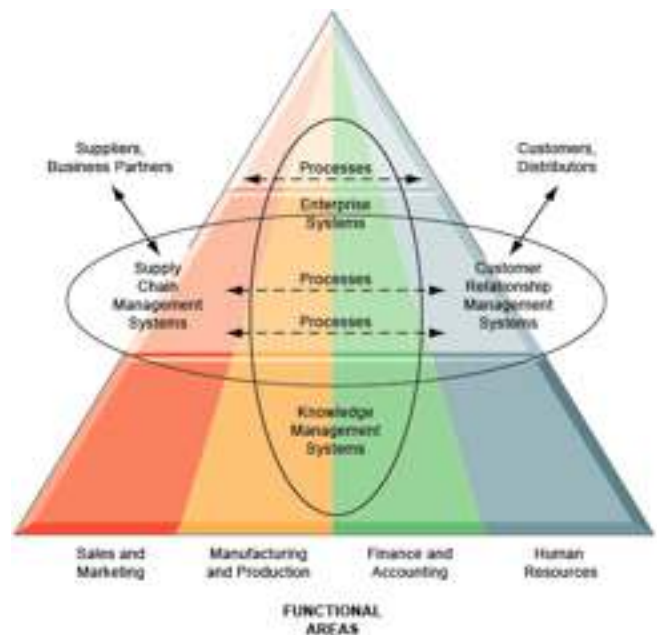
L3 – Implementing Systems + (p.521-541)

- building new IS ⋯→ organisational change
  - involves much more than new hardware and software
  - changes in jobs, skills, management, organisation

Systems development and organisational change
- The most common forms of organisational change are automation and rationalisation (slow-moving, slow-changing, less risk)

(1) Automation
  - frequently reveals bottlenecks in production and makes existing arrangement of procedures and structures painfully cumbersome (=ingombrante, scomodo, difficile)

(2) Rationalisation
  - the streamlining of standard operating procedures ⋯→ for specific parts of biz

(3) Redesign
  - biz processes are analysed, simplified, and redesigned. Reorganises work flows, combining steps to cut waste and eliminate repetitive, paper-intensive tasks (sometimes eliminate jobs as well). Requires new vision of how the process is to be organised ⋯→ business process that need radical change ⋯→ for specific parts of biz

(4) Paradigm shifts
  - involves rethinking the nature of the biz and the nature of the organisation. 3&4 usually fail as it involves extensive organisational change (more difficult to orchestrate).
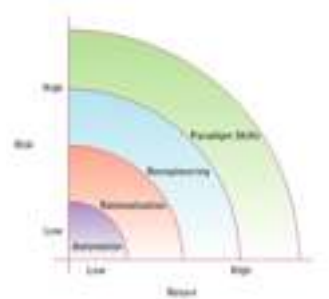
Business Process Redesign/Reengineering (BPR)

- **Business Process Reengineering (BPR)**
  - has helped the home mortgage industry which re-examines the entire set of logically connected processes required to obtain a mortgage.
  - Assisted by *Work Flow management:* the process of streamlining business procedures so that documents can be moved easily and efficiently + *document management software* (automates processes and allow many people to work on a document simultaneously).
  - Indexing system: let users be able to retrieve files in many different ways, based on the content of the doc.
  - Steps in effective reengineering: understand what business processes need improvement ⋯→ determine what business processes are the most important and how improving these processes will help the firm execute its strategy. ⋯→ Measure the performance of existing processes as baseline
- **Business process management (BPM)** ⋯→ provides a variety of tools and methodologies to analyse existing processes and optimize those processes
  - enables organisation to manage incremental process changes that are required simultaneously in many areas of the business. Includes work flow management, business process modelling, quality management, change management, and process monitoring and analytics, and tools for recasting the firm's business processes into a standardised form where they can be continually manipulated. Process mapping tool ⋯→ to identify and document existing processes and to create models of improved processes that can then be translated into software.
  - companies practicing business process management go through the following steps:
    1. **Identify process for change**
       - what business processes need improvement?
       - when systems are used to strengthen the wrong business model of business processes, the business can become more efficient at doing what it should not
       - manager need to determine what business processes are the most important and how improving these processes will help business performance
    2. **Analyse existing processes**
       - existing business processes should be modelled and documented, noting inputs, outputs, resources, and the sequence of activities
       - the process design team identifies redundant steps, paper-intensive tasks, bottlenecks, and other inefficiencies
    3. **Design the new process**

- • once the existing process is mapped and measured in terms of time and cost, the process design team will try to improve the process by designing a new one
- • a new streamlined "to- be" process will be documented and modelled for comparison with the old process

4. Implement the new process
- • once the new process has been thoroughly modelled and analysed, it must be translated into a new set of procedures and work rules
- • new IS or enhancements to existing systems may have to be implemented to support the redesigned process
- • as the business start using this process, our problems are uncovered and addressed; employees recommended improvement

5. Continuous measurement
- • once are process has been implemented and optimised, it needs to be continually measured

- **Quality Management**
  - • **Total Quality Management** ⇢ make quality the responsibility of all people and functions within an organisation.
  - • **Six Sigma** ⇢ specific measure of quality (represent **3.4 defects per million opportunities**?) raise quality and lower cost as the earlier problem is eliminated, the lesser it will cost the co.

Systems development

- are activities that go into producing an information system solution to an organisational problem or opportunity.

Systems Development Life Cycle (SDLC) Life-Cycle Phases
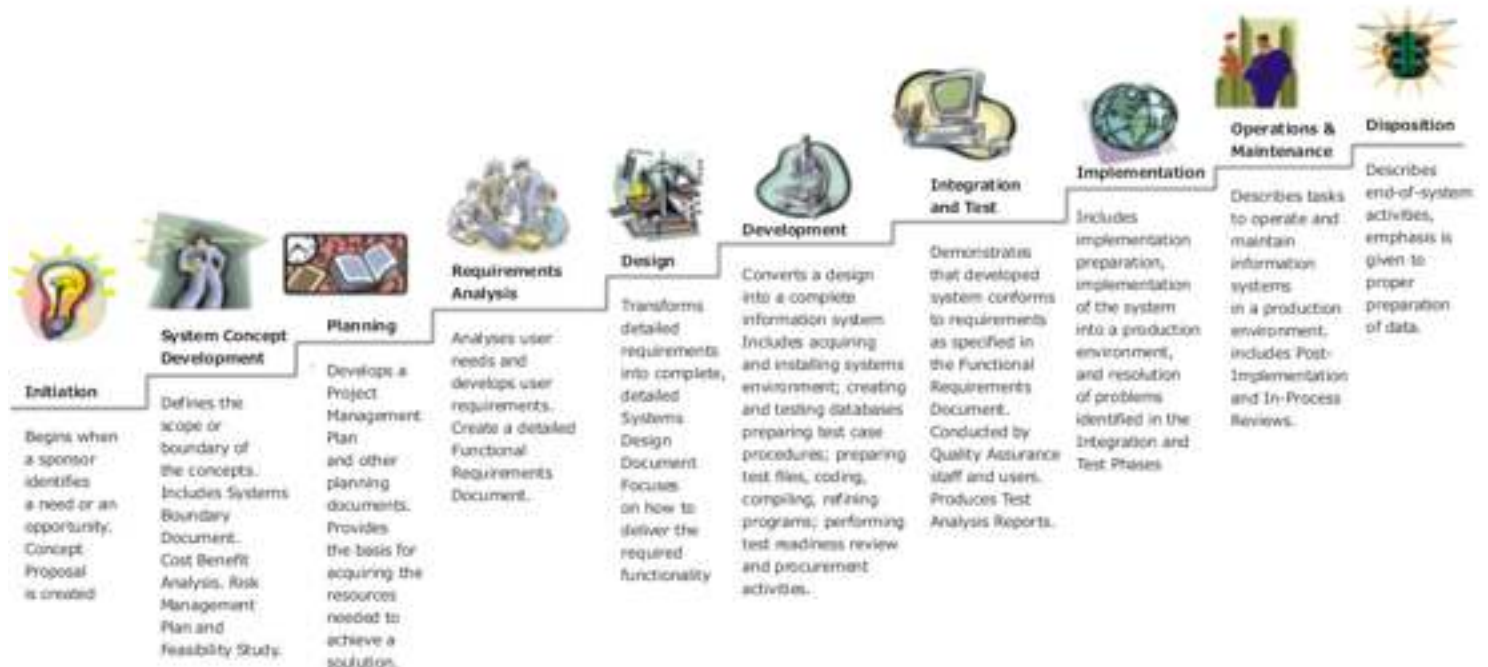
- (6) activities include:

1. **Systems Analysis:** Analysis of the problem (what a sys should do to meet information requirements) ⸱⸱⸱⟶ define+ identify causes+ specify solutions+ identify information requirements (who needs the info, where, when, and how) + feasible study (whether the sol is feasible from financial, technical and organisational viewpoint). Role of users: get interviewed, survey.

2. **System design:** shows how the system will fulfil this objective in system analysis. Consists of design specifications that give the system its form and structure:

Output: medium, content, timing	Controls: input, processing, output and procedural control.
Input: origins, flow, data entry	Security: access controls, catastrophe plans
User interface: simplicity, efficiency, feedback	Documentation: operation, systems and users
Database design: logical data model, volume and speed requirements, file organisation	Conversion: transfer files, select testing mtd, cut over to new system
Processing: computations, program modules	Training: techniques, modules, facilities
Manual procedures: what activities, when, how...	Organisational changes: task redesign, job, process, organisational structure

Role of end users: working on design increases users' understanding and acceptance.

3. **Programming:** where system specifications are translated into software program code.
4. **Testing:** unit or program testing, system testing, acceptance testing (final certification that sys is ready to be used in a production setting ⸱⸱⸱⟶ revaluated by users and management). Test plan ⸱⸱⸱⟶ general condition being tested is usually record change
5. **Conversion:** the process of changing from the old system to the new system. Train users. Strategies:
   • Parallel strategy: both old and its potential replacement run together for a time. Safest but very expensive due to additional staff or resources required to run the extra system.
   • Direct cutover: replaces the old system directly with new. Very risky + potentially more costly if serious problem arise in the new sys.
   • Pilot study: introduces new sys to only limited area of the organisation
   • Phased approach: introduces new sys in stages
6. **Production and Maintenance:** operate, evaluate and modify the system.

Modelling and designing systems
- **Structured methodologies:** structured refers to the fact that the techniques are step by step, with each step building on the previous one. Structured methodologies are top-down, progressing from the highest most abstract level, to the lowest level of detail. Useful for modelling processes, but do not handle the modelling of data well. Treat data and processes as logically separate entities
  • <u>Data flow diagram (DFD):</u> tool for representing a sys component processes and flow of data.
  • <u>Data dictionary:</u> information about individual data and groupings within a system. (defines the contents of data flows and data stores). Hierarchical structure chart where software design is modelled-shows relationship to other levels.
- **Object-oriented development:** uses the object as the basis unit of system analysis and design. Object: combines data and specific processes that operate on those data.
- **Computer- Aided Software Engineering (CASE)** provides software tools to automate these methodologies to reduce the amount of repetitive work the developer needs to do.

Systems Development v Implementation
(1) **Traditional Systems Life Cycle:** phased approach to building a system. Requires IS to be developed in formal stages with the production of many formal documents that reflect up-to-date specifications of the project. Inflexible as tasks in one stage need to be completed before starting the next phased and there are huge hindrance to go back the stages because of the many formal documents that have to be regenerated again. Used for large and very complex project that has need for formal requirement analysis, predefined specifications and tight controls over the system-building process. **Not agile:** costly, time-consuming, inflexible; project is irresponsive to unpredictable and unplanned needs of cust ⸱⸱⸱⟶ can't blame users for changing their minds, have to charge expensive as the system is rigid to changes- cust unhappy.

(2) **Prototyping:** consists of building an experimental system rapidly and inexpensively for end users to interact with and evaluate. Encourage end user involvement in system development and iteration of design (process of building a preliminary design, trying it out, refining, and trying again) until specifications are captured (accurately reflecting users requirement). **Adv**: useful when there is uncertainty about requirements or design solutions and are often used for designing info sys's end user interface. **Disadv**: the rapid creation of prototypes can result in systems that have not been completely tested or documented or that are technically inadequate for a production environment

(3) **End-user development:** is the development of information sys by end users, either alone or with minimal assistance from IS specialist. End user development can be created rapidly and informally using fourth-generation software tools. However, end user development may create IS that do not necessarily meet quality assurance standards and that are not easily controlled by traditional means.

(4) **Application Software packages:** reduces the amount of design, programming, testing, installation, and maintenance work required to build a system. Application software packages are helpful if a firm does not have the internal info system (IS) staffs or financial resources to custom build a system. To meet an organisation's unique requirements, packages may require extensive modification that can substantially raise devt cost.

(5) **Outsourcing:** consists of using external vendor to build (or operate) a firm's IS instead of the organisations internal IS staffs. Outsourcing can save application devt cost or enable firms to develop applications without internal IS staff. However firm risk of losing control over there is and becoming too independent on external vendors. Monitoring cost. Outsourcing also entails hidden costs, especially when the work is sent offshore e.g. coping with cultural difference that could drain productivity, human resource issues.
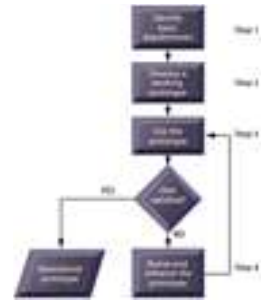
7.4. Application Development for the Digital Firm:

- **Rapid Application Development (RAD):** used to describe this process of creating workable sys in a very short period of time. (E.g. object-oriented, reusable software, prototyping, fourth generation language tools
- **Joint application design (JAD):** used to accelerate the generation of information requirements and to develop the initial systems design by bringing end users and information sys specialist together.
- **Agile development:** focus on rapid delivery of working software by breaking a large project into a series of small sub- projects that are completed in short periods of time using iteration and continuous feedback
- **Component-Based Development and Web Services:** enables a system to be built by assembling and integrating existing software components

L4 – Databases and Information Management + (p.241-267)

- An effective information system provides users with accurate, timely, and relevant information

File organisation terms and concepts
- a computer system organises data in a hierarchy that starts with bits and bytes and progresses to fields, records, files, and databases
- **bit:** represents the smallest unit of data a computer can handle
- **byte**: group of bits, represents a single character, which can be a letter, a number or another symbol
- **field**: a grouping of characters into a word, a group of words, or a complete number (e.g. person's name or age)
- **record**: a group of related fields, such as the student's name, the course taken, the grade
- **file**: a group of records
- a record describes an **entity**: a person, place, thing, or event on which we store and maintain information
- **attribute**: each characteristic or quality describing a particular entity

Data Hierarchy Diagram – with Employee Database example

Problems with the traditional file environment
- Data redundancy and inconsistency
  - **data redundancy**: presence of duplicate data in multiple data files so that the same data are stored in more than one place or location
  - **inconsistency**: the same attribute may have different values
- Program-data dependence
  - refers to the coupling of data stored in files and the specific programs required to update and maintain those files such that changes in programs require changes to the data
- Inflexibility
  - a traditional file system can deliver routine scheduled reports after extensive programming efforts, but it cannot deliver ad hoc reports or respond to unanticipated information requirements in a timely fashion
- Poor data security
- Inability to share data among application
  - because pieces of information in different files and different parts of the organisation cannot be related to one another, it is virtually impossible for information to be shared or accessed in a timely manner
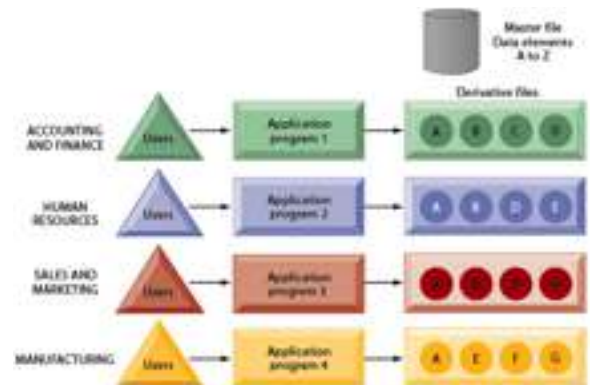

Database Approach to Data Management
- **Database management system (DBMS)** ⤳ software that permits an organisation to centralise data, manage them efficiently, and provide access to the stored data by application programs
- The DBMS relieves the programmer or end user from the task of understanding where and how the data are actually stored by separating the *logical* and *physical views* of the data
  - the *logical view* presents data as they should be perceived by end users or business specialists
  - the *physical view* shows how data are actually organised and structured on physical storage media

How a DBMS solves the problems of the traditional file environment

- reduces data redundancy and inconsistency by minimising isolated files in which the same data are repeated
- type of DBMS:
1. **Relational DBMS:** keep track pf entities attributes, and relationships (type of DBMS for PCs and larger computers)
    - represents data as 2D tables (called *relations*)
    - one table for entity SUPPLIER and one for entity PART
    - each individual element of data for each entity is stored as a separate files, and each field represents an attribute for that entity
    - **fields** = COLUMNS
    - the actual information about a single supplier that resides in a table is called a ROW. Rows are commonly referred to as RECORDS or **TUPLES**
    - **key field** includes both foreign key and primary key (unique identifier for all the information in any row of the table and cannot be duplicated)
    - **Operations of a relational (DBMS)**: tables can be combined provided any two tables share a common data element. Simply select, join and project.
        - *Select operation* ⟶ creates a subset consisting of all records in the file that meet started criteria (creates a subset of rows that meet certain criteria)
        - *Join operation* ⟶ combines relational tables to provide the user with more information than is available in individual tables
        - *Protect operation* ⟶ creates a subset consisting of columns in a table, permitting the user to create new tables that contain only the information required
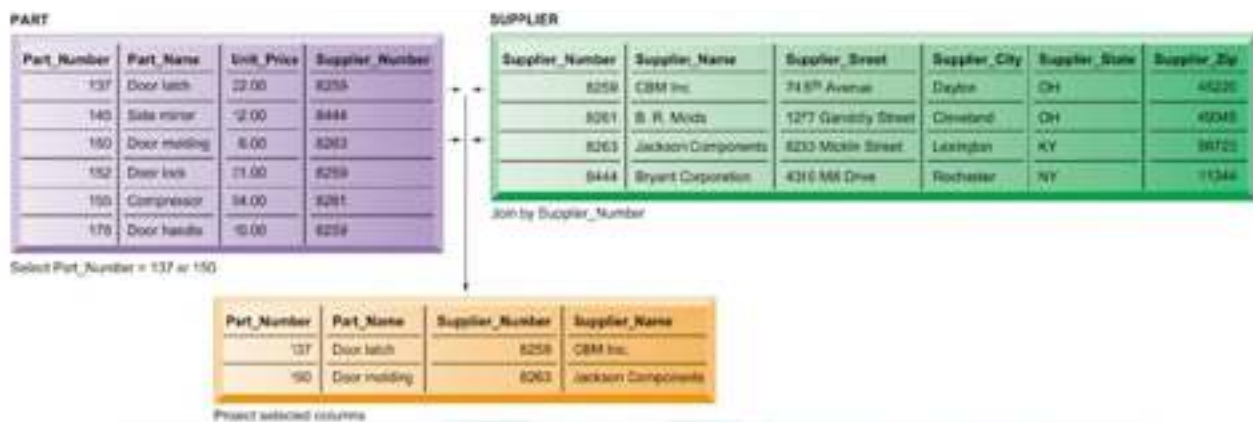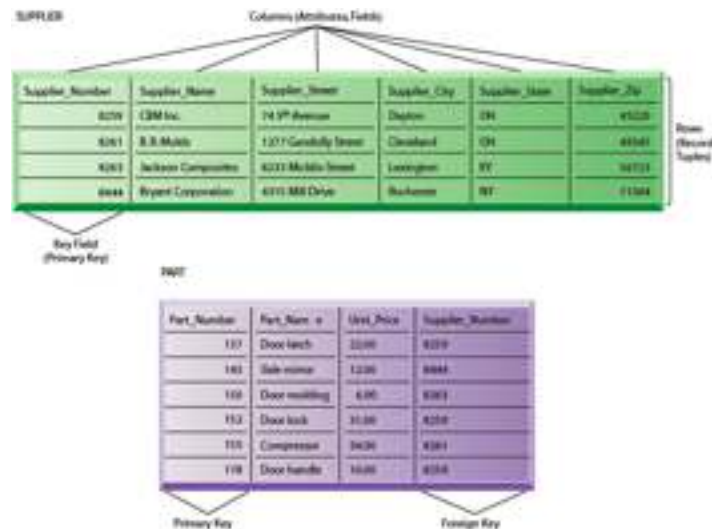
Extract from the new table only the following columns: Part_Number, Part_Name, Supplier_Number, and Supplier_Name

2. **Non-relational database management systems (NoSQL):** use a more flexible data model and are designed for managing large data sets across many distributed machines and for easily scaling up or down
    - useful for accelerating simple queries against large volumes of structured and unstructured data, including Web, social media, graphics, and other forms of data that are difficult to manage with traditional SQL-based tools
    - alternative to the traditional RDBMS

Capabilities of DBMS
- *Data definition*: specify the structure of the content of the database.
- *Data dictionary*: automated or manual file that stores definitions of data elements and their characteristics.
- *Data manipulation*: used to add, change, del, and retrieve the data in the database. E.g. **Structured Query Language (SQL)** to retrieve information from database and automatically make into report.

Designing Databases

- To create a database, you must understand relationships among data, type, how it will be used, and how it needs to be change. Requires both:
  - Conceptual design: abstract model of the database from a biz perspective. Describes how the data are to be grouped, identifies relationships. Normalisation: process of creating small, stable, and yet flexible and adaptive data structures from complex groups of data; and
  - Physical design: shows how the database is actually arranged on direct-access storage devices.
- Referential integrity: enforce this rule to ensure that relationships b/w coupled items remain consistent. i.e. if change a record into the table with foreign key, the corresponding record in the linked table also have to be changed.

Using databases to Improve Business Performance and Decision Making

Where large company is involved, special capabilities and tools are required such as: Data warehousing, data mining and tools for accessing internal databases through the web.

- ✱ **Data Warehouses:** a database that stores current and historical data of potential interest to decision makers throughout the company. Data accessed cannot be altered
  - **Data marts**: subset of data warehouse in which a summarised or highly focused portion of the organisation's data is placed in a separate database

Once data has been captured in data warehouses and data marts ⌐

- ✱ **Business Intelligence:** use tools for analysing patterns, relationships and insights from data warehouses to help users make informed decision.

•**Online Analytical Processing (OLAP)**: supports multidimensional data analysis, enabling users to view the same data in different dimensions (price, region, cost). But users need to have a good idea what information they are looking for. Unlike data mining.

•**Data Mining**: is more discovery driven. Provides insights into corporate data that cannot be obtained with OLAP by finding hidden patterns and relationships in large databases and inferring rules from them to predict future behaviour. Type of information obtainable includes:

- ○ **Associations** are occurrences linked to a single event. Find associations or correlations among sets of items. E.g. when corn chips are purchased cola drink is purchased together 65% of the time.
- ○ **Sequences**: events are linked over time. E.g. when a house is bought, 2 weeks after refrigerator is bought 65% of the time and then...
- ○ **Classification** recognises patterns that describe the group to which an item belongs by examining existing items that have been classified and by inferring a set of rules. E.g. discover characteristics of cust that could leave.
- ○ **Clustering**: process of grouping related records together on basis of similar values for attributes. Works in a manner similar to classification when no groups have yet been identified.
- ○ **Forecasting** uses a series of existing values to forecast what other values will be.
- **Text Mining**: analyse unstructured data such as email, memos, survey responses etc.
- **Web Mining**: the discovery and analysis of useful patterns and info from the web.
- **Databases and the Web**: using the Web to access an organisation's internal databases is easier, requires few or no changes to internal database, costs much less.
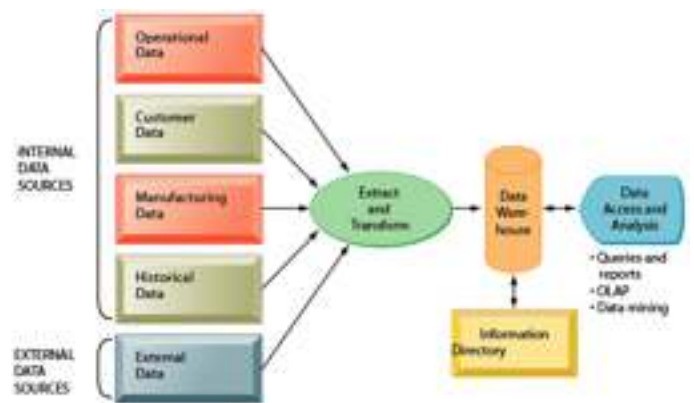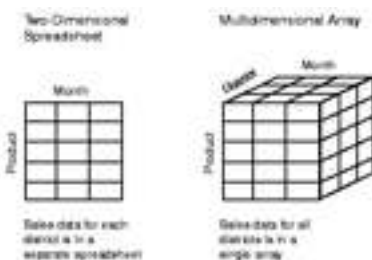
L5 – ERP Implementation + (p.241-267)

- **Enterprise Resource Planning** is an industry term for the broad set of activities that managers use to run the important parts of an organisation such as:
  - purchasing
  - human resources
  - accounting
  - production
  - sales
- **CORE ERP MODULES** include financials, HR, operations
  - there are many modules, but organisations are not forced to purchase all of them —> of course, the more they have, the greater integration (meaning greater ROI)
- wl ERP Systems, once data is entire, it is readily available on-line and real-time to users in all departments
- They help prevent human error
- Stakeholders can be notified in real-time about bottlenecks and performance problems as they occur, possibly quickly enough to prevent large-scale process failures
- ERP systems demand standardisation of business processes
  - **business process** = collection of activities that together add value to the company
  - ERP provides a template to standardise business processes —> i.e. lead to advantage mentioned above
- Some DISADVANTAGES are:
  - they impose standardised way of conducting business processes
    - so if the process doesn't match the way the business is already operating = mess - difficulties in implementation or operation
  - A company still needs to be good at what they do. ERP plays only a part of the job
    - company needs to have a good strategy, objectives and goals
  - maintenance of hardware is enormous (need constant care and feeding)
  - Sometimes problems arise during its <u>implementation</u>
    - people/employees haven't received enough training so they don't accept the new adoption and revert to old practices
    - sometimes so sophisticated you need to hire a professional consultant to assist
- **Software as a Service (SaaS)** a firm accesses the ERP system at a vendor's site over the Internet (so the vendor assumes the responsibility of managing the servers)
    - problem: security and privacy concerns
- **Open source software** : freely distributed in source code form with little or no copyright protection to restrict its use
- A **tier** is a classification of software by the size of the company it fits
  - the second and third tiers are known as **small-to-medium sized enterprises (SME)**
  - 4 tiers: tier 1 is for the bigger firms (use Oracle, SAP etc.), Tier 4 is for the small companies
- Applications access relational databases by issuing queries and statements in **structured query language (SQL)**, a declarative programming language, which means applications specify what database should do, but not what database actually performs
  - simple query is the most common
- An ERP system's underlying database structure consists of thousands of tables
- certain tables, called **configuration tables**, include options that enable a company to tailor a particular aspect of the system tot he way it chooses to do business
- the process of selecting "switches" that lead the software down one path or the other is known as **configuration**
  - in order to know what option to select, system implementers must have a deep understanding of how the org operates
  - vendors can sell the same packages but with different configurations
  - Configuration options provide for a number of settings: security, optimise the software to accommodate more than one legal entity, sales area, warehouse, shipping point etc.
- **Customisation** is a controversial topic surrounding ERP
  - during software selection, most companies have every intention of implementing an ERP system "**vanilla**" (= without customisation) —> most consider this approach (little or no customisation, built going on)
  - customisation is expensive bc it involves rewriting and coding (analysis, design etc)

- **Reengineering** consists of the methods companies use to make changes to their business processes using techniques that abandon the old, traditional labour mindset in favour of the breakthrough improvements in performance measure
- **Business process reengineering (BPR)** is the fundamental, radical, redesign in business processes to achieve dramatic improvements in key measures of performance such as costs, quality, speed, and service
  - Thanks to BPR, companies reduced or eliminated non-value-added work and costs, reduced cycle time, mountains of paper, mistakes, facilities by transforming their business processes in order to make them more efficient and customer-centric
  - Lead to:
    - cost reductions
    - improved customer satisfaction
    - improved agility
    - increased profitability and reputation
  - Risks: employee resistance to new CEO trying to transfer the business processes
  - 2 types of reengineering:
    - clean slate reengineering (can be costly, needs resources)
    - technology-enabled (involves the use of technology to facilitate the reengineering process; the company's processes are reengineered to match best practices in ERP)
- BPR and ERP aim to reduce costs and improve customer satisfaction while increasing profits and stakeholder value
- move focus from functions to processes —> BPR shifts the focus to organisational goals and shared processes
- Neither of them have a perfect record though, so keep in mind!
- BPR Principles:
  - have those who use the output of the process, perform the process
  - empower workers with decision-making responsibilities leading to higher quality product or service
  - treat geographically dispersed resources as though they were centralised
  - link parallel activities instead of integrating their results - merge straight away
  - organise around processes, not tasks or functional area
  - self-service
  - put the decision point where the work is performed and build controls into the process
  - capture information once and at the source

L6 – Knowledge Management + (p.449-474)

- knowledge mng and collaboration systems are among the fastest growing areas of corporate and govt. software investment
- knowledge becomes useful when it can be communicated and shared across the firm
- we live in an information economy in which the major source of wealth and prosperity is the production and distribution of information and knowledge
- data ≠ information ≠ knowledge ≠ wisdom
  - **data** is a flow of events or transactions captured by an org's systems
  - to turn data into **information** a firm must expend resources to organise data into categories of understanding (e.g. monthly, daily, regional, store-based reports of total sales)
  - information into **knowledge**, a firm must expand additional resources to discover patterns, rules and contexts where the knowledge works
  - to **wisdom**, the collective and individual experience of applying knowledge to the solution of problems
- **tacit knowledge** = knowledge residing in the minds of employees that has not been documented
- **explicit knowledge** = knowledge that has been documented

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KNOWLEDGE IS A FIRM ASSET
* Knowledge is an intangible asset.
* The transformation of data into useful information and knowledge requires organisational resources.
* Knowledge is not subject to the law of diminishing returns as are physical assets, but instead experiences network effects as its value increases as more people share it

KNOWLEDGE HAS DIFFERENT FORMS
* Knowledge can be either tacit or explicit
* knowledge involves know-how, craft and skill
* Knowledge involves knowing how to follow procedures
* Knowledge involves knowing why, not simply when things happen (causality)

KNOWLEDGE HAS A LOCATION
* Knowledge is a cognitive event involving mental models and maps of individuals
* There is both a social and an individual basis of knowledge
* Knowledge is *sticky* (hard to move), *situated* (enmeshed in a firm's culture) and *contextual* (works only in certain situations)

KNOWLEDGE IS SITUATIONAL
* Knowledge is conditional; knowing when to apply a procedure is just as important as knowing the procedure (conditional)
* Knowledge is related to context; you must know how to use a certain tool and under what circumstances

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- Organisational learning = learning from collection of data, careful measurement of planned activities, trial and error (experiment), feedback from customers and environment

The knowledge management value chain
- refers to the set of business processes developed in an org to create, store, transfer and apply knowledge
- increases the ability of the org to learn from its environment
- **knowledge acquisition**
  - reports, documents, email, discover patterns in data
- **knowledge storage**
  - creation of database
- **knowledge dissemination**
  - portals, email, instant messaging, wikis, social business tools, search engines technology to share calendars, documents,
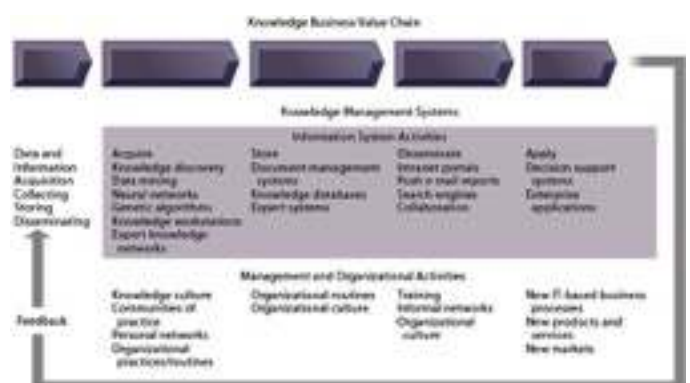
data, graphics
- **knowledge application**
- **building organisational and management capital: collaboration, communities of practice, and office environments**
  - managers can help by creating new organisational roles
  - **communities of practice (COPs)** are informal social networks of professionals and employees within and outside the firm who have similar work-related activities and interests

Types of knowledge management systems
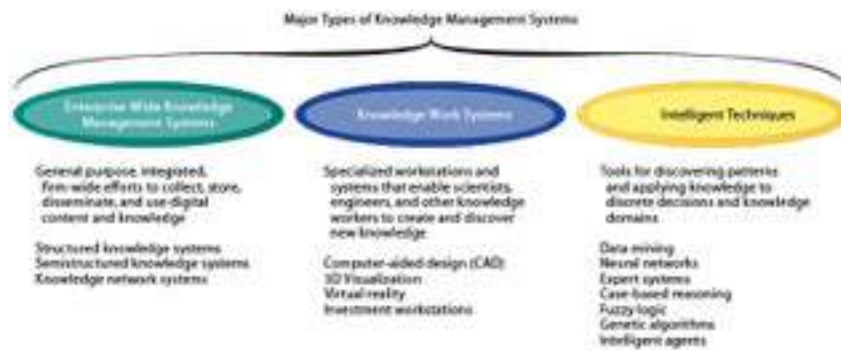
Enterprise-wide knowledge management systems

- Deal wl 3 types of knowledge:
  - structured (documents, reports, presentations…)
  - semi-structured (email, voice mail, chat room, videos…)
  - in employee's head, rarely written down (tacit knowledge)

1. ENTERPRISE CONTENT MANAGEMENT SYSTEMS (ECM)
   - main vendors: IBM, Oracle, Open Text Operations, EMC
   - helps org manage structured and semi-structured knowledge
   - a key problem in managing knowledge is taxonomy
2. KNOWLEDGE NETWORK SYSTEMS
   - address the problems that arises when the appropriate knowledge is not in the form of a digital doc but instead resides in the memory of individual experts in the firm
3. COLLABORATION AND SOCIAL TOOLS AND LEARNING MANAGEMENT SYSTEMS
   - social bookmarking (Pinterest) and folksonomies (user-created taxonomies for shared bookmarks; tags)
   - learning management systems (LMS) provides tools for the management, delivery, tracking, and assessment of various types of employee training and learning (e.g. future learn)

Knowledge Work Systems

- **Knowledge workers and knowledge work**
  - researchers, scientists, designers, architects, engineers
  - create new products or find ways of improving existing ones
  - perform 3 roles:
    - keep the organisation current in knowledge as it develops in the external world - in technology, science, social thought and the arts
    - serve as internal consultants regarding the areas of their knowledge, the changes taking place, and opportunities
    - acting as change agents, evaluating, initiating, and promoting change projects
- **Requirements**
  - powerful graphics, analytical tools, communications, document management capabilities
  - e.g. design engineers —> CAD
- **Examples**
  - **Computer-aided design (CAD)** = supply data for 3-D printing

- **Virtual reality systems** = have visualisation, rendering and simulation capabilities that go far beyond those of conventional CAS (e.g. dissect a body virtually, design a car…)
- **Augmented reality (AR)** = a related technology for enhancing visualisation; provides a live direct or indirect view of a physical real-world environment whose elements are augmented by virtual computer-generated imagery
- **Virtual Reality Modeling Language (VRML)** = set of specifications for interactive, 3D modeling on the WWW that can organise multiple media types, including animation, images, and audio to put users in a simulated real-world environment.
- **Investment workstations** (e.g. Bloomberg Terminals)

Intelligent Techniques

- artificial and database technology provide a number of intelligence techniques that organisations can use to capture individual and collective knowledge and to extend their knowledge please
- Networks and data mining are used for **knowledge discovery**
- **Artificial intelligence (AI)** technology, consists of computer-based systems (both hardware and software) that attempts to emulate human behaviour
    - These systems are able to learn languages, accomplish physical tasks, is a perceptual apparatus, emulate human expertise and decision-making
- ✳ **Expert systems** = intelligent technique for capturing tacit knowledge in a very specific and limited domain of human expertise. these systems capture the knowledge of skilled employees in the form of a set of rules (called **knowledge base**) in a software system that can be used by others isn the organisation
    - How do they work?
        - experts put human knowledge as knowledge base;
        - the strategy used to search through the knowledge base is called the **inference engine**;
        - two strategies are commonly used:
            - **forward chaining**: the inference engine begins with the information entered by the user and searches the rule base to arrive at a conclusion
            - **backward chaining**: the strategy for searching the rule base starts with a hypothesis and proceeds by asking the user questions about selected facts until the hypothesis is either confirmed or disproved
- ✳ **Case-based reasoning (CBR)** = descriptions of past-experiences of human specialists, represented as cases, are stored in a database for later retrieval when the user encounters a new case with similar parameters
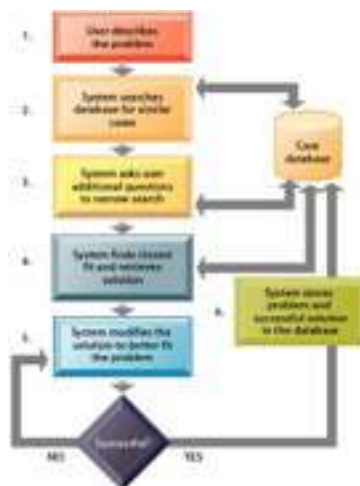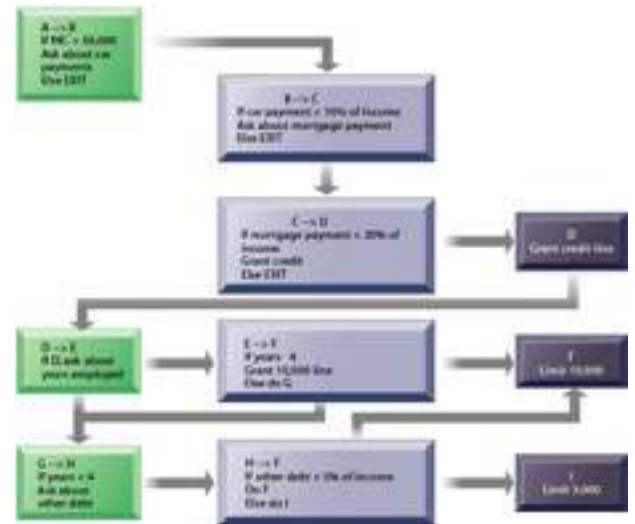
- ✳ **Fuzzy logic** is a rule-based   technology that can represent such

imprecision by creating rules that use approximate or subjective values; approach to computing based on "degrees of truth" rather than the usual "true or false" (1 or 0)

- not either hot or cold. It can be also cool or warm
- membership functions are terms

✱ **Machine learning** is the study of how computer programs can improve their performance without explicit programming; it recognises patterns in data, and changes its behaviour based on its recognition of patterns, experience or prior learning (a database)

- **Neural networks** = used for solving complex, poorly understood problems for which large amounts of data have been collected. They find patterns and relationships in massive amounts of data that would be too complicated and difficult for a human being good to analyse (e.g. Google image)
- **Genetic algorithms** = useful for finding the optimal solution for a specific problem by examining a very large number of possible solutions for that problem

✱ Intelligent agent technology helps businesses navigate through a large amounts of data to locate and act on information that is considered important; **intelligent agents** are software programs that work without direct human intervention to carry out specific tasks for an individual user, business process, or software application (e.g. Siri from Apple iOS) —> capable of learning from experiences

ALL OF THESE SYSTEMS (genetic algorithms, fuzzy logic, neural networks, expert systems) CAN BE INTEGRATED INTO A SINGLE APPLICATION CREATING HYBRID AI SYSTEM

L7 – Customer Relationship Management + (p.381–387)

DEFINITIONS

- CRM is an information industry term for methodologies, software and usually Internet capabilities that help an enterprise manage customer relationships in an organized way.
- CRM is the process of managing all aspects of interaction a company has with its customers, including prospecting, sales and service. CRM applications attempt to provide insight into and improve the company/customer relationship by combining all these views of customer interaction into one picture.
- CRM is an integrated approach to identifying, acquiring and retaining customers. By enabling organizations to manage and coordinate customer interactions across multiple channels, departments, lines of business and geographies, CRM helps organizations maximise the value of every customer interaction and drive superior corporate performance.
- CRM is an integrated information system that is used to plan, schedule and control the pre-sales and post-sales activities in an organization. CRM embraces all aspects of dealing with prospects and customers, including the call centre, sales-force, marketing, technical support and fi eld service. The primary goal of CRM is to improve long-term growth and profitability through a better understanding of customer behaviour. CRM aims to provide more effective feedback and improved integration to better gauge the return on investment (ROI) in these areas.
- CRM is a business strategy that maximises profitability, revenue and customer satisfaction by organizing around customer segments, fostering behaviour that satisfies customers and implementing customer- centric processes.

Type of CRM	Dominant characteristic
Strategic aims at	Strategic CRM is a core customer-centric business strategy that winning and keeping profitable customers
Operational processes	Operational CRM focuses on the automation of customer-facing such as selling, marketing and customer service
Analytical related data	Analytical CRM focuses on the intelligent mining of customer- for strategic or tactical purposes
Collaborative boundaries value	Collaborative CRM applies technology across organizational with a view to optimising company, partner and customer

STRATEGIC CRM

- focused upon the development of a customer-centric business culture
- dedicated to winning and keeping customers by creating and delivering value better than competitors
- 3 major business orientations: PRODUCT, PRODUCTION, SELLING, CUSTOMER
  - **Product-oriented:** believe that customers choose products wl best quality, performance, design, features
  - **Production-oriented:** believe that customers choose low-price products —> operating costs low
  - **Sales-oriented:** believe customers are driven to buy by advertising, selling, PR, sales promotions
  - **Customer/Market-oriented** company puts the customer first; developed better value propositions

OPERATIONAL CRM

- automated and improves customer-facing and customer supporting business processes
- focus on automation of MARKETING, SALES-FORCE, SERVICE function
- struggles to reach full effectiveness wlout analytical info

ANALYTICAL CRM

- concerned with capturing, storing, extracting, integrating, processing, interpreting, distributing, using and reporting customer-related data to enhance both customer and company value
- builds on the foundation of customer-related information
- ask questions to determine selling approaches for e.g.

COLLABORATIVE CRM

- term used to describe the strategic and tactical alignment of normally separate enterprises in the supply chain for the more profitable identification, attraction, retention and development of customers
- e.g. manufacturers of consumer goods and retailers can align their people, processes and technologies to serve shopper more efficiently and effectively
- Some CRM technology vendors have developed partner relationship mng (PRM) applications that enable companies to mng complex partner or channel ecosystems and reduce the costs of partner or channel mag

MISUNDERSTANDING ABOUT CRM

1. *CRM is database marketing*
   - CRM is much wider in scope than database marketing
   - analytical CRM has the appearance of database marketing BUT database marketing is less evident in strategic, operational and collaborative CRM
2. *CRM is a marketing process*
   - CRM software applications are used for many marketing activities: market segmentation, customer acquisition, customer retention and customer development (e.g.)
   - however, operational CRM extends into selling and service functions
3. *CRM is an IT issue*
   - CRM needs to be seen as a broader strategic initiative
   - IT is an enabler and facilitator
4. *CRM is about loyalty schemes*
   - A small part of CRM. Some companies may have nothing to do with loyalty schemes
5. *CRM can be implemented by any company*
   - All companies can implement CRM. Some better than others. But analytical CRM is a different matter bc it is based on customer-related data. If that is missing, then no CRM

Commercial contexts of CRM

- **Banks**: want CRM for its analytical capability to help them manage customer defection rates and to enhance cross-sell performance
- **Automobile manufacturers**: use CRM for its ability to help them develop better and more profitable relationships with their distribution networks
- **High-tech companies**: CRM helps DTC (direct-to-customer) companies to collect customer information, segment their customer base, automate their sales processes with product configurator software and deliver their customer service online. also developed automated relationships with suppliers to keep less inventory and as a consequence need less space
- **Consumer goods manufacturers**: use CRM to develop profitable relationships with retailers

Models of CRM

- **IDIC model**
  - <u>Identify</u> – who customers are
  - <u>Differentiate</u> – customers to decide which ones have more value
  - <u>Interact</u> – with customers
  - <u>Customise</u> – offers and communications
- **CRM value chain**
  - The model consists of five primary stages and four supporting conditions leading towards the end goal of enhanced customer profitability. The primary stages of customer portfolio analysis, customer intimacy, network development, value proposition development and managing the customer lifecycle are sequenced to ensure that a company, with the support of its network of suppliers, partners and employees, creates and delivers value propositions that acquire and retain profitable customers.

UNDERSTANDING RELATIONSHIPS

- customer-supplier relationships can evolve through awareness, exploration, expansion, commitment, dissolution
- there must be mutual <u>trust</u> & <u>commitment</u>

- <u>Trust</u> can be focused on one's *benevolence, honesty, competence*
- If trust is absent, conflict and uncertainty rise, whilst cooperation falls
- there are 3 characters of trust:
  - **calculus-based trust:** 'I trust you bc of what I am gaining or expect to gain from the relationship'
  - **knowledge-based trust:** relies on history and knowledge of each other
  - **identification-based trust:** happens when mutual understanding is so deep that each can act as a sub for the other in interpersonal interaction
- <u>Commitment</u> arises from *trust, shared values, belief that partners can be difficult to replace*

MANAGING CUSTOMER RETENTION (= tenere i customers per sé)

- Managing customer retention and tenure intelligently generates 2 key benefits for companies: <u>reduced marketing costs</u> and <u>better customer insight</u>

seven-stage customer journey from suspect status to advocate status

Suspect	Does the potential customer fit your target market profile?
Prospect	The customer fits the target market profile and is being approached for the first time.
First-time customer	The customer makes a first purchase.
Repeat customer	The customer makes additional purchases. Your offer plays a minor role in the customer's portfolio.
Majority customer	The customer selects your company as supplier of choice. You occupy a significant place in the customer's portfolio.
Loyal customer	The customer is resistant to switching suppliers and has a strong positive attitude to your company or offer.
Advocate	The customer generates additional referral dollars through positive word of mouth.

LIFETIME VALUE LTV

- Customers are a <u>lifetime value</u> (LTV) bc they are a <u>lifetime income stream</u>
- Lifetime value is the present day value of all net margins earned from a relationship with a customer, customer segment or cohort
- *Revenues grow*, *cost-to-serve is lower* (for existing customers, bc both supplier and customer understand each other), *referrals are generated* (word of mouth)*, higher prices are paid* (by existing customers than those paid by new customers)
- Computing LTV
  1. what is the probability that the customer will buy products and services from the company in the future, period-by-period?
  2. what will the gross margins on those purchases be, period-by-period?
  3. what will the cost of serving the customer be, period-by-period?

     For new customers an additional piece of information is needed:
  4. what is the cost of acquiring the customer?

     Finally, to bring future margins back to today's value, another question needs to be answered for both existing and new customers:
 5. what discount rate should be applied to future net margins?

<u>THESE ARE REASONS AS TO WHY COMPANIES WANT RELATIONSHIPS WI CUSTOMERS</u>

<u>WHY WOULDN'T THEY WANT A RELATIONSHIP??</u>

- <u>Fear of dependency</u> → supplier might act opportunistically, loss of personal authority and control
- <u>lack of perceived value in the relationship</u> → there is no perceived value above and beyond that obtained from the product or service
- <u>lack of confidence in the supplier</u> → customers believe supplier is not reliable, too small, strategically insignificant, poor reputation, insufficiently innovative
- <u>customer lacks relational orientation</u> → not all company cultures are equally inclined towards relationship building; The preference for transactional rather than relational business operations may be reflected in a company's buying processes and reward systems.

- rapid technological changes → commitment to one supplier might mean that the customer misses out on new developments available through other suppliers

IMPORTANT FOR CRM IS **ENHANCEMENT OF CUSTOMER SATISFACTION, CUSTOMER LOYALTY** and **BUSINESS PERFORMANCE**
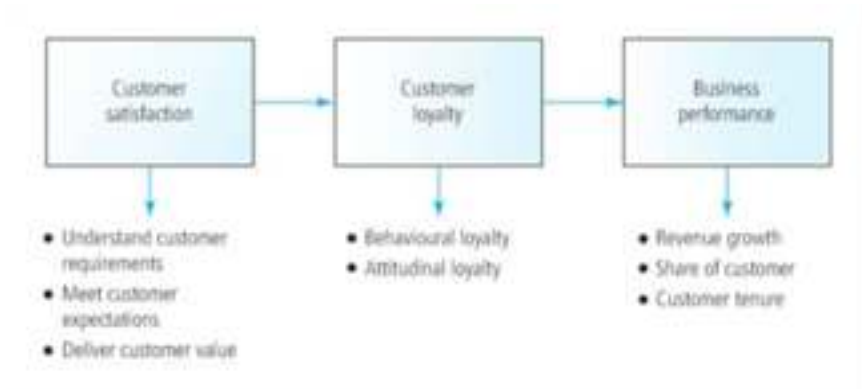
To measure business performance, use balance scorecard:
- The balanced scorecard employs four sets of linked key performance indicators (KPI): financial, customer, process and learning and growth. The implied connection between these indicators is that people (learning and growth) do things (process) for customers (customer) that have effects on business performance (financial).
- The balanced scorecard is highly adaptable to CRM contexts. Companies need to ask the following questions. What customer outcomes drive our financial performance? What process outcomes drive our customer performance? What learning and growth outcomes drive our process performance? The satisfaction-profit chain suggests that the customer outcomes of satisfaction and loyalty are important drivers of business performance.

PLANNING AND IMPLEMENTING CRM PROJECTS
- CRM implementation: *"CRM strategy is a high-level plan of action that aligns people, processes and technology to achieve customer-related goals."*
    1. **Develop the CRM strategy**
        • **situation analysis**
            - analysis sets out to describe, understand and appraise the company's current customer strategy
            - three-dimensional analysis of your company's served market segments, market offerings and channels (routes to market) (Customer strategy cube 5x4x3 [*lookup*])
            - customer or segments; market offering *(what product do we offer? Branding? Competition? etc…)*; channels *(what channels do we use to distribute to our customer?)*
        • **commence CRM education**
            - education has the twin benefits of allaying any fears that people might have, based on their misunderstandings, and encouraging participation from people whose jobs might be impacted
            - education enables stakeholders to identify opportunities to improve their workplace
        • **develop the CRM vision**

- your CRM vision is a high-level statement of how CRM will change your business as it relates to customers —> gives shape and direction to CRM strategy
- **set priorities**
  - CRM projects vary in their scope and can touch on one or more customer-facing parts of your business – sales, marketing or service
  - Priority might be given to projects which produce quick wins, fast returns or are low-cost. Longer-term priorities might prove more difficult to implement
- **establish goals and objectives**
  - 'goal' to refer to a qualitative outcome and 'objective' to refer to a measurable outcome
  - e.g. increase customer satisfaction and retention, reflecting the satisfaction-profit chain introduced earlier
- **identify people, process and technology requirements**
- **develop the business case**
  - the business case is built around the costs and benefits of the CRM implementation and answers the question: "Why should we invest in this CRM project?"
  - the business case looks at both costs and revenues.

2. Build the CRM project foundations

- **identify stakeholders**
  - include any party that will be impacted by the change – include senior management, users of any new system, marketing staff, salespeople, customer service agents, channel partners, customers and IT specialists
- **establish governance structures**
  - give responsibilities
  - the programme director (PD) has responsibility for ensuing that the project deliverables are achieved and that project costs are controlled
  - the programme team is composed of representatives from the major stakeholders. They have the responsibility of implementing the project successfully.
  - System integrator needed to align disparate systems into coherent whole to support the project objectives *(Systems integration is the practice of aligning and combining system components such as people, processes, technology and data for the achievement of defined outcomes)*
- **identify change management needs**
  - According to John Kotter's eight-step approach to managing change (*see-feel-change approach*):
  1. create a sense of urgency so people begin to feel "we must do something"
  2. put together a guiding team to drive the change effort
  3. get the vision right, and build supporting strategies (ORGANISATIONAL CULTURE)
  4. communicate for buy-in [*lookup*]
  5. empower action by removing organizational barriers to change
  6. produce short-term wins to diffuse cynicism, pessimism and scepticism
  7. don't let up, but keep driving change and promoting the vision
  8. make change stick by reshaping organizational culture.
- **identify project management needs**
  - a CRM project plan spells out the steps that will get you from where you are now (customer strategy situation analysis) to where you want to be (CRM vision, goals and objectives), on time and within budget
- **identify critical success factors**
  - CSFs are attributes and variables that can significantly impact business outcomes.
  - CRM consultants and vendors offer a range of opinions on CSFs, mentioning the following: a clear customer strategy that defines your company's offers, markets and channels; an organizational culture that promotes coordination and information-sharing across business units; an agreed definition of what counts as CRM success; executive sponsorship of the CRM programme's objectives; availability and use of pertinent, accurate, timely and useable customer-related information; a clear focus on people and process issues, not only technology; starting small with quick wins that are then promoted within the company as success stories; focus on automating processes that have major implications for costs or customer experience; engagement of all stakeholders, including end-users and customers, in programme planning and roll-out.

- **develop risk management plan**
  - at this stage, you'll be trying to identify the major risks to achieving the desired outcomes. Once identified, you can begin to put risk mitigation strategies and contingency plans in place. As you'd expect, some risks reflect an absence of the CSFs identified above
  - common causes of CRM failure: management that has little customer understanding or involvement; rewards and incentives that are tied to old, non-customer objectives; organizational culture that is not customer-focused; limited or no input from the customers; thinking that technology is the solution; lack of specifically designed, mutually reinforcing processes; poor-quality customer data and information; little coordination between departmental initiatives and projects; creation of the CRM team happening last, and the team lacks business staff; no measures or monitoring of benefits and lack of testing.

3.   Specify needs and select partner

- **process mapping and refinement**
  - identify processes that need attention
  - can be classified in several ways:
  - ✦ <u>vertical</u>: processes located entirely within a business function. For example, the customer acquisition process might reside totally within the marketing department.
  - ✦ <u>horizontal</u>: cross-functional. New product development processes are typically horizontal and span sales, marketing, fi nance and research and development functions.
  - ✦ <u>front-office</u>: (or front-stage) processes are those that customers encounter. The complaints handling process is an example.
  - ✦ <u>back-office</u>: (or back-stage) processes are invisible to customers, for example, the procurement process.
  - ✦ <u>primary</u>: have major cost implications for companies or, given their impact on customer experience, major revenue implications.
  - ✦ <u>secondary</u>: have minor implications for costs or revenues, or little impact on customer experience.
- **data review and gap analysis**
  - At this stage of planning the CRM project, you are identifying the data that is needed for CRM purposes and creating an inventory of data that is available for these purposes
  - the gap between what is available and what is needed may be quite significant. A useful distinction can be made between 'need-to-know' and 'like-to-know' that is, between information needed for CRM purposes and information that might be useful at some future point

- **initial technology needs specification, and research alternative solutions**
- **write request for proposals (RFP)**
  - include company background; CRM vision and strategy; strategic, operational, analytical requirements; process, technology, people, costing, implementation contractual issues
- **call for proposals**
  - invite potential partners to respond to the RFP.
- **revise technology needs identification**
  - identify opportunities for improved CRM performance
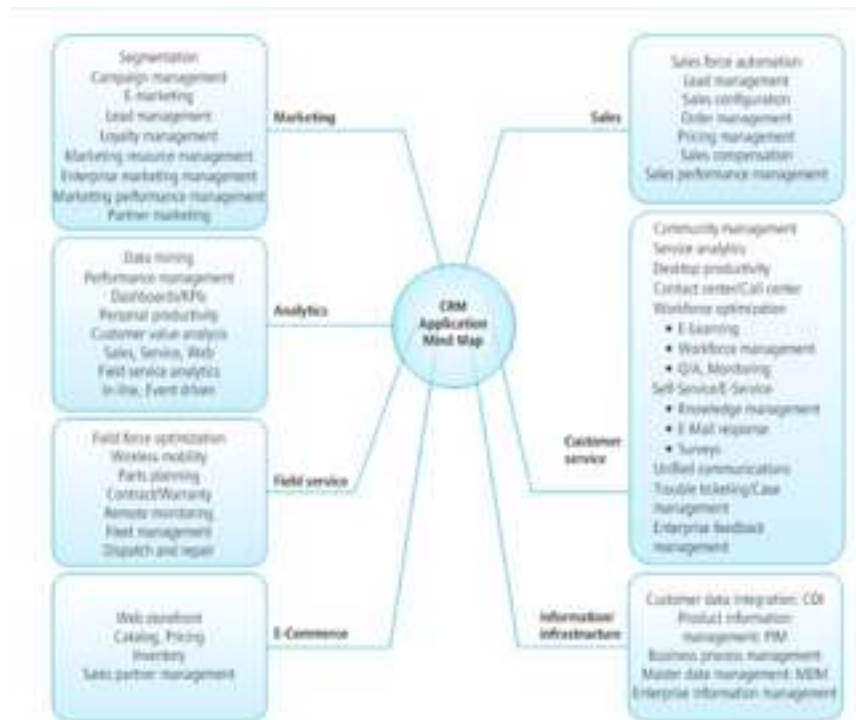
- **assess proposals and select partners**

4.	**Implement the project**

- **refine project plan** with partners
- **identify technology customisation needs**
  - industry-specific versions of CRM software (e.g. Oracle) yet customisation is often required
- **prototype design, test, modify and roll out**
  - The output of this customisation process will be a prototype that can be tested by users on a duplicated set, or a dummy set, of customer-related data. End-user tests will show whether further customisation is required.

5.	**Evaluate performance**

- **project outcomes**
- **business outcomes**