# Unit 3

## PS02CINT21: Modern MIS Techniques

# TYPES OF INFORMATION SYSTEM

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# Categories of Information Systems

- **Operation Support Systems**
  - TPS , MIS , ERP
- **Management Support Systems**
  - DSS , EIS , Expert System
- **Office Automation Systems**
  - Text Processing system
  - Document management system
  - Message communication system

# Transaction Processing Systems

- A TPS focuses on the **recording and processing** of economic events in the enterprise
- Its scope encompasses the entire gamut of daily **routines transactions** of the enterprise.
- The TPS is **structured** around the type of transactions in an organization.

# Features of TPS

1. Large volume of data
2. Automation of basic operations
3. Benefits are easily measurable
4. Source of input for other systems

# Office Automation System

- **Producing outgoing documents**(using text processors)
- **Storage and retrieval of documents**(using document management systems)
- **Transmission of messages**(using message communication systems)
- **Scheduling and meeting management**(using video-conferencing systems)

- **Computer Based Office Automation Systems**
  - Text processors and related systems
  - Electronic document management systems
  - Electronic message communication systems
  - Teleconferencing and videoconferencing systems

# Benefits of Office Automation Systems

- **Improving communication** within an organization and between organizations.
- **Reduce the cycle time** between preparation of messages and receipt of messages at the recipient's end.
- **Reduce the costs** of office communication both in terms of time spent by executives and cost of communication links.
- **Ensure accuracy** of communication flows.

# Need Resource Matching: TPS

- Thin line of demarcation
- Cost structures
- Varying benefits
- Scalability

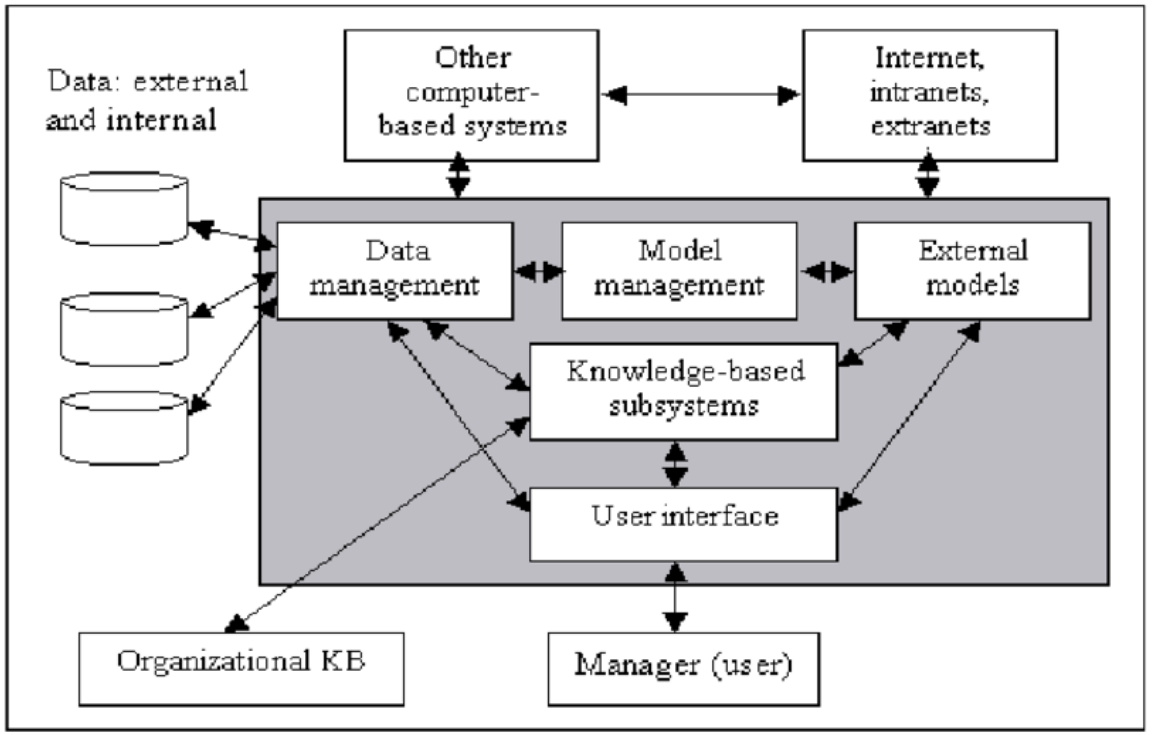
# Decision Support System

- DSS are designed to **support the decision making** process of managers to improve their effectiveness.
- They are based on the premise that managerial **judgment cannot be replaced** by any computer based solution.
- However, by offering the **support of data and models**, it is possible to **improve** the decision making process even in the case of semi structured and unstructured problems.
- The basic purpose of **DSS is to extend the capability of a manager's decision making process by supporting tools and data** made available to him under his direct control.

- DSS **neither pre-supposes** specific information requirements **nor** does it impose **any solutions** on a manager.
- Thus it gives **flexibility** to the manager to decide the input data, analysis for decision making.
- DSS offers an **interactive environment** for users and thus permits manager to experiment with data and models to develop the optimal decision making strategy in a given situation.
- DSS are described as **interactive information system** that help managers utilize data analysis models to solve **unstructured** problems.

# Building Blocks of DSS

- Database
- Query interface/Data query
- Model creation & execution
- Statistics & forecasting
- Report generator & graphics



# Types of DSS

- DSS may be
  - **data oriented or**
  - **model oriented**.
- The data oriented DSSs have greater input of **data retrieval and data analysis**.
- The model oriented DSS has powerful facilities for **simulation of decision scenarios** by estimating the outcome of an action and generating suggestions.
- In fact, it is difficult to find a DSS exclusively for data retrieval and analysis or for modeling.

# Features of DSS

- DSS does not aim at any specific type of decisions. It has the **flexibility of use** in various unexpected decision situations
- The **user friendly interface** of DSS makes it different from other types of information systems.
- The **report generators and graphics** facilities in DSS provide better ways of representing the information generated by use of models in DSS.
- DSS offers any user **complete control** over the system.

# Benefits of DSS

- Evaluation of a larger number of alternatives as the facilities in DSS **reduce the time and effort in collecting and analysis** of data **for different alternatives**.
- **Modeling and forecasting** becomes easy for managers using DSS enabling them to get more insight into the business process.
- Usefulness in **intra-group and inter-group communication** because it makes it possible to explain to others, how one has arrived at a particular conclusion.
- Facilities for **quicker analysis** of data for structured decision.
- Quicker identification of **variances and exceptions**.
- **In-depth analysis** of data.

# Application of DSS

- **Production :**
  - Procurement analysis,
  - cost estimation and analysis,
  - production planning and
  - scheduling etc.

# Application of DSS

- **Finance:**
  - Capital budgeting,
  - Financial planning and analysis ,
  - Tax planning,
  - Strategic financial planning ,
  - Budgeting, Capital management ,
  - Debt and equity financing analysis,
  - Foreign exchange risk management,
  - Financial performance analysis, etc.

# Executive Information Systems

- The top level manager deserves **better environment for information access** than that provided by DSS (and MIS).
- The top executives need **fast access** to up-to-date, **concise information and exception reports** with facilities to **personalized** information and analysis.
- The information systems designed to cater to such needs of top executives are called EIS.
- These system act as **electronic briefing systems** and offer **tremendous flexibility** in use.
- EIS uses internal as well as external information and offers an **interactive** and a user friendly operating environment.

# Application of EIS

- Executive Briefing
  - See https://unilearning.uow.edu.au/report/4bi1.html for sample
- Personalized Analysis
- Exceptions Reporting
- Model Based Analysis

# DSS & EIS

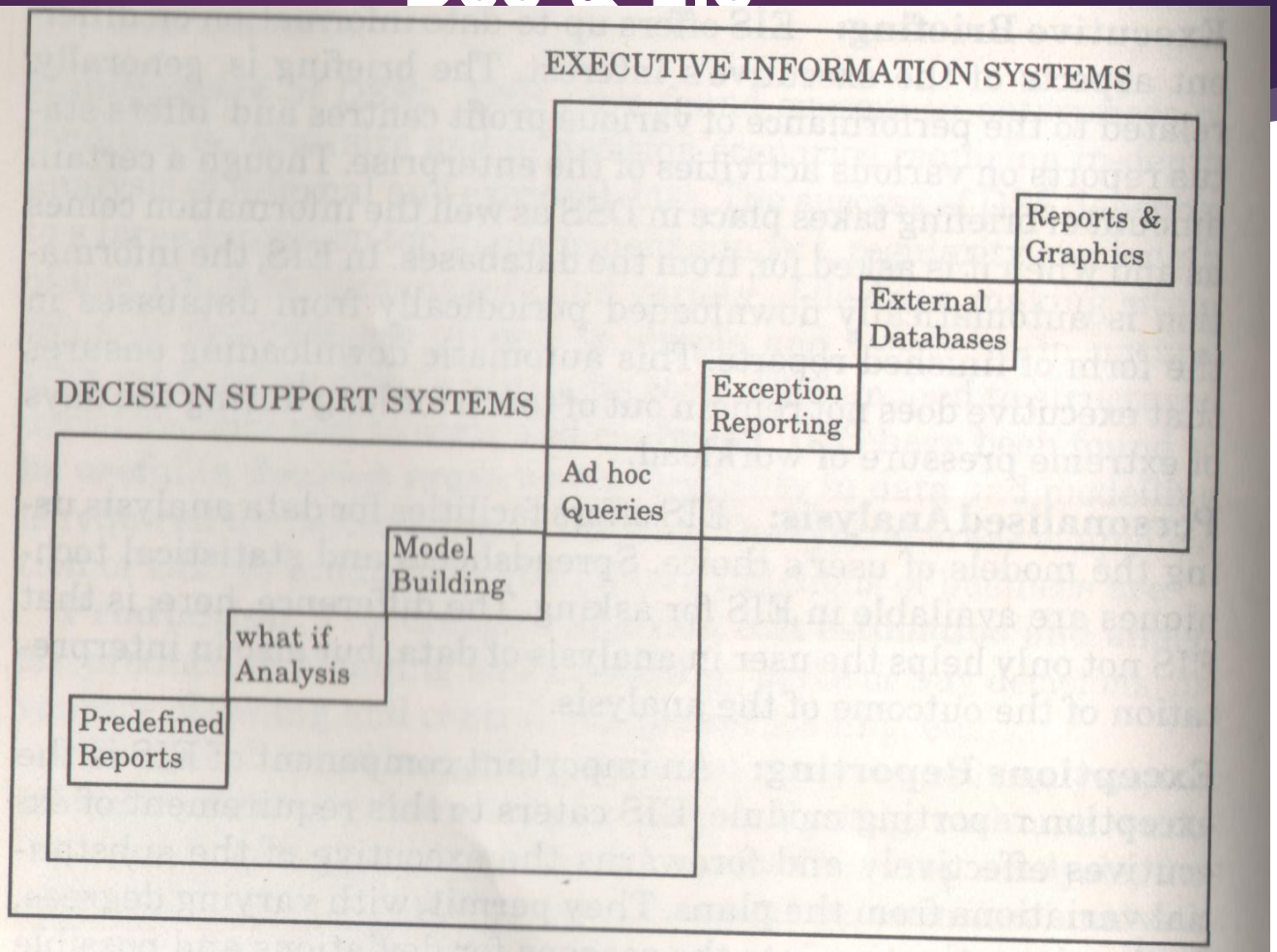



**Fig. 10.4** DSS and EIS at different levels of information support

# COMPARING AND INTEGRATING EIS AND DSS

Extra

| Dimension | EIS | DSS |
|---|---|---|
| Focus | Status access, drill down | Analysis, decision support |
| Typical users | Senior executives | Analysts, professionals, managers (via intermediaries) |
| Impetus | Expediency | Effectiveness |
| Application | Environmental scanning, performance evaluation, identification of problems and opportunities | Diversified areas where managerial decisions are made |
| Decision support | Indirect support, mainly high-level and unstructured decisions and policies | Supports semistructured and unstructured decision making, ad hoc decisions, and some repetitive decisions |
| Type of information | News items, external information on customers, competitors, and the environment; scheduled and demand reports on internal operations | Information supporting specific situations |
| Principal use | Tracking and control, opportunity identification | Planning, organizing, staffing, and controlling |
| Adaptability to individual users | Tailored to the decision-making style of each individual executive, offers several options of outputs | Permits individual judgments, what-if capabilities, some choice of dialog style |
| Graphics | A must | Important part of many DSS |
| User-friendliness | A must | A must if no intermediaries are used |
| Processing of information | Filters and compresses information, tracks critical data and information | EIS triggers questions, answers worked out by using the DSS and fed back into the EIS |
| Supporting detailed information | Instant access to the supporting details of any summary (drill down) | Can be programmed into the DSS but usually is not |
| Model base | Limited built-in functions | The core of the DSS |
| Construction | By vendors or IS specialists | By users, either alone or with specialists from the information center or IS department |
| Hardware or | Mainframe, RISC workstations, Web, LANs, or distributed systems | Mainframe, RISC workstations, Web, PCs, distributed systems |
| Nature of software packages | Interactive, easy access to multiple databases, online access, sophisticated DBMS capabilities, complex linkages | Large computational capabilities, modeling languages and simulation, application and DSS generators |
| Nature of information | Displays pregenerated information about the past and present, creates new information about the past, present, and future | Creates new information about the past, present, and future |

# Benefits of EIS

- Information support for strategic decisions
- Changing the focus

Critical success factors in EIS implementation

I. Difficulty in system specification
II. Large volumes of data
III. Resistance from lower levels
IV. Management styles
V. Increased size and cost

# Experts systems

- The **Information Fatigue Syndrome** (information overload due to over exposure to media) and the **limitations of human experts** in the changing business environment have result in increasing popularity of **Business Expert System (**BES).
- These systems simulate human activity and keep capturing and systematizing business knowledge, extending the decision making capabilities of **expensive and scarce human experts** so that others can use their decision experiences.
- They offer the advantages of flexibility in capturing and representing information of different types in diverse forms.

# Application of ES in business

- Make or buy decisions
- New product launch decisions
- Product development
- Investment counseling
- Performance evaluation
- Incentive systems
- Customer query
- Project evaluation
- Production scheduling
- Routing decisions

# Building blocks of BES

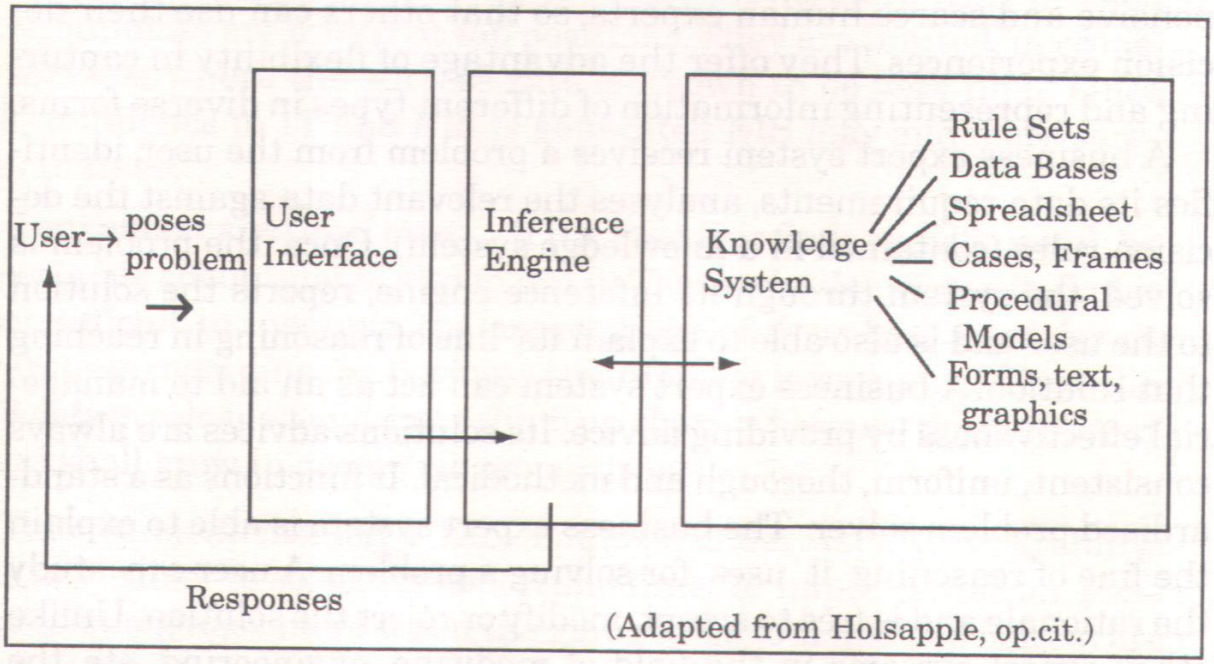



**Fig. 10.5** Components of an expert system

# Benefits of ES

- Documentation (Coding) of expertise
- Enhanced understanding of business process
- Timely availability of expertise
- Easy replication
- Eliminates routine consultation requests
- Consistency
- Line of logic
- Strategic applications

# Managerial Decision Making

- Operational Decisions
- Tactical Decisions
- Strategic Decisions

| | Production | Finance | Personnel | Marketing |
|---|---|---|---|---|
| Strategic | New plant location | Alternative financing | Welfare policy | Competitor survey |
| Tactical | Production bottleneck | Variance analysis | Performance appraisal | Advertising |
| Operational | Daily scheduling | Payroll | Leave records | Sales analysis |

- **Environments: Three types**

1. **Certainty** : In this type of environment , there is **only one type event** that can take place.
2. **Uncertainty** : In this type of environment , **more than one type of event** can take place and the decision maker is completely in dark regarding the event that is likely to take place.
3. **Risk** : Under the **condition of risk**, there are more than **one possible events** that can take place.

# Planning for IT Infrastructure

- **Identification** of the applications.
- **Evaluation** of each of these applications based on established evaluation criteria.
- Establishing a **priority ranking** for these applications.
- Determining the **architecture of IT infrastructure** that can serve the top priority applications.

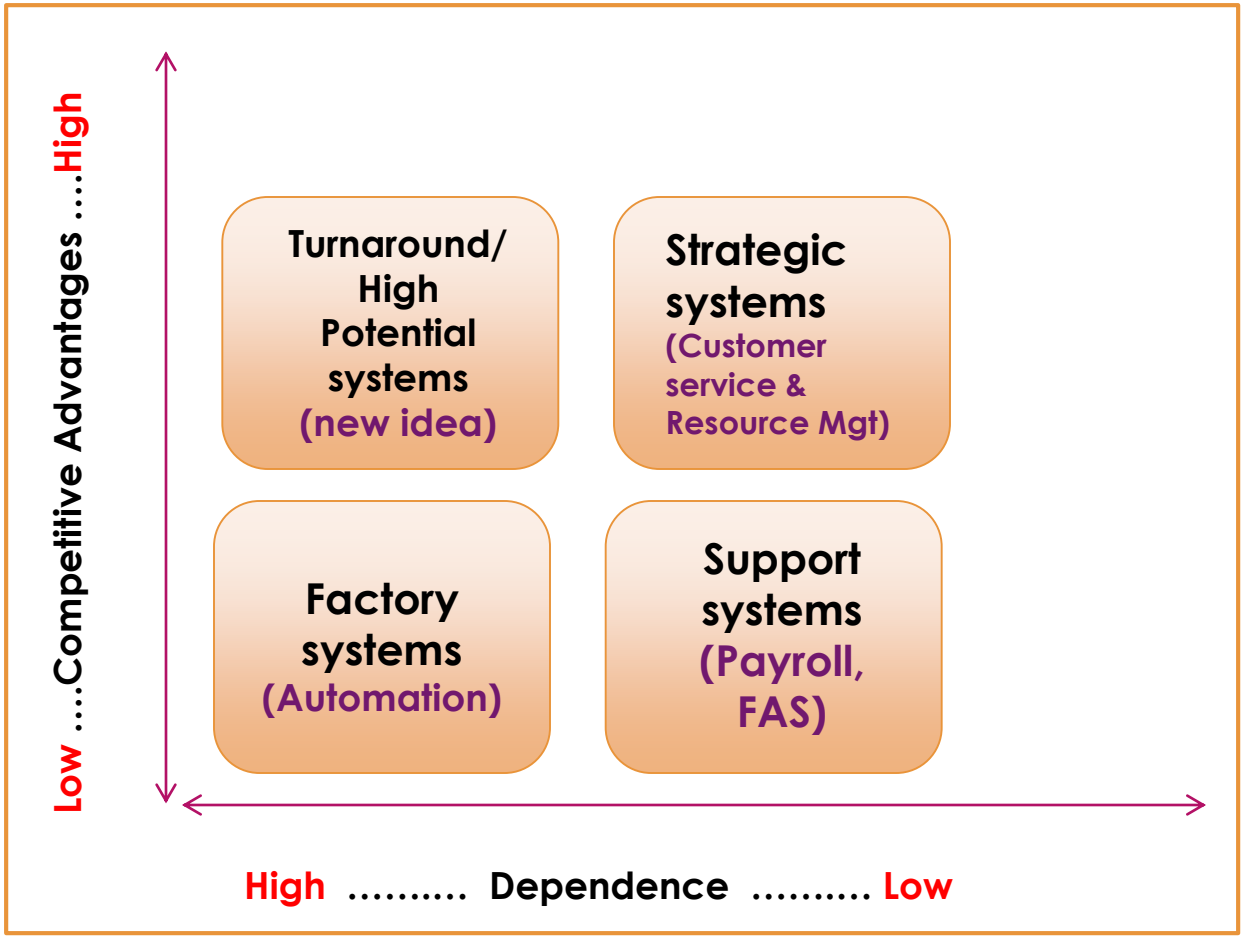
# The problems while planning for IT Infrastructure

- IT Infrastructure is subject to **high rate of obsolescence**.
- The benefits if IT Infrastructure are mostly **intangible, indirect and qualitative** in nature.
- The present day IT scene offers **a large variety of choices** to the planner with regard to most of the resources.
- IT professionals as well as managers have a very **little experience** to fall back upon, in case of doubt.

# Portfolio Approach

- This approach is based on the assumption that **IT Infrastructure is not equal significance** for all organizations and all applications.
- The **investments in IT infrastructure** for different applications are likely to offer **different 'rates of return'** in terms of benefits with varying degrees of risks.
- It is important to understand what **role each application**, which the IT Infrastructure is designed to serve **is likely to play** in the effectiveness of the business enterprise and the **commitment of resources** should depend primarily upon role.

# McFarlan's 'Strategic Grid'



# Factory Systems

- **Automation of existing operations** with the objective of improving performance in terms of **speed, accuracy and cost savings** by reduction of manpower or other resource requirements is the key feature of factory systems.
- These system are **low return, low risk** applications and the likely benefits can be easily identified and estimated with a reasonable degree of accuracy.

# Support Systems

- These systems relate to routine applications such **as payroll, financial accounting** etc.
- Generally, the driving force behind the development of these applications is likely **improvement in efficiency of the specific tasks** and the statutory **obligation of generating accurate and timely information** for reporting to various external users.

# Strategic Systems

- These systems involve applications that are **critical for future competitive success** of the enterprise.
- These systems offer **benefits in the long run** and involve large investments in IT infrastructure.
- The typical **examples** would be applications for **customer services and resource management**.

# Turnaround Systems

- These are **high potential, high risk systems** and are essentially **experimental in nature**.
- The proposals for such systems generally emanate from **new business idea** or opportunity that needs to be explored.
- The purpose of such applications is to give a **test run** and if found cost effective and feasible, it may be used for a variety of applications.

# Techniques of Evaluating IT Investments

**Financial Justification**

- **Substitutive**: These applications aim at **substituting manpower** by machine power.
- **Complementary:** These applications aim **at improving the performance of employees at various levels** in the enterprise.
- **Innovative:** These applications are meant to create and maintain technological entry barriers and help enterprises differentiate their products in **order to gain competitive edge**.

# Five Techniques for Evaluating IT Investments

**Parker suggests proposals:**

## Cost benefits analysis:

- Cost against benefits (direct cost, indirect cost, process change, cost of risk, etc. ) See example on next slide

## Value linking:

- Improvement in business performance and not just on cost savings, eg secure buying, customer centric operations, etc.

## Value acceleration:

- Saving time, increasing productivity and improving brand image

## Value restructuring:

- Kaison, restructuring a job or function

## Innovation

## Cost Benefit Analysis: Customer Service System

**Costs**

| Category | Item | Quantity | Price | Total |
|---|---|---|---|---|
| Hardware & services | User workstations | 7 | $2,000 | $14,000 |
| | Server system | 2 | $4,000 | $8,000 |
| | Secure networked printers | 2 | $1,750 | $3,500 |
| | Cable installation | 1 | $6,200 | $12,400 |
| | Software licenses | 1 | $22,000 | $44,000 |
| System training | System overview | 10 | $625 | $6,250 |
| | Software | 10 | $625 | $6,250 |
| | Tools | 15 | $875 | $13,125 |
| | | | **TOTAL COSTS** | **$107,525** |

**Benefits**

| | |
|---|---|
| More effective promotion campaigns | $58,000 |
| Improved lead conversion | $42,000 |
| Better customer retention and loyalty | $28,000 |
| Enhanced productivity | $35,000 |
| Workflow efficiencies | $28,000 |
| Higher quality database | $45,000 |
| **TOTAL BENEFITS** | **$236,000** |

# Template for Cost Benefit Analysis

SIMPLE COST BENEFIT ANALYSIS TEMPLATE

smartsheet

| | | | |
|---|---|---|---|
| COMPANY NAME | | DATE CONDUCTED | |
| PROPOSED PRODUCT/INITIATIVE/SERVICE | | COMPLETED BY | |

| QUANTITATIVE ANALYSIS | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 | TOTAL |
|---|---|---|---|---|---|---|
| NON-RECURRING COSTS | | | | | | |
| Hardware | | | | | | $ - |
| Servers | | | | | | $ - |
| Desktop | | | | | | $ - |
| Telecommunication equipment | | | | | | $ - |
| Software (packaged or custom) | | | | | | $ - |
| Computer room upgrades | | | | | | $ - |
| Furniture and fixtures | | | | | | $ - |
| Project organizational/support costs | | | | | | $ - |
| Planning (upon approval) | | | | | | $ - |
| Procurement | | | | | | $ - |
| Contract negotiations | | | | | | $ - |
| Labour | | | | | | $ - |
| Infrastructure | | | | | | $ - |
| Development | | | | | | $ - |
| Business Process owners (users) | | | | | | $ - |
| Management | | | | | | $ - |
| Training of employees (pre-implementation) | | | | | | $ - |
| Transition costs (parallel systems) | | | | | | $ - |
| Post implementation reviews | | | | | | $ - |
| TOTAL NON-RECURRING COSTS | $ - | $ - | $ - | $ - | $ - | $ - |
| RECURRING COSTS | | | | | | |
| Hardware/Software | | | | | | $ - |
| Software maintenance and upgrades | | | | | | $ - |
| Computer supplies | | | | | | $ - |
| Desktops (incremental to the project) | | | | | | $ - |
| Help Desk support | | | | | | $ - |
| Ongoing Additional Labour | | | | | | $ - |
| IT staff costs (incl. benefits) | | | | | | $ - |
| User training | | | | | | $ - |
| Other | | | | | | $ - |
| Telecommunications | | | | | | $ - |
| Office leases | | | | | | $ - |
| TOTAL RECURRING COSTS | $ - | $ - | $ - | $ - | $ - | $ - |
| TOTAL COSTS | $ - | $ - | $ - | $ - | $ - | $ - |

| QUANTITATIVE BENEFITS | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 | TOTAL |
|---|---|---|---|---|---|---|
| REVENUES | | | | | | |
| (Enter revenue sources here) | | | | | | $ - |
| | | | | | | $ - |
| | | | | | | $ - |
| TOTAL REVENUES | $ - | $ - | $ - | $ - | $ - | $ - |

***https://www.smartsheet.com/expert-guide-cost-benefit-analysis***

# Cost Benefits Analysis

- The costs are the measurement of resources required to obtain the benefits associated  with the application.
- The benefits may be in terms of cost savings, cost avoidance, increase in revenue and the intangible benefits.

# Value linking

- Value linking focuses on improvement in business performance and not just on cost savings.
- The improvement may be in terms of accuracy and quick performance of activities thereby increasing the capability/capacity of  the enterprise in handling greater volumes of activities with same or higher degree of effectiveness.

# Value Acceleration

- Value acceleration is used to access the financial implications of time saved in the business process with the help of IT infrastructure.
- The costs involved in completion of project may be reduced the time over runs involved in the implementation of the project.

# Value Restructuring

- Value restructuring focuses on the business values associated with restructuring a job or function.
- It aims at measuring the benefits of an application that stem from organization change.

# Innovation

- IT may help innovate the business activity by creating new/alternative functions, products and service; open up new niche markets offering competitive edge of the enterprise.

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