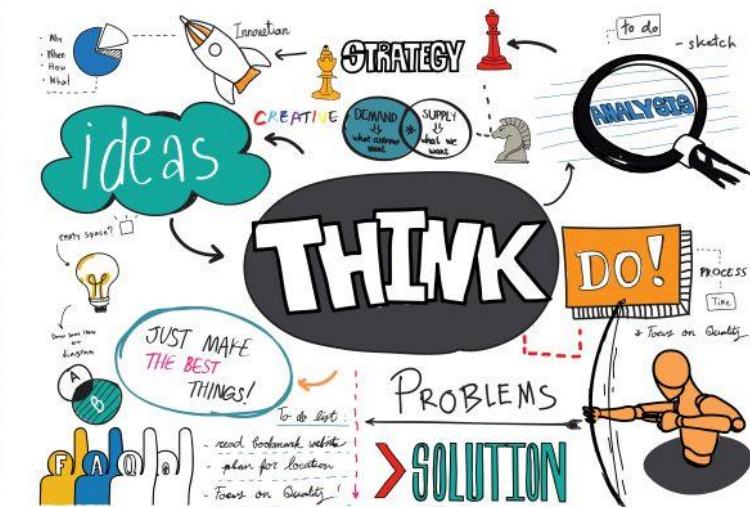


HUM 4167: Fundamentals of Business Analytics

UNIT - 2

DATA-ANALYTIC THINKING FOR BUSINESS

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What is A Business Enterprise???



A **business enterprise** consists of producing goods or services in exchange for commercial and financial benefits.

A business enterprise is any type of operation that is involved in providing goods or services with the anticipated outcome of earning a profit.

Business enterprises can vary in size, industry, and structure, but they all share common functions that are essential for their successful operation.



TYPES OF BUSINESS ENTERPRISES

- **Broad Perspective**

Primary sector

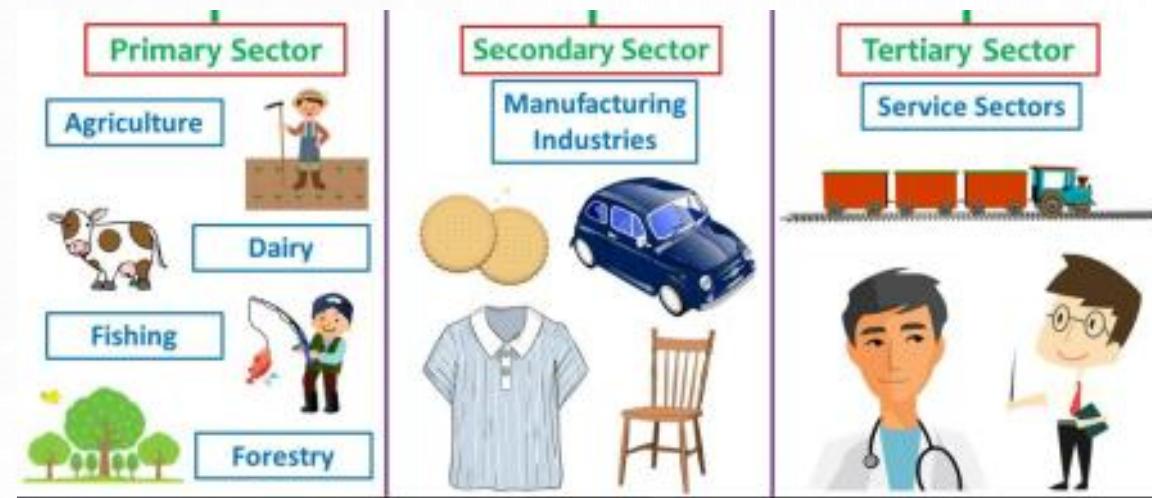
The primary sector involves businesses that are at the beginning of the production processes. These businesses make sure that the raw materials are created and produced to be used later by other companies.

Secondary sector

The secondary sector consists of business enterprises at the second step of the production process. These businesses use raw materials produced from the primary sector to develop into new goods and services.

Tertiary sector

The tertiary sector involves business enterprises concerned with providing services to individuals.



- **Ownership and Management Perspective**

1) Private Sector Enterprises: Enterprises owned, controlled and managed by private individuals fall under this category with the main objective of earning. Shobhit fail.

A) Sole proprietorship

B) Participation

C) Joint Hindu Family Business

D) Cooperative

E) Company

2) Public Sector Enterprises: Business enterprises owned, controlled and operated by public enterprises, with the primary goal as welfare and secondary goal as profit.

Either whole or most of the investment in these ventures is done by the government such as:

A) Departmental undertaking

B) Public corporation

C) Government companies

3) Joint Sector Enterprises: The joint sector is a form of partnership between the private sector and the government where management is generally in the hands of the private sector, and adequate representation by the government on the board of directors. Resources in such enterprises are mostly generated equally.

Thus, one of the first decisions an entrepreneur must make for his new venture is how the business should be structured.

From the entrepreneur's point of view, the most commonly chosen forms for starting a new venture are:

- Sole proprietorship
- Partnerships
- Company

FUNCTIONS OF A BUSINESS ENTERPRISE

The basic functions of a business enterprise are Finance, Operations, Human Resources, and Marketing.

✓ **Finance**

One of the essential functions of a business is raising and managing money. A business enterprise may use internal or external sources of finance to raise the funds needed to get the business going.

Internal sources of finance involve the money that business owners invest in their own business.

In contrast, external sources of finance involve cash from outside sources, such as money from family, banks loans, and investors. After the money starts moving around the business, the business managers should manage it cautiously so they don't have too many costs, thereby failing to make any sales.

✓ **Operations**

An important function of a business enterprise is the use of raw materials to produce new goods that will be served to customers. A business also uses its resources to provide services to customers. A business enterprise is always concerned with producing types of goods or offering services that meet the needs and demands of customers. If this need or demand is not met or is relatively small, there is no real purpose for production.

✓ **Human Resources**

Another important function of a business enterprise is that of human resources. A business needs to get the right human capital to provide goods or services. This entails hiring people with the necessary expertise and skillset that the production process requires.

✓ **Marketing**

Marketing is concerned with commercializing the goods and services a business offers. This includes pricing strategies, strategizing the way customers are approached, and determining why someone would want to buy the good or service.

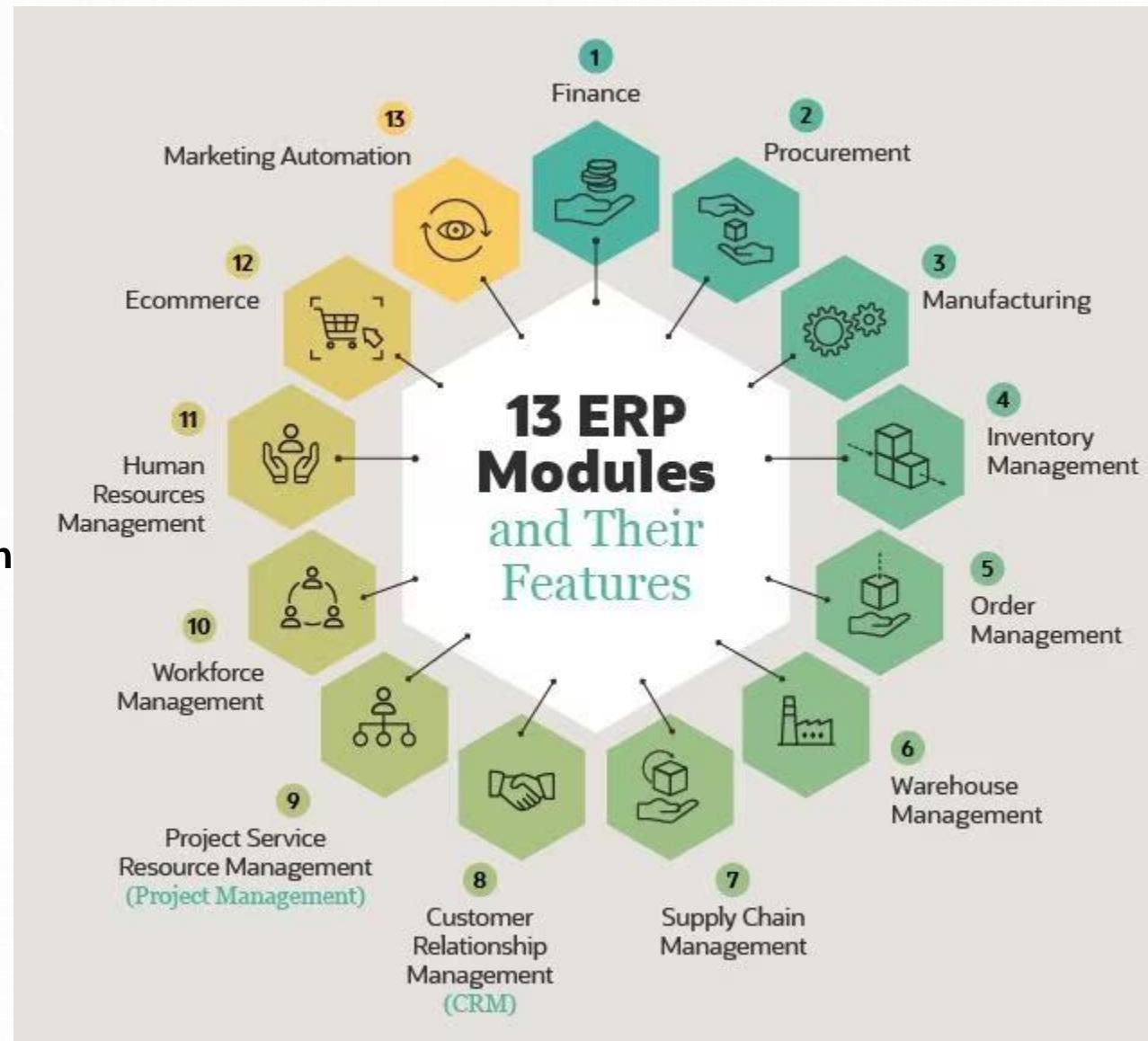
ERP - ENTERPRISE RESOURCE PLANNING

Enterprise Resource Planning software is fully integrated “**Business Management Software**” to link business processes automatically and give real time information to authorized user.

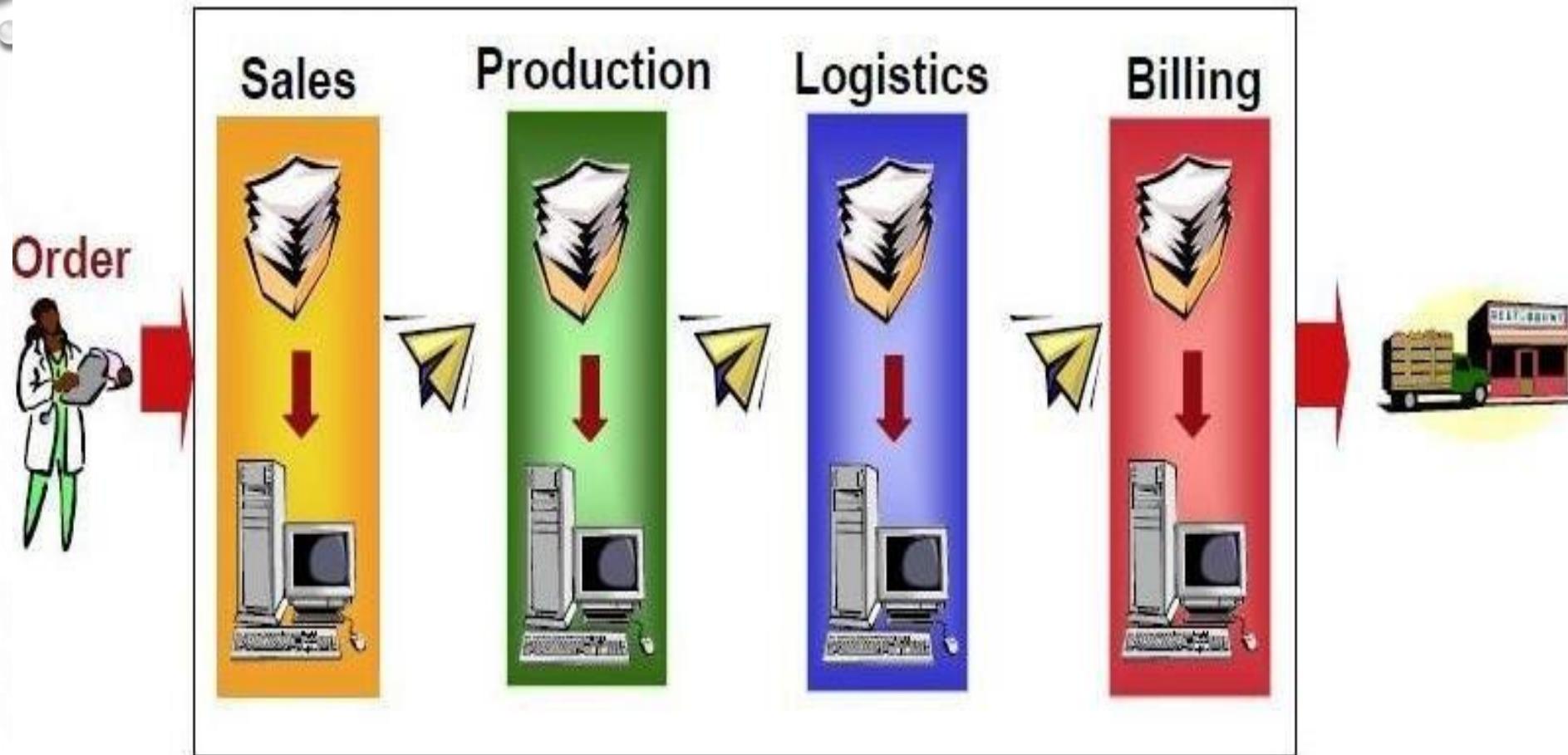
Key Characteristics

Seamless integration of all the information flowing through a company.

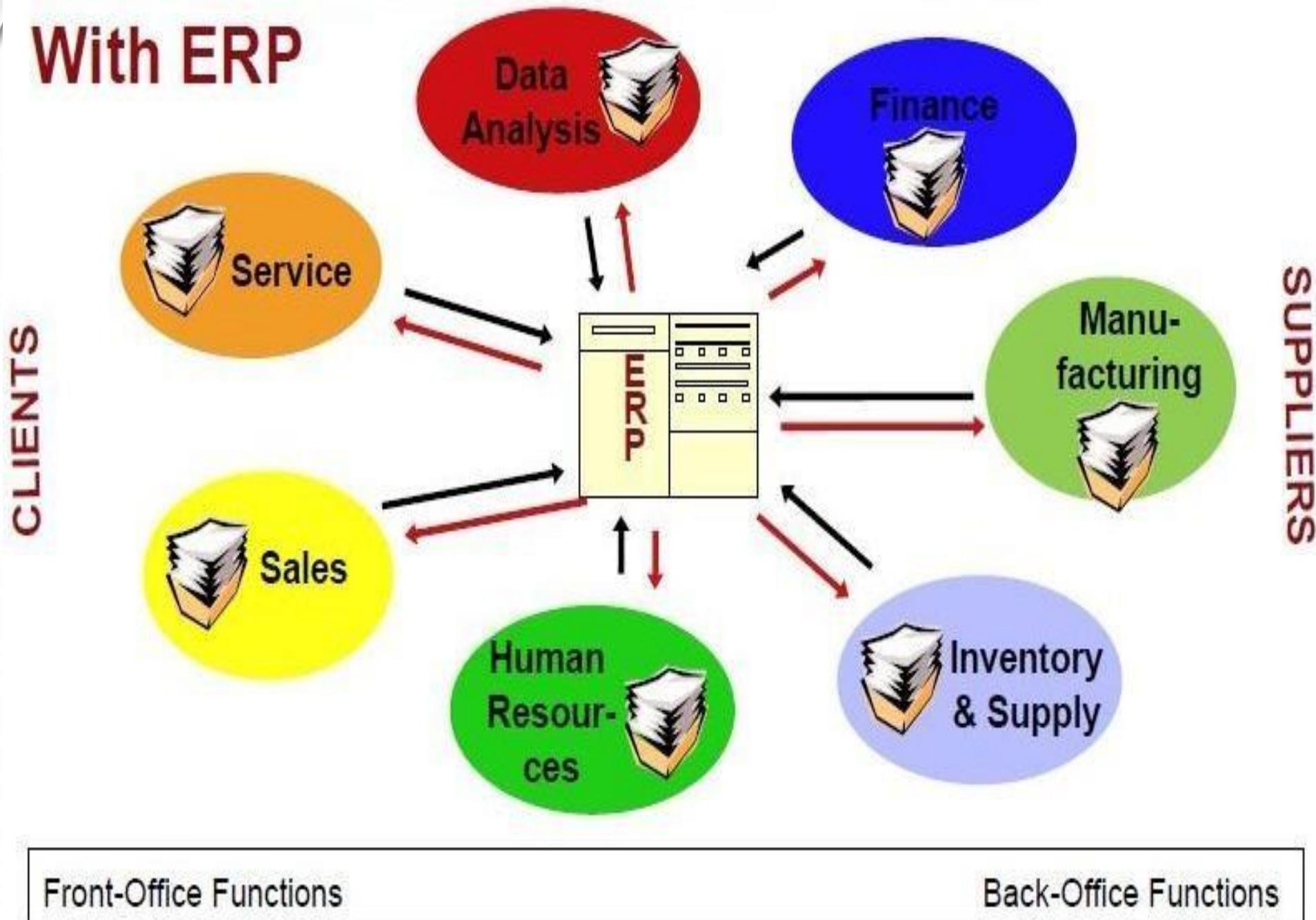
- To support business goals.
- Integrated, secure, self-service processes for business.
- Lower Costs.
- Empower Employees.

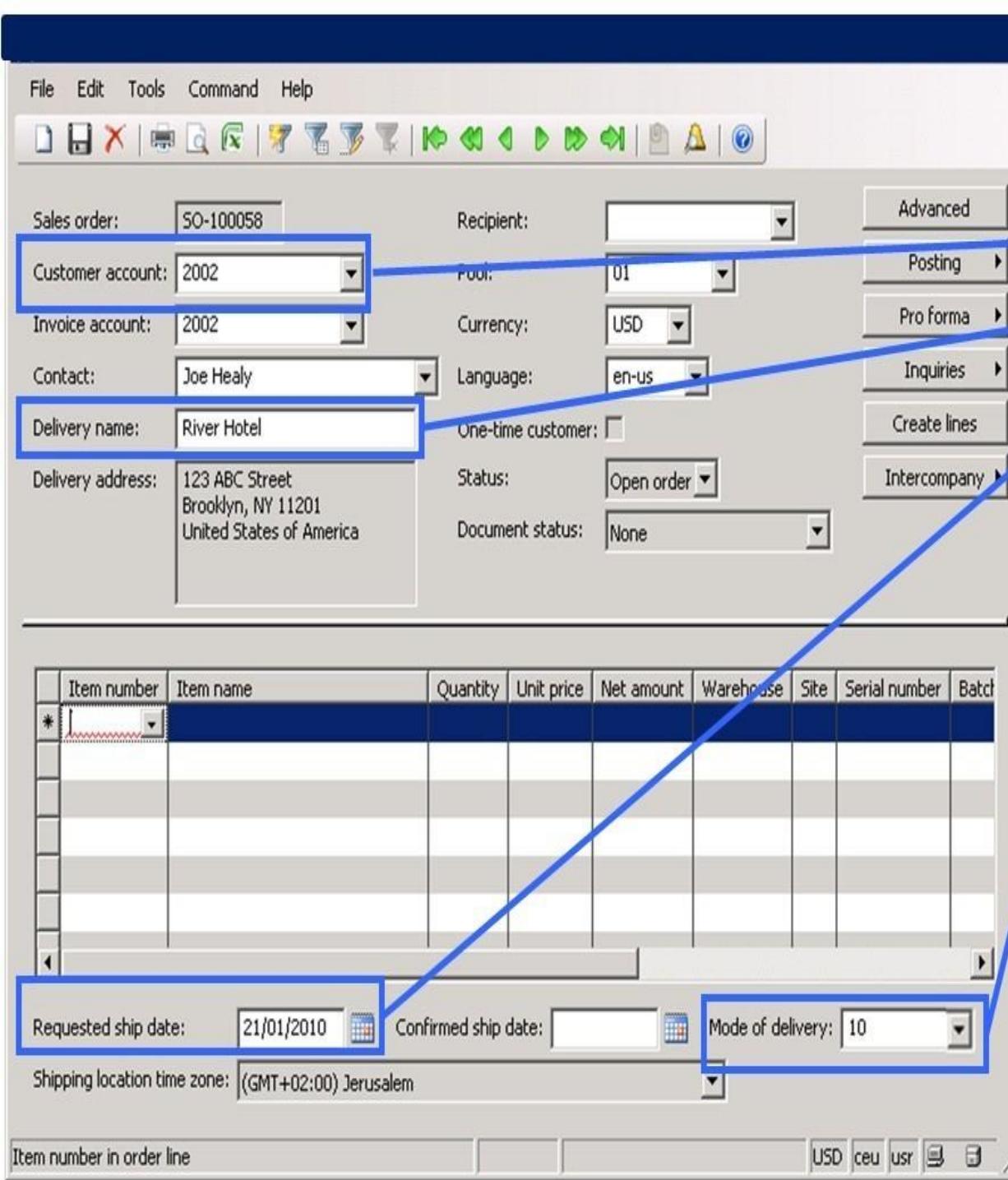


Before ERP



With ERP





BENEFITS OF ERP

TANGIBLE BENEFITS

- INVENTORY REDUCTION
- PERSONAL REDUCTION
- PRODUCTIVITY IMPROVEMENTS
- ORDER MANAGEMENT IMPROVEMENTS
- FINANCIAL CYCLE IMPROVEMENTS
- INFORMATION TECHNOLOGY COST REDUCTION
- PROCUREMENT COST REDUCTION
- CASH MANAGEMENT IMPROVEMENT
- REVENUE / PROFIT INCREASE

INTANGIBLE BENEFITS

- INFORMATION VISIBILITY
- CUSTOMER RESPONSIVENESS
- COST REDUCTIONS
- INTEGRATION
- STANDARDIZATION
- FLEXIBILITY
- BETTER PERFORMANCE

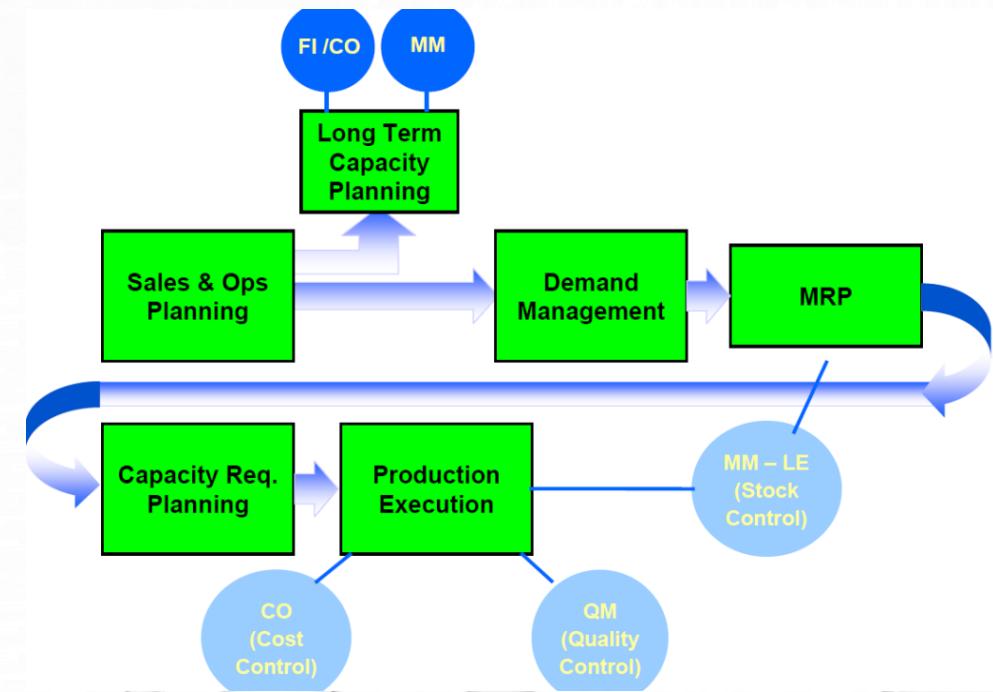
EXAMPLE: ERP - MODULES



MANUFACTURING / PRODUCTION MODULE:

Production Planning helps an organization plan production with the optimum utilization of all available resources. Material Requirement Planning is done based on the production advice generated by the sales department. Feasibility of production is evaluated using details like raw material availability and procurement time, machine availability and capacity. The important sections in manufacturing module will be:

- » Resource & capacity planning
- » Material planning
- » Workflow management
- » Quality control
- » Bills of material
- » Manufacturing process

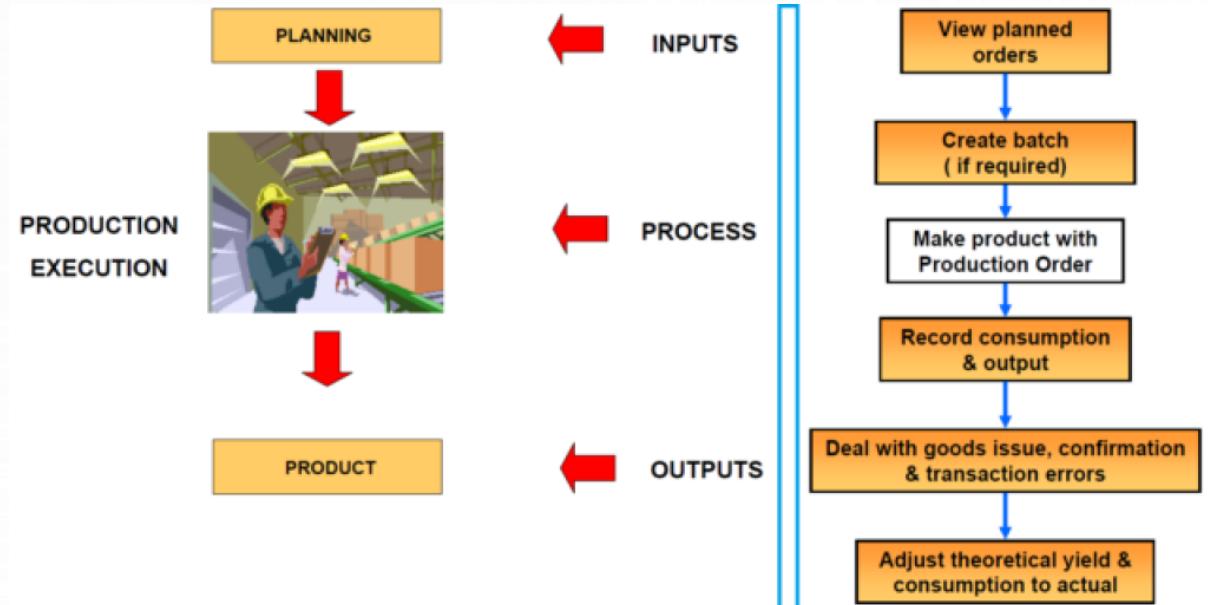


Production Order Execution

The production order is the main central data object in shop floor control and manufacturing execution process. The production order contains every data relevant to the production objectives, material components, required resources, and costs. A normal production order will cover the demand for a single material or product, but you can also produce multiple products jointly in one production order (co-products) and distribute incurred costs between the different products.

The complete process includes several steps:

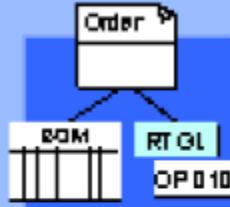
- Creation and release of a production order
- Goods issues of components
- Confirmation of production activity
- Goods receipts of the finished good



Production Order

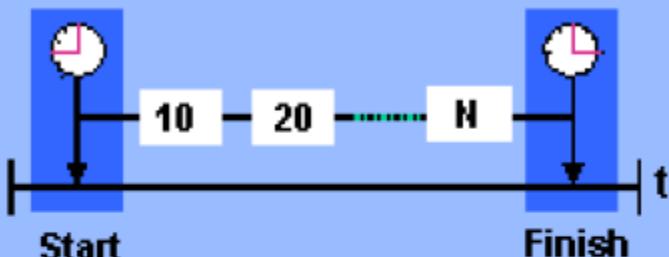
A production order defines which material is to be processed, at which location, at what time and how much work is required. It also defines which resources are to be used and how the order costs are to be settled.

Production / Assembly



- Times
- Control data
- Texts
- Production resources/tools
- Material
- Quality assurance

Scheduling



Capacity Planning



Costing

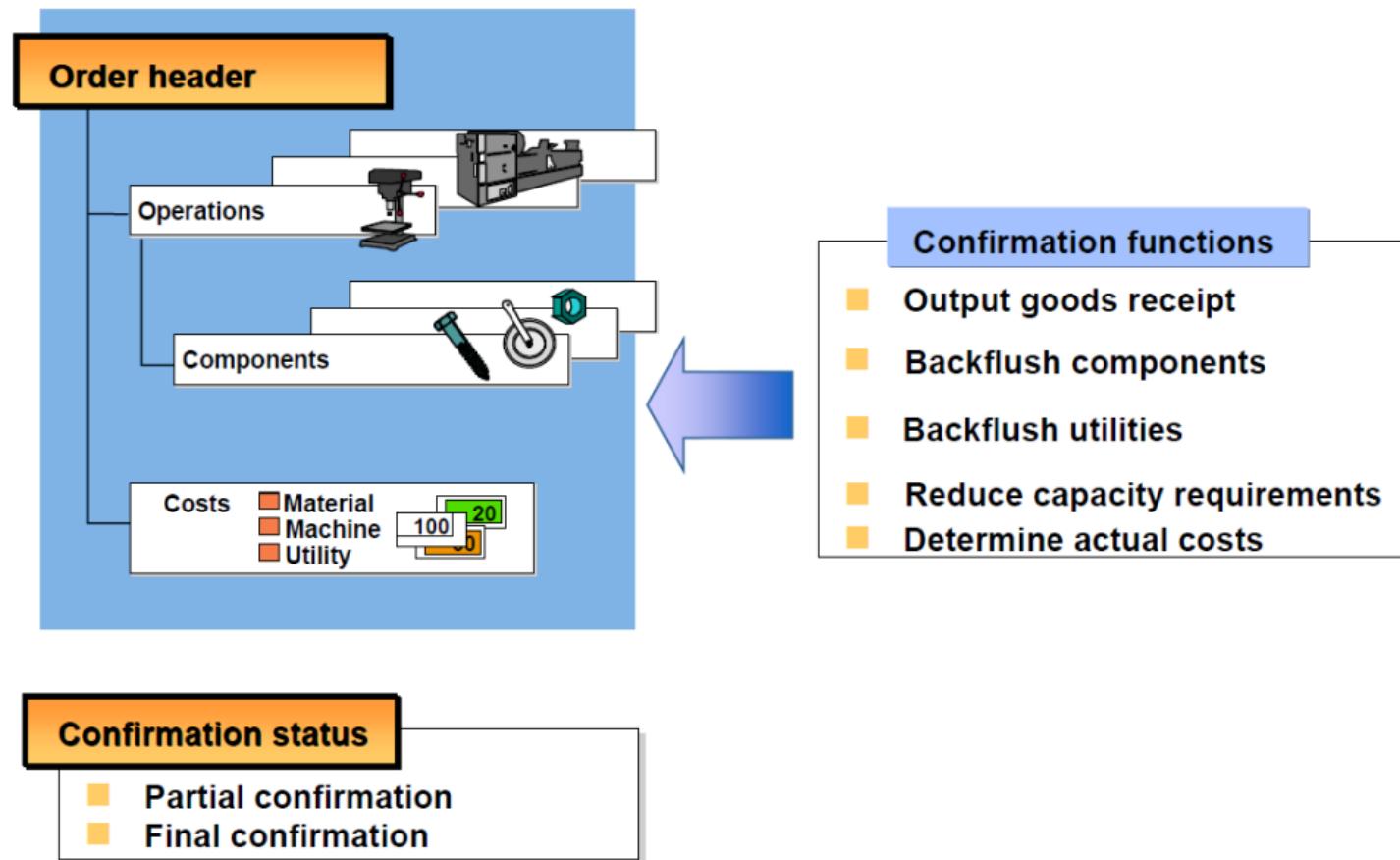


Production Order Statuses

- Created:** Order is created and changes can be made
- Released:** Order released, suggested not to make any change
- Partially confirmed:** Production qty/activity partially confirmed
- Fully confirmed:** Production qty/activity fully confirmed
- Delivery completed:** Entire order quantity has been received
- Technically completed:** Order processing is over, ready for month-end processing by accounts

5 Steps involved in Manufacturing Procedure:

1. View Orders
2. Make Product
3. Record consumption & output
4. Record process data & batch characteristics
5. Final Confirmation & Back Flush

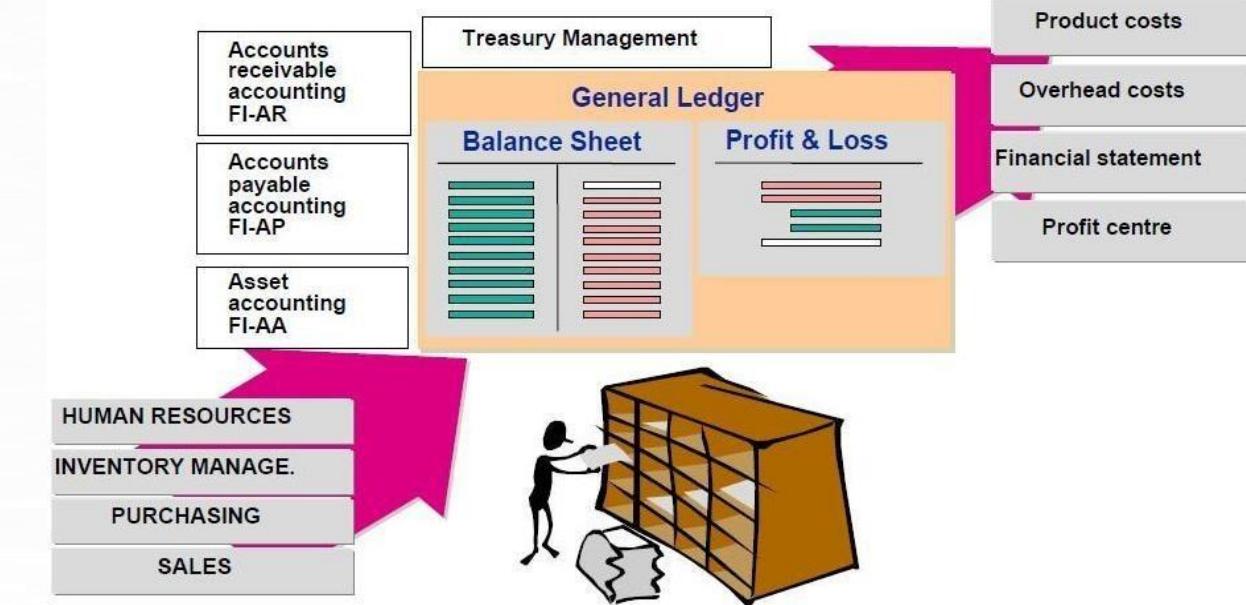


FINANCE / ACCOUNTING MODULE:

Finance Module take care of all accounts related entries and their impact on the whole system. How the finance comes and how it is been utilized. Total flow of money (Cash/Bank) and total expenditures will be reflected here.

As an after effect of this, the management will be able to take their important financial decision, Budgeting etc. They can come to know about company's financial position at any point of time. All sorts of important financial reports i.e. **Trial Balance**, **Trading A/c**, **Profit & Loss A/c**, **Balance Sheet**, **Debtor's Balance**, **Creditors Balance**, **Cash/Bank Fund position** and many more are covered in this module. The important sections in finance module will be:

- **Accounts payable**
- **Accounts receivable**
- **General ledger**
- **Cash management**
- **Billing**



Inventory Module

The inventory module will be provided with facilities to handle receipts, transfers, returns, sales and issues of stock with full stock-take and stock adjustment functionality, providing management control over the quantity and value of stock on hand.

Full transaction history in both detail and summary will allow management to spot trends, analyze sales and profitability while preventing over-stocking and ensuring that customer demands are met without lost sales.

Human Resource

HR module will maintain a complete employee database including contact information, salary details, attendance and payroll of all employees. Also the processing of the pay roll with respect to attendance can be done in this module.

The important sections in HR module will be: **Recruitment Benefits**

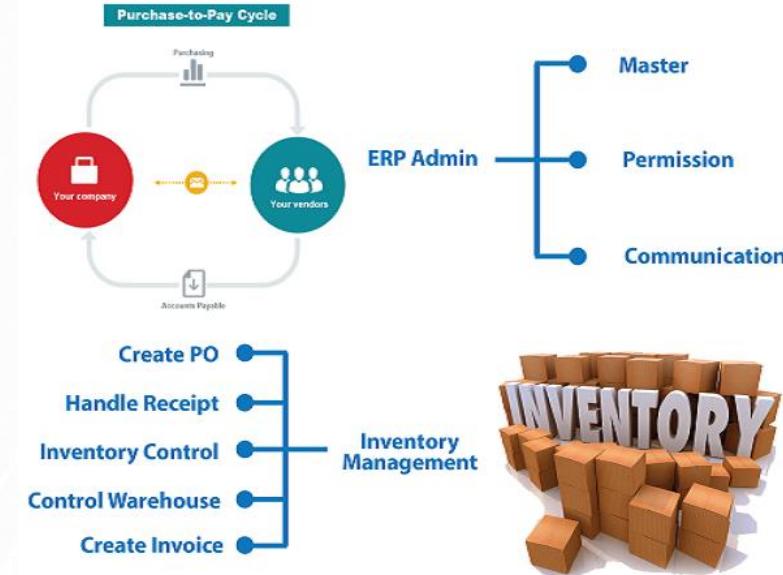
Compensations

Training

Payroll

Time and attendance Labor rules

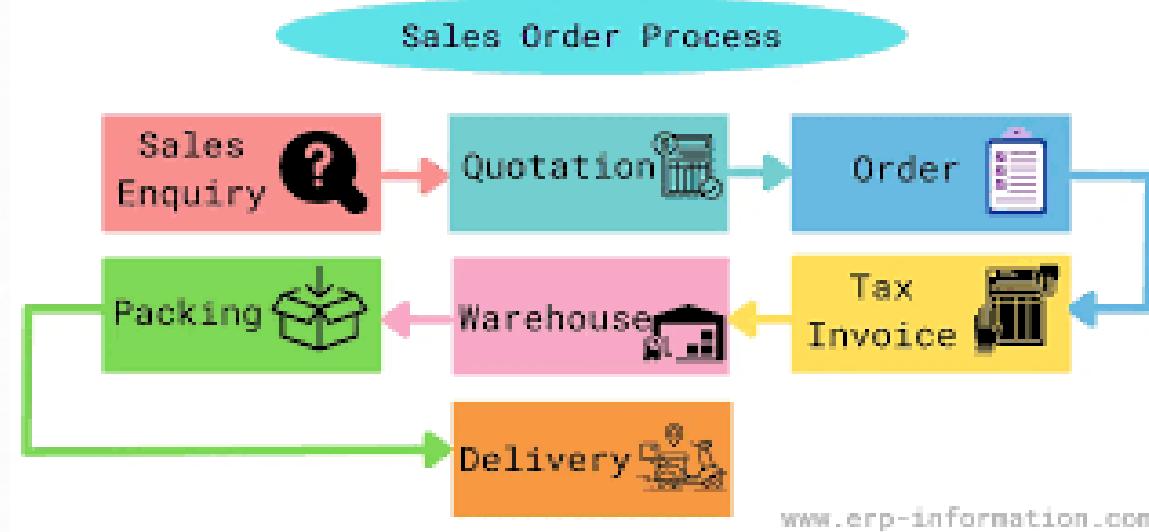
People management



Sales Module:

ERP Sales module is the most important and essential function for the existence of an organization. ERP Sales module implements functions of order placement, order scheduling, shipping and invoicing.

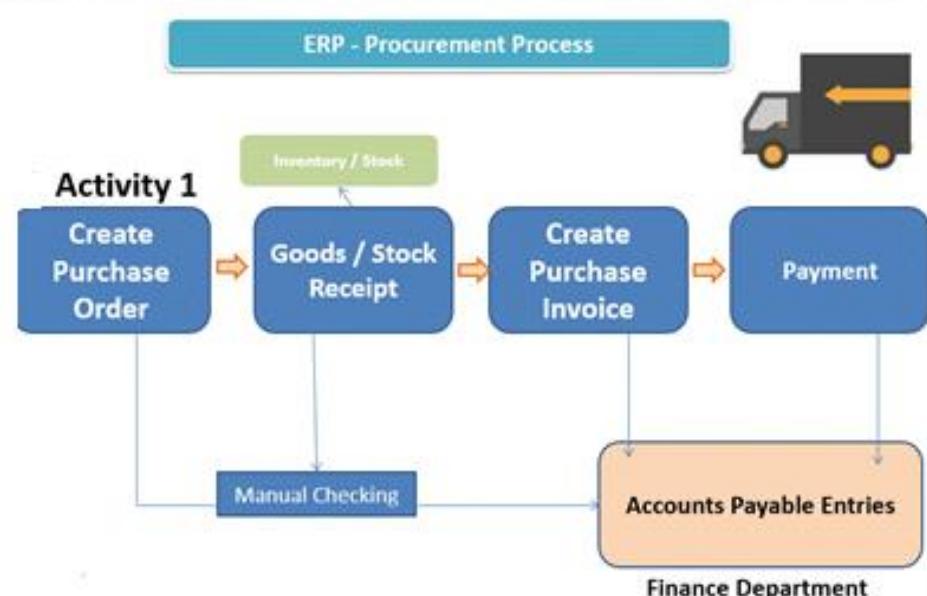
Capturing enquiries, order placement, order scheduling and then dispatching and invoicing form the broad steps of the sales cycle. Important analysis reports are provided to guide decision making and strategy planning.



Purchase Module:

ERP Purchasing module streamlines procurement of required raw materials. It automates the processes of identifying potential suppliers, negotiating price, awarding purchase order to the supplier, and billing processes.

All purchasing activities such as supplier evaluation, placing purchase order, order scheduling and billing are covered in this module.



HOW ERP REDUCES YOUR COSTS?

Cut operations costs:

Seeing exactly where your money is going is the first step to cutting costs.

ERP provides this information both at a summary level and at a detail level. Complete visibility on a monthly, quarterly, or annual basis can provide graphical, up-to-the-minute information to allow for timely adjustments.

Less data entry and errors:

ERP organizes all of your company's information into one, centralized system. This means that there is no need for different departments to re-key information and less need for manual paperwork, thus reducing the potential for errors.

Reduce purchasing costs:

By forecasting demand to suppliers, taking better advantage of quantity breaks, and tracking vendor performance with ERP, you can get the best prices from your vendors.

Return on Investment:

ERP provides solid, measurable financial benefit within the first year after implementation.

Inventory carrying costs decrease due to better planning, tracking and forecasting of requirements.

Vendor pricing decreases by taking better advantage of quantity breaks and tracking vendor performance.
Collections are turned faster due to better visibility into accounts and fewer billing errors.

In Short we can say that ERP provides:

More centralized and efficient operations, with resulting cost savings.

Easier integration of new applications and functionality.

A more comprehensive and current (real-time or near real-time) view of the business.

FEW ERP SOFTWARE

- **SAP ERP:** Is one of the largest and most well-established ERP vendors globally. Their ERP suite offers comprehensive solutions for various industries and business sizes.
- **ORACLE ERP CLOUD** provides a range of ERP solutions, including cloud-based options. their ERP cloud offers a scalable and flexible platform for businesses of different sizes.
- **MICROSOFT DYNAMICS 365:** Microsoft offers a suite of ERP solutions under the dynamics 365 umbrella. these solutions cater to different aspects of business operations, including finance, supply chain, and customer relationship management.
- **TALLY.ERP 9** is widely used in india, especially by small and medium-sized businesses. it's known for its user-friendly interface and suitability for accounting and financial management.

- **Infor ERP** offers industry-specific ERP solutions that cater to various sectors such as manufacturing, distribution, healthcare, and more.
- **Ramco ERP** provides cloud-based ERP solutions that cover a wide range of functionalities, including finance, HR, supply chain, and more.
- **Zoho ERP** offers a suite of business software, including ERP modules, which can be suitable for small and medium-sized businesses.
- **Netsuite** now a part of Oracle, provides cloud-based ERP solutions that are scalable and offer comprehensive features for various industries.
- **Sage ERP** offers ERP solutions that focus on accounting and financial management, along with other business processes.
- **Focus ERP** : Focus Softnet provides ERP solutions tailored for various industries, including manufacturing, distribution, and retail.

CRM - CUSTOMER RELATIONSHIP MANAGEMENT

Customer relationship management (CRM) is a model for managing a company's interactions with current and future customers. It involves using technology to organize, automate, and synchronize sales, marketing, customer service, and technical support.

CRM “is a business strategy that aims to understand, predict and manage the needs of an organisation’s current and potential customers”



DEFINITION

“CRM is concerned with the creation, development and enhancement of individualised customer relationships with carefully targeted customers and customer groups resulting in maximizing their total customer life-time value”.



THE PURPOSE OF CRM

- Help a business to keep customers.
- It helps the business to understand what it needs to do to get more customers.
- Reduce costs by managing costly complaints and finding out what services are useless for customers.
- Help a company figure out if its product is working and, ultimately, increases profit.
- Prime reason is to log and manage customer relationships.

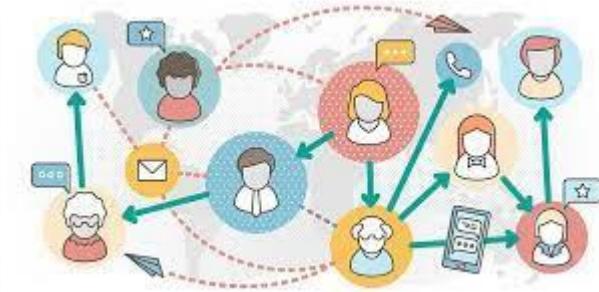


RELATIONSHIP MARKETING

Relationship marketing was first defined as a form of marketing developed from direct response marketing campaign which emphasizes customer retention and satisfaction, rather than a dominant focus on sales transactions.

Marketing activities that are aimed at developing and managing trusting and long-term relationships with larger customers.

In relationship marketing, customer profile, buying patterns, and history of contacts are maintained in a sales database, and an account executive is assigned to one or more major customers to fulfill their needs and maintain the relationship.



Relationship Marketing



PURPOSE OF RELATIONSHIP MARKETING

- **Satisfaction**

Today's customers face a growing range of choices in the products and services they can buy . They are making their choice on the basis of their perceptions of quality, service, and value. Companies need to understand the determinants of customer value and satisfaction.

- **Retention**

To create customer satisfaction, companies must manage their value chain as well as the whole value delivery system in a customer-centered way. The company's goal is not only to get customers, but even more importantly to retain customers. Customer relationship marketing provides the key to retaining customers and involves providing financial and social benefits as well as structural ties to the customers. Companies must decide how much relationship marketing to invest in different market segments and individual customers, from such levels as basic, reactive, accountable, proactive, and full partnership

IMPORTANCE OF CRM

CRM helps the organization to identify customer's needs and re-focus its strategy to serve them better. It helps the company to archive business growth through development edge and excellence. Some of the major issue it address are:

- Identify customer needs.
- Helps in rediscovering the customer and understanding him.
- Identify untapped business potential.
- Identify strong and weak points of supplier.
- Provide feedback to the supplier on his total operation.
- Provide feedback and new information on competitors.
- Action plan to make organization customer – centric.

CRM CYCLE

There are four phases to the customer life cycle. The four phases include; marketing, customer acquisition, relationship management, and loss.

Marketing

The marketing part of the customer life cycle is when messages are sent to the target market to attract prospect customers.

Customer Acquisition

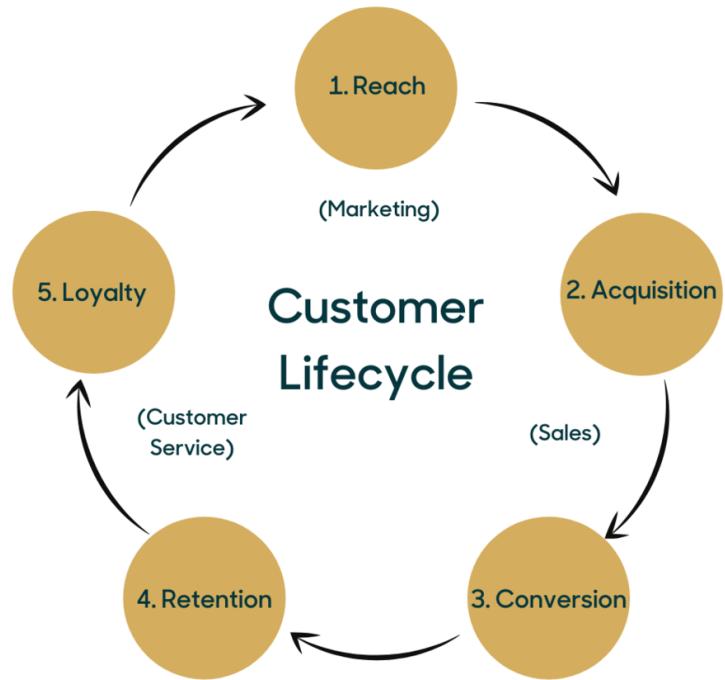
The next phase is customer acquisition which means prospects become customers when they place an order.

Relationship Management

The third stage is relationship management. Relationship management is when resell processes increase the value of existing customers.

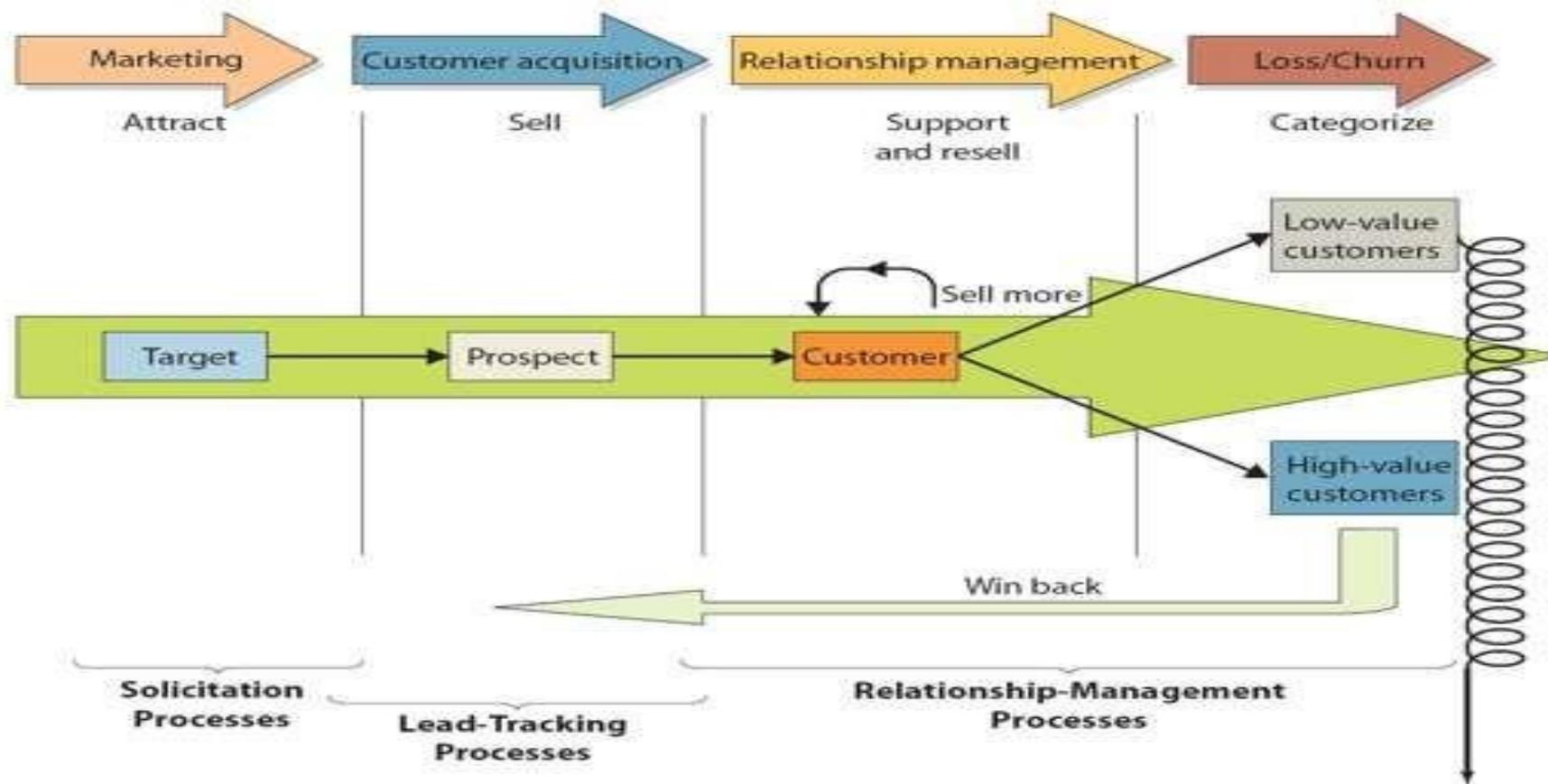
Loss/Churn

The end stage of a customer life cycle is loss/churn when inevitably in time a company may lose a customer. The company then needs to establish a win-back process. The company then needs to decide which lost customers are of most value and try to win back their business.



CRM CYCLE

A CRM system integrates all four phases of the customer life cycle into three major processes. These processes are solicitation, lead-tracking, and relationship management. The diagram above depicts the four phases and the three major processes. It shows the flow of phases and what each phase means.



TYPES OF CRM

Nowadays, three major types of customer relationship management systems, namely operational CRM, analytical CRM and collaborative CRM are being used in many organizations.

1. Operational CRM

It provides support to front-office business processes that involve direct interaction with customers through any communication channel, such as phone, fax, e-mail, etc. The details of every interaction with customers, including their requirements, preferences, topics of discussion etc., are stored in the customers' contact history and can be retrieved by the organization's staff whenever required.

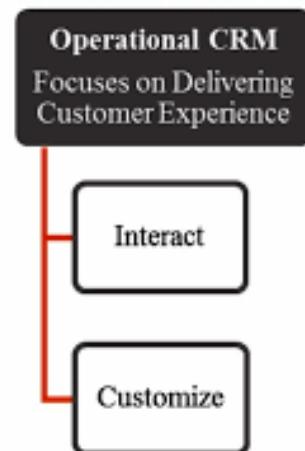
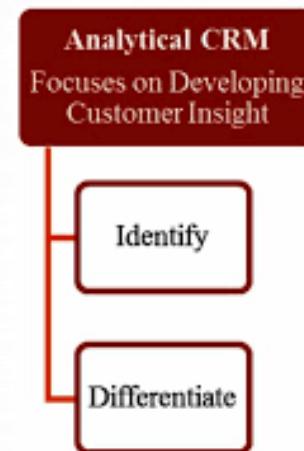
Thus, it presents a unified view of customers across the organization and across all communication channels.

Examples of operational CRM applications are sales force automation (SFA), customer service and support (CSS), enterprise marketing automation (EMA),etc.



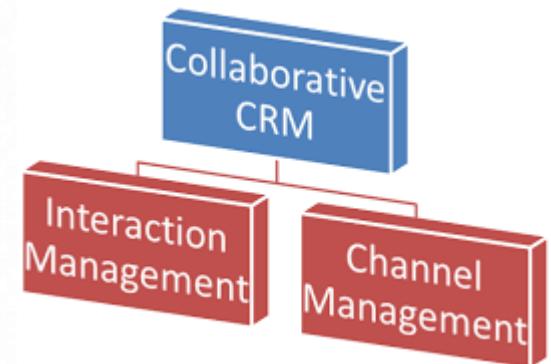
2. ANALYTICAL CRM

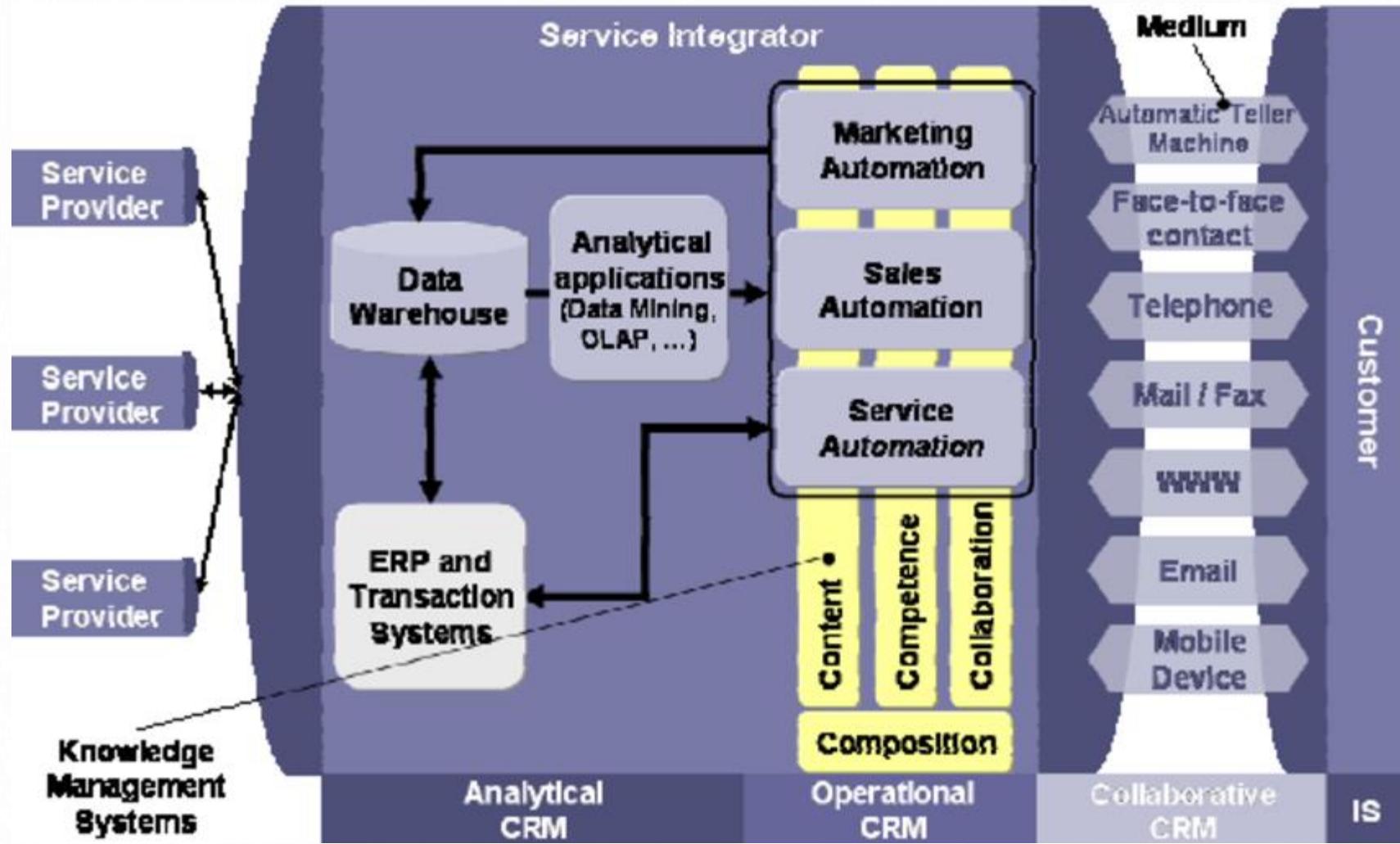
It enables to analyze customer data generated by operational CRM applications, understand the customers' behavior, and derive their true value to the organization. This helps to approach the customers with related information and proposals that satisfy their needs. The analytical customer relationship management applications use analytical marketing tools like data mining to extract meaningful information like the buying patterns of the customers, target market, profitable and unprofitable customers, etc., that help to improve performance of the business.



3. COLLABORATIVE CRM

It allows easier collaboration with customers, suppliers, and business partners and, thus, enhances sales and customer services across all the marketing channels. The major goal of collaborative customer relationship management applications is to improve the quality of services provided to the customers, thereby increasing the customers loyalty. Examples of collaborative CRM applications are partner relationship management (PRM), customer self-service and feedback, etc.





CRM Software

3 Main Types



Operational

- Sales Force Automation
- Marketing Automation
- Service Automation



Analytical

- Data Warehousing
- Data Mining
- Online Analytical Processing



Collaborative

- Interaction Management
- Channel Management
- Activity Streams
- Document Management

SUCCESS FACTORS IN CRM

1. Clear Objectives and Strategy
2. Customer-Centric Culture
3. Data Quality and Management
4. User Adoption and Training
5. Integration with Existing Systems
6. Personalization and Customization
7. Analytics and Insights
8. Communication and Collaboration
9. Change Management
10. Continuous Improvement
11. Executive Support and Sponsorship
12. Measurable Metrics

Benefits of CRM Implementation:

- Improved Customer Insights: Collect and analyze data for a deeper understanding of customer behavior and preferences.
- Enhanced Customer Service: Streamline communication, provide personalized experiences, and resolve issues promptly.
- Increased Sales and Retention: Identify cross-selling and upselling opportunities, leading to revenue growth.
- Efficient Marketing: Targeted campaigns based on customer segments and preferences.
- Data-Driven Decision-Making: Access to real-time data for informed business decisions.

MIS : MANAGEMENT INFORMATION SYSTEM

A Management Information System (MIS) is a computer-based system that provides information and support for managerial decision-making within an organization. It gathers, processes, stores, and disseminates information to help managers at various levels make informed decisions.

MIS typically focuses on internal data and operational processes. It helps monitor the organization's performance, generate reports, and support planning and control activities.

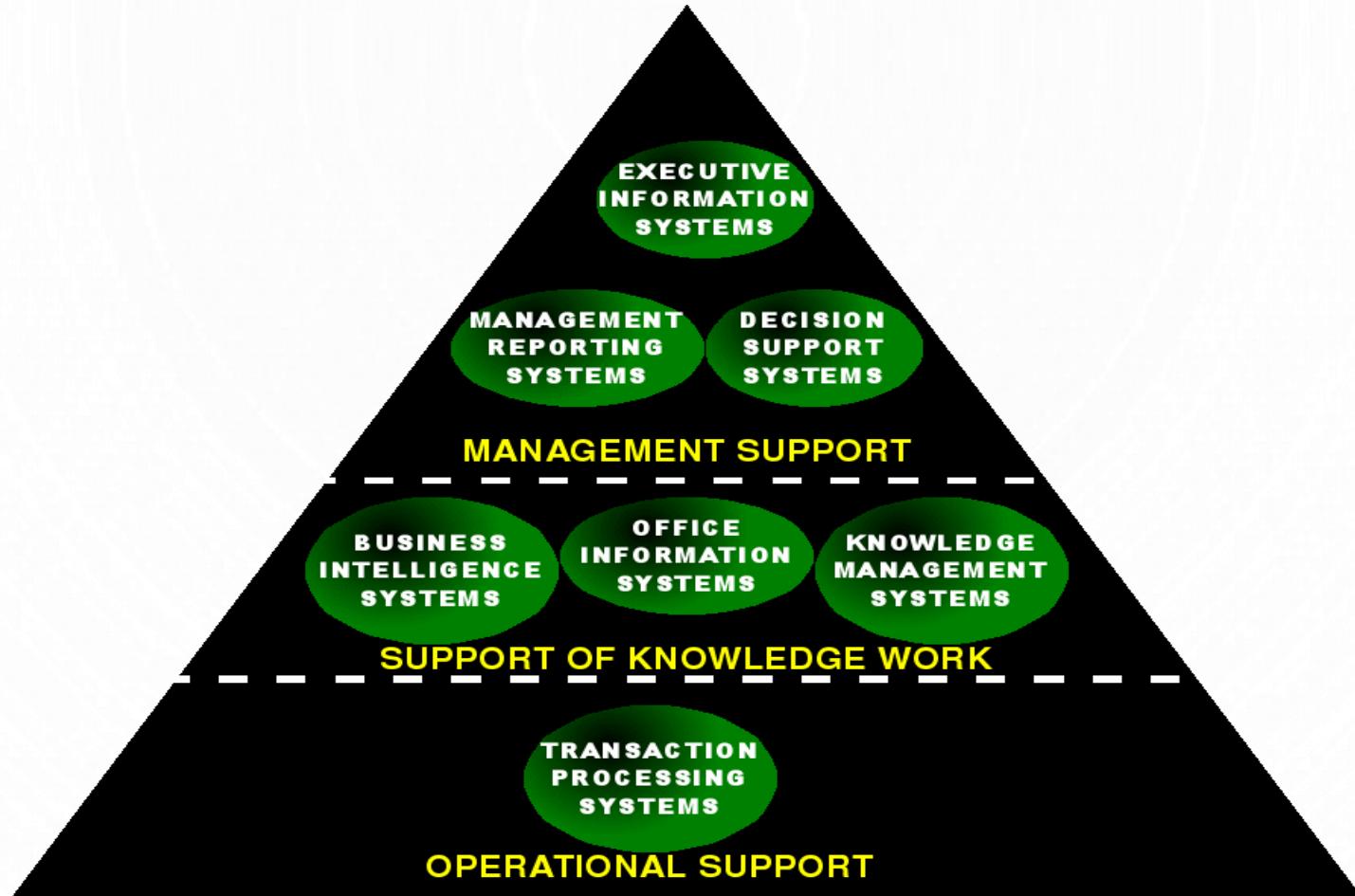


INFORMATION SYSTEMS

An information system is an organized combination of people, hardware, software, communications networks and data resources that collects, transforms, and disseminates information in an organization.



TYPES OF INFORMATION SYSTEM



Management information systems are distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization. MIS involve three primary resources: technology, information, and people.

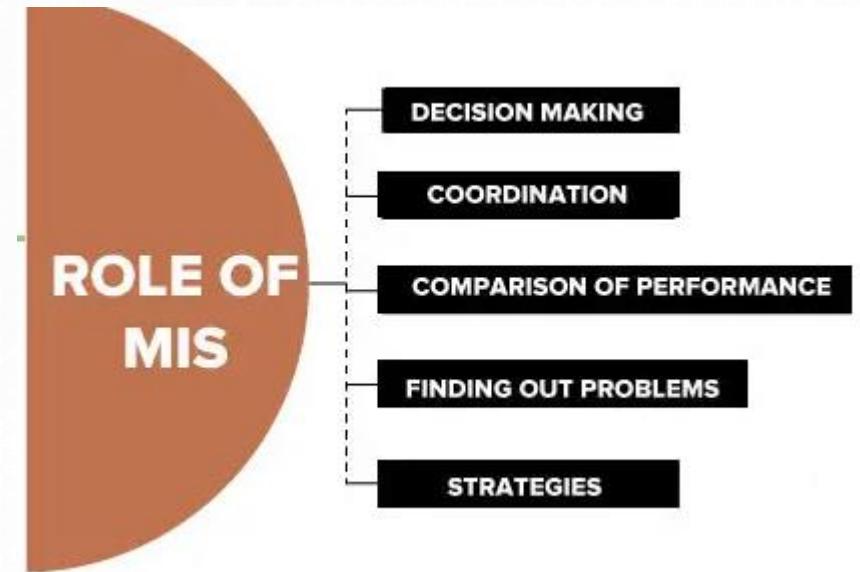
Management information systems are regarded to be a subset of the overall internal controls procedures in a business, which cover the application of people, documents, technologies, and procedures used by management accountants to solve business problems such as costing a product, service or a business-wide strategy.

ROLE OF MIS

The role of MIS in an organization can be compared to the role of heart in the body. The information is the blood and MIS is the heart. In the body the heart plays the role of supplying pure blood to all the elements of the body including the brain.

The MIS plays exactly the same role in the organization.

The system ensures that an appropriate data is collected from the various sources, processed, and sent further to all the needy destinations.



- The system is expected to fulfill the information needs of an individual, a group of individuals, the management functionaries: the managers and the top management.
- The MIS satisfies the diverse needs through a variety of systems such as Query Systems, Analysis Systems, Modeling Systems and Decision Support Systems.
- The MIS helps in Strategic Planning, Management Control, Operational Control and Transaction Processing.

The broad **functions of MIS** are as follows:

- To Improve Decision-Making
- To Improve Efficiency
- To Provide Connectivity
- Data Processing
- Prediction
- Planning
- Control
- Assistance

OBJECTIVES OF MIS

OBJECTIVES OF MIS

- 1 DATA CAPTURING
- 2 PROCESSING OF DATA
- 3 STORAGE OF INFORMATION
- 4 RETRIEVAL OF INFORMATION
- 5 DISSEMINATION OF INFORMATION

CHARACTERISTICS OF MIS

- **Management-oriented:** The basic objective of MIS is to provide information support to the management in the organization for decision making.
- **Management directed:** When MIS is management- oriented, it should be directed by the management because it is the management who tells their needs and requirements more effectively than anybody else.
- **Integrated:** It means a comprehensive or complete view of all the subsystems in the organization of a company.
- **Common data flows:** The integration of different subsystems will lead to a common data flow which will further help in avoiding duplicacy and redundancy in data collection, storage and processing.

Heavy planning-element: The preparation of MIS is not a one or two day exercise. It usually takes 3 to 5 years and sometimes a much longer period.

- **Subsystem concept:** When a problem is seen in 2 sub parts, then the better solution to the problem is possible.
- **Common database:** This is the basic feature of MIS to achieve the objective of using MIS in business organizations.
- **User friendly/Flexibility:** An MIS should be flexible.
- **Information as a resource:** Information is the major ingredient of any MIS.

FEATURES OF MIS



- Timeliness
- Accuracy
- Consistency
- Completeness
- Relevance

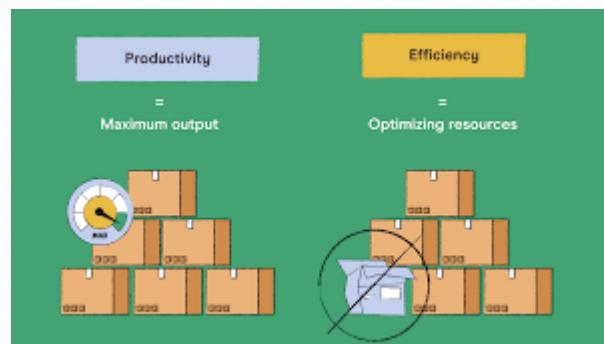


IMPORTANCE OF MIS IN TODAY'S BUSINESS LANDSCAPE

1. Informed Decision Making: MIS provides accurate, timely, and relevant information to managers at various levels, enabling them to make well-informed decisions. It aids in identifying market trends, customer preferences, and potential opportunities, which is crucial for strategic, tactical, and operational decision-making.



2. Efficiency and Productivity: Efficiency is enhanced through streamlined processes, automation of routine tasks, and optimal resource allocation. MIS minimizes manual efforts, reduces errors, and improves overall productivity across departments and functions.



3. Data-Driven Insights: MIS transforms raw data into meaningful insights through data analysis and reporting. It empowers organizations to uncover patterns, correlations, and trends in data, facilitating proactive decision-making and more accurate predictions.



4. Strategic Planning: MIS aids in long-term planning by providing historical data, market analysis, and performance metrics. Organizations can formulate strategies that align with their goals, allocate resources effectively, and adapt to changing market dynamics.



5. Competitive Advantage: Companies that effectively utilize MIS gain a competitive edge. By swiftly adapting to market changes and customer preferences, they can introduce new products, services, or strategies ahead of competitors.



6. Real-time Monitoring: MIS allows for real-time monitoring of key performance indicators (KPIs) and critical metrics. This real-time visibility enables timely intervention and course correction, helping organizations stay on track with their objectives.



7. Collaboration and Communication: MIS facilitates communication and collaboration among different departments and teams within an organization. It ensures that all stakeholders have access to the same up-to-date information, fostering better teamwork and coordination.



8. Customer Relationship Management (CRM): MIS supports CRM by tracking customer interactions, preferences, and behaviors. This information helps organizations provide personalized experiences, target marketing efforts, and improve overall customer satisfaction.



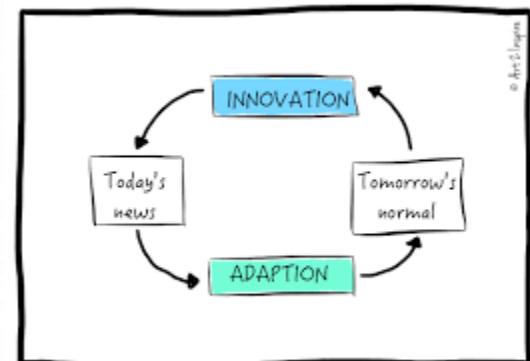
9. Risk Management: MIS aids in identifying potential risks and vulnerabilities by analyzing historical data and market trends. It enables organizations to implement risk mitigation strategies and contingency plans to minimize potential negative impacts.



10. Compliance and Regulation: In industries with strict regulatory requirements, MIS helps organizations maintain compliance by tracking and reporting on relevant data. It ensures adherence to legal and industry standards.



11. Innovation and Adaptation: MIS fosters innovation by providing insights into emerging technologies and market trends. It allows organizations to adapt to new business models and seize opportunities in a rapidly changing business landscape.



COMPONENTS OF MIS

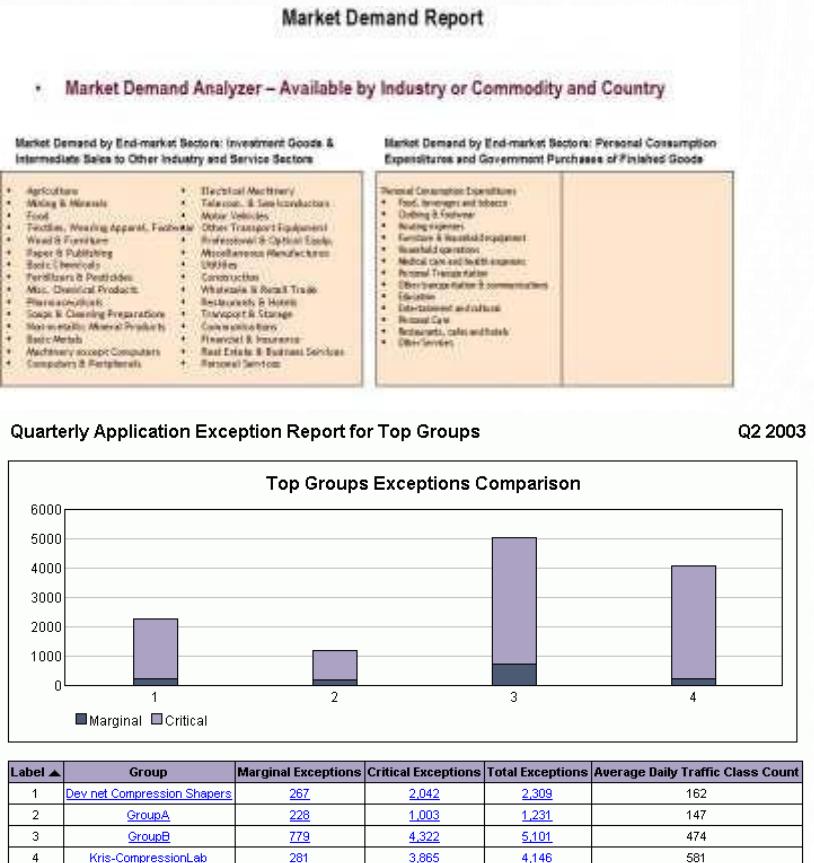
- **PEOPLE RESOURCES:** People are required for the operation of all information system.
- **DATA RESOURCES:** Database holds processed and organized data.
- **SOFTWARE RESOURCES:** It includes all sets of information processing instruction.
- **HARDWARE RESOURCES:** Include all physical devices and materials used in information processing.
- **PROCESS:** Is a step undertaken to achieve a goal.

OUTPUTS OF A MIS

- **Scheduled reports** which are produced periodically, or on a Schedule (daily, weekly, monthly).
- **Key-indicator report** which summarizes the previous day's critical activities and also it is typically available at the beginning of each day.



- **Demand report** which gives certain information at a manager's request.
- **Exception report** which is automatically produced when a situation is unusual or requires management action.



COMPARISON BETWEEN MIS, CRM AND ERP

Aspect	MIS	CRM	ERP
Focus	Information management	Customer interactions	Business processes
Primary Purpose	Provide information for decision making	Manage customer relationships	Integrate and manage business processes
Scope	Organization-wide	Customer-centric	Organization-wide
Data Management	Collects, processes, and stores data for analysis	Manages customer information	Integrates data across various processes
Functionality	Reporting, analysis, decision support	Customer data, interactions, sales automation	Process automation, data integration
Key Features	Data analysis, reporting, dashboards	Customer database, lead management, sales tracking	Resource planning, inventory management, financials

Aspect	MIS	CRM	ERP
Key Users	Managers, executives	Sales, marketing, customer service teams	Departments across the organization
Focus on	Overall organization performance	Improving customer relationships	Streamlining business processes
Examples	Sales reports, financial analysis	Customer profiles, sales forecasts	Order processing, inventory management
Integration	Can integrate with other systems	Can integrate with other systems	Integrates various business functions
Benefits	Informed decision making, efficiency	Improved customer satisfaction, targeted marketing	Process automation, cost reduction
Challenges	Data accuracy, system complexity	Data quality, user adoption	Implementation complexity, change management

BUSINESS INTELLIGENCE

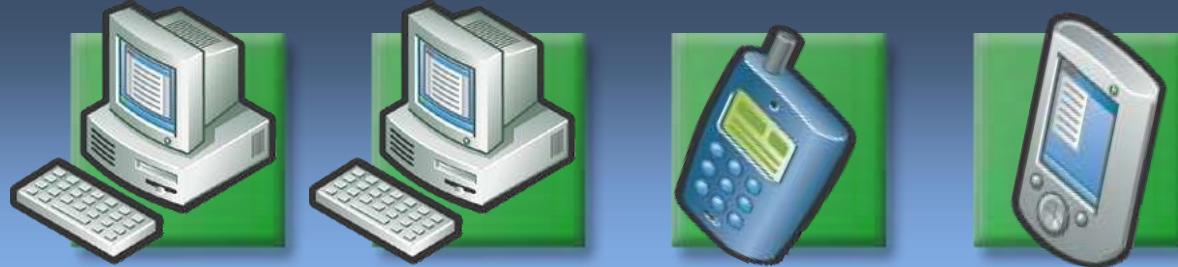
What is
Business
Intelligence?

- Business Intelligence (BI) is about getting the right information, to the right decision makers, at the right time.
- BI is an enterprise-wide platform that supports reporting, analysis and decision making.
- BI leads to:
 - fact-based decision making
 - “single version of the truth”

What is Business Intelligence

- Making useful, actionable insight from stored data.
- The act of using historical data to gain new information.
- Techniques include:
 - multidimensional analyses
 - mathematical projection
 - modeling
 - ad-hoc queries
 - 'canned' reporting
 - Dashboards

QUESTIONS BI IS DESIGNED TO ANSWER



- What happened?
- What is happening?
- Why did it happen?
- What will happen?
- What do I want to happen?

Past

Present

Future



Data

ERP

CRM

SCM

3Pty

Black books

QUESTIONS BI IS DESIGNED TO ANSWER

- A BI solution, with the right data and features, should be able to take operational data and enable users to answer specific questions such as:
 - Sales and marketing
 - Which customers should I target?
 - What has caused the change in my pipeline?
 - Which are my most profitable campaigns per region?
 - Did store sales spike when we advertised in the local paper or launched an email campaign?
 - What is the most profitable source of sales leads and how has that changed over time?

● Operational

- Which vendors are best at delivering on time and on budget? – How many additional personnel do we need to add per store during the holidays?
- Which order processing processes are most inefficient?

● Financial

- What is the fully loaded cost of new products?
- What is the expected annual profit/loss based on current marketing and sales forecasts?
- How are forecasts trending against the annual plan?
- What are the current trends in cash flow, accounts payable and accounts receivable and how do they compare with plan?

● Overall business performance

- What are the most important risk factors impacting the company's ability to meet annual profit goals?
- Should we expand internationally and, if so, which geographic areas should we first target?

BUSINESS INTELLIGENCE VISION

Improving organizations by providing business insights to **all** employees leading to better, faster, more relevant decisions.

- Advanced Analytics
- Self Service Reporting
- End-User Analysis
- Business Performance Management
- Operational Applications
- Embedded Analytics



Business Analytics vs Business Intelligence		
Aspect	Business Analytics	Business Intelligence
Focus	Data analysis to gain insights into past performance and predict future trends.	Data collection, integration, and presentation for informed decision-making.
Objective	Extract actionable insights for strategic and operational decisions.	Provide historical, current, and predictive views of business operations.
Scope	Deeper analysis of specific problems using statistical and quantitative methods.	Broader overview of organizational data for reporting and monitoring.
Data Usage	Analyzes raw data to discover patterns, correlations, and causality.	Organizes data into understandable formats like dashboards and reports.
Techniques	Advanced statistical modeling, predictive modeling, data mining.	Reporting, data visualization, OLAP, data warehousing.
Time Focus	Future-oriented, emphasizes predictive analysis.	Past and present-oriented, emphasizes historical reporting.
Users	Data scientists, analysts, and specialists.	Managers, executives, and operational staff.
Decision Support	Supports data-driven decision-making through insights and predictions.	Supports decision-making by providing relevant, organized data.
Examples	Customer segmentation, market basket analysis, predictive maintenance.	Sales reports, inventory tracking, financial statements.

Business Analytics (BA):

- Focuses on advanced statistical analysis and predictive modeling.
- Aims to extract actionable insights from data to drive decision-making.
- Often involves analyzing specific problems, uncovering patterns, and making predictions.
- Typically used by data scientists and analysts to forecast trends and outcomes.

Business Intelligence (BI):

- Emphasizes data presentation and reporting for a broader organizational view.
- Provides historical, current, and predictive views of business operations.
- Used to monitor and visualize key performance indicators (KPIs) and track trends over time.
- Designed for managers, executives, and operational staff to support informed decision-making.

INDICATIVE USE OF BUSINESS ANALYTICS AND BUSINESS INTELLIGENCE BY THE FEW KNOWN COMPANIES

Company	Business Analytics (BA)	Business Intelligence (BI)
Netflix	<ul style="list-style-type: none">- Analyzing viewer behavior patterns to personalize content recommendations.	<ul style="list-style-type: none">- Providing executive dashboards with real-time viewership metrics.
Amazon	<ul style="list-style-type: none">- Optimizing pricing strategies using real-time data to adjust prices based on demand and competition.	<ul style="list-style-type: none">- Analyzing historical sales data to forecast demand, manage inventory, and optimize supply chain.
Uber	<ul style="list-style-type: none">- Utilizing dynamic pricing models based on factors like real-time demand, traffic, and weather conditions.	<ul style="list-style-type: none">- Monitoring driver efficiency, ride patterns, and customer feedback through interactive dashboards.
Coca-Cola	<ul style="list-style-type: none">- Analyzing historical sales data and consumer trends to forecast demand and adjust production accordingly.	<ul style="list-style-type: none">- Generating financial reports, balance sheets, and sales performance summaries for management and investors.
Walmart	<ul style="list-style-type: none">- Applying demand forecasting models to optimize inventory levels and prevent stockouts.	<ul style="list-style-type: none">- Creating dashboards for store managers to track sales, inventory turnover, and employee performance.
Starbucks	<ul style="list-style-type: none">- Analyzing customer preferences and purchase patterns to introduce new products and tailor menus.	<ul style="list-style-type: none">- Providing regional managers with insights into real-time sales, customer preferences, and store performance.
Procter & Gamble	<ul style="list-style-type: none">- Analyzing sales data and market trends to optimize product portfolios and launch new products.	<ul style="list-style-type: none">- Monitoring global sales data, analyzing market trends, and generating reports to inform strategic decisions.

Examples of BI

The screenshot shows the Microsoft Power BI Desktop interface with the following details:

- Home Tab:** Selected.
- File Tab:** Includes options like Paste, Cut, Copy, Format painter, and Clipboard.
- Insert Tab:** Includes options like Get data, Excel workbook hub, Data, SQL Server, Enter data, Dataverse, Recent sources, Transform data, Refresh data, New visual, Text box, More visuals, New measure, Quick measure, Sensitivity, and Publish.
- Visualizations:** A large section on the right containing:
 - A search bar: "Search".
 - A list of filters:
 - Chain is (All)
 - City is (All)
 - District is (All)
 - Name is (All)
 - Open Month is (All)
 - Store Type is (All)
 - A "Values" section with "Add data fields here".
 - A "Drill through" section with "Cross-report" (radio button off) and "Keep all filters" (checkbox on).
 - "Add drill-through fields here"
- Fields:** A search bar: "Search". Below it is a list of fields:
 - Sales
 - District
 - Item
 - Store
 - Time
- Report Content:**
 - Store Sales Overview:** A pie chart titled "This Year Sales by Chain" showing Lindseys (\$4M) and Fashions Direct (\$14M).
 - New Stores:** A text value of 10.
 - Total Stores:** A text value of 104.
 - Map:** A map of the United States showing store locations by PostCode and Store Type (New Store: blue dot, Same Store: red dot).
 - Total Sales Variance by FiscalMonth and District Manager:** A stacked area chart showing sales variance from January to August across different district managers.
 - Total Sales Variance %, Sales Per Sq Ft and This Year Sales by District and District:** A bubble chart showing sales variance percentage and sales per square foot for various districts.
- Bottom Navigation:** Buttons for Info, Overview (selected), District Monthly Sales, New Stores, and a plus sign icon.
- Page Information:** Page 2 of 4.
- Zoom:** 53%.

Microsoft BI Platform

BUSINESS INTELLIGENCE USERS

4 Types of Users

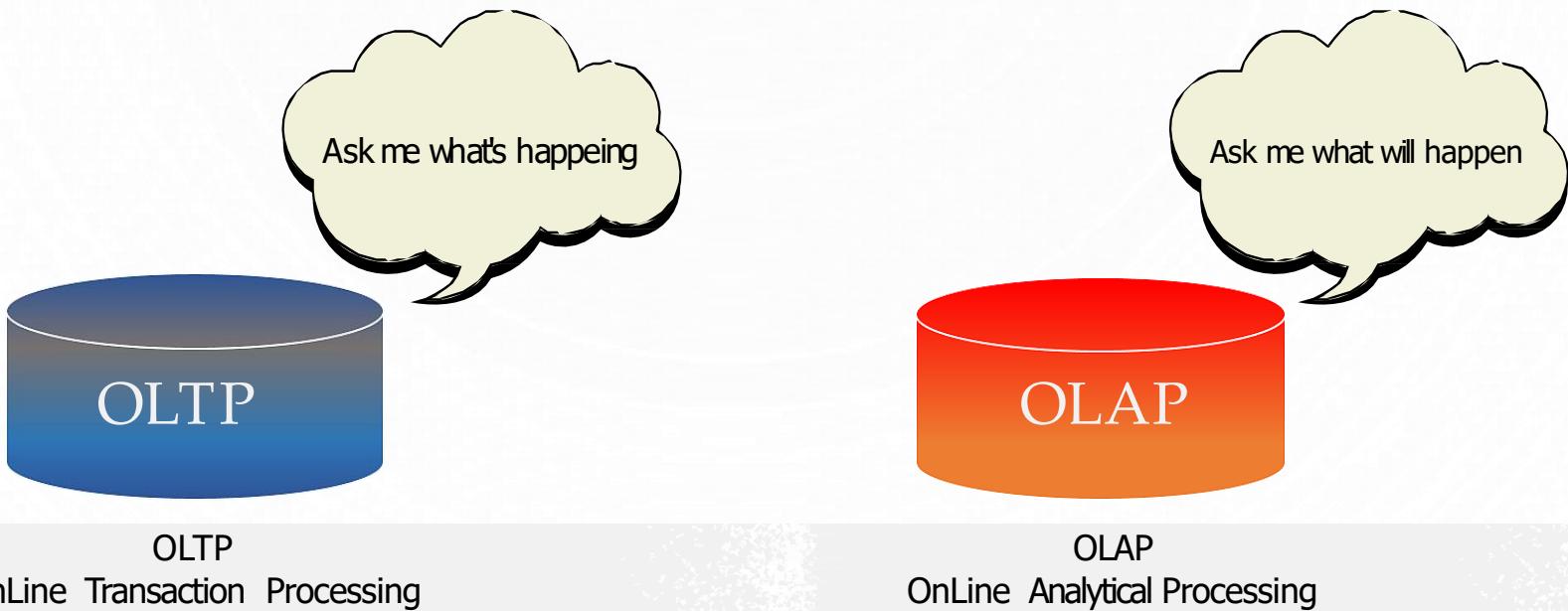
- **Executives** : Information is summarized and has been defined for them. Users have the ability to view static information online and/or print to a local printer.
- **Casual Users**
Casual users require the next level of detail from the information that is provided to viewers. In addition to the privileges of a viewer, casual users have the ability to refresh report information and the ability to enter desired information parameters for the purposes of performing high-level research and analysis.
- **Functional Users**
Functional users need to perform detailed research and analysis, which requires access to transactional data. In addition to the privileges of a casual user, functional users have the ability to develop their own ad hoc queries and perform OLAP analysis.
- **Super Users**
Super users have a strong understanding of both the business and technology to access and analyze transactional data. They have full privileges to explore and analyze the data with the BI applications available to them.

Business Analytics Software	Business Intelligence Software
RStudio	Tableau
Python (pandas, NumPy, scikit-learn)	Microsoft Power BI
MATLAB	QlikView/Qlik Sense
IBM SPSS	MicroStrategy
RapidMiner	IBM Cognos Analytics
KNIME	Google Data Studio
Alteryx	SAP BusinessObjects
SAS Analytics	Domo
TIBCO Statistica	Looker
Weka	Sisense
Orange	Dundas BI
D3.js (JavaScript data visualization)	Pentaho
Microsoft Excel (data analysis features)	Yellowfin BI
H2O.ai	Zoho Analytics
Apache Spark (with MLlib)	Board
StatTools	Mode Analytics
Statistica	GoodData
SPSS Statistics	QlikView/Qlik Sense

What are the differences between...

OLTP VS OLAP

Why would an organization need an OLAP?



OLTP, or Online Transaction Processing, is a type of database management system and processing methodology designed for managing and handling transaction-oriented workloads in real-time. It is primarily used in scenarios where many users need concurrent access to a database, and the focus is on quick and efficient processing of individual transactions.

Characteristics include:

1. Transaction-oriented
2. Real-time processing
3. High concurrency
4. Data integrity (ACID properties)
5. Normalized data
6. Indexing
7. Small, frequent reads/writes
8. Relational Database Management Systems (RDBMS)
9. Reporting and analytics separation

Examples: OLTP systems are commonly used in various industries, including e-commerce (e.g., online shopping carts), banking (e.g., ATM transactions), healthcare (e.g., patient record management), and more.



OLTP's are operational systems which help execute and record the day to day operations of a business

Houses the original source of the data

Control and Run fundamental business tasks

Snapshot of on-going business process

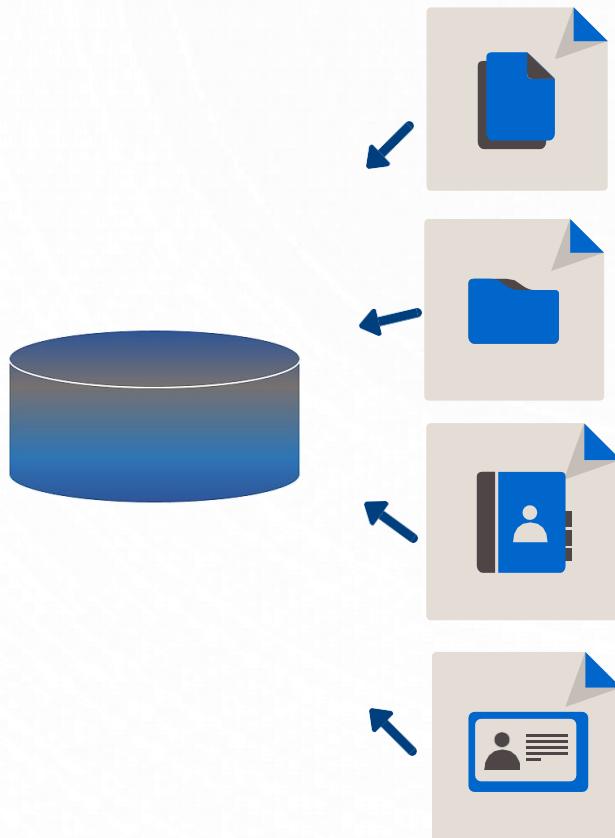
Constant modifications to data input by end users

Simple queries performed to yield non-complex records

Quick processing speeds to keep up with daily transactions

Highly normalized with many tables

OLTP



With all of the information and transactions the OLTP system is required to handle, utilizing the system to run complex queries can put an extreme and unnecessary load onto the system.

(This can in turn cause detrimental lags in the daily 'transaction' functionality, which the OLTP is designed to run)

Back ups must be done frequently as data loss in your OLTP can lead to Monetary and Legal complications.

Aspect	Advantages	Limitations
Performance	- High-speed processing of small transactions	- May not handle complex queries efficiently
Concurrency	- Supports multiple concurrent users	- Potential for locking and contention issues
Data Integrity	- Maintains ACID properties	- Increased overhead for data integrity
Real-time	- Provides real-time or near-real-time data	- Scalability challenges with high loads
Normalized Data	- Reduces data redundancy	- Complex queries may require joins
Indexing	- Optimizes data retrieval	- Index maintenance overhead
Small Transactions	- Efficient handling of small operations	- May not suit batch processing scenarios
Examples	- Suitable for e-commerce, banking, healthcare	- Less suitable for data warehousing
RDBMS Support	- Supported by many relational databases	- May require complex schema management
Analytics Separation	- Keeps transaction and analytics data separate	- Extra complexity for analytics integration

OLAP, or Online Analytical Processing, is a category of computer processing that facilitates complex, multidimensional analysis of large volumes of data. It's primarily used for business intelligence and decision support systems.

Overview of OLAP (Online Analytical Processing) in list format:

1. Multidimensional Data Model
2. Data Aggregation
3. Complex Queries
4. Speed of Query Response
5. Read-Only Data
6. Data Warehouses
7. Star and Snowflake Schema
8. Reporting and Visualization
9. Types of OLAP (MOLAP, ROLAP, HOLAP)
10. Scalability
11. Security

Examples: OLAP is used in various domains, including finance (for financial analysis and reporting), retail (for sales and inventory analysis), and healthcare (for clinical data analysis).

OLAP



OLAP's are data warehouses which leverage data acquired from OLTP systems to help organizations make better decisions

Consolidation of data from OLTP system(s)

Helps with Planning, Problem Solving, and making Decision

Multi-Dimensional views of business activities

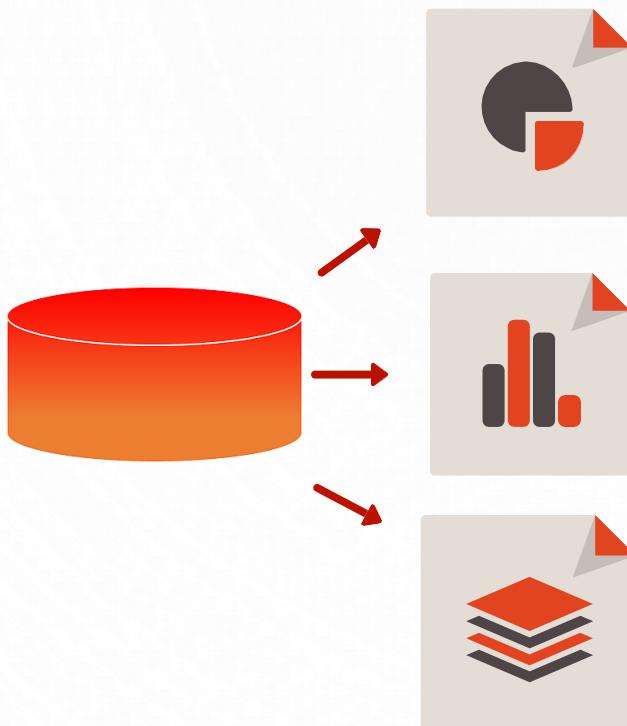
Periodic Refreshes made to upload data from OLTP system(s)

Allows for the execution of complex queries (aggregations)

Processing speed can vary depending on system structure

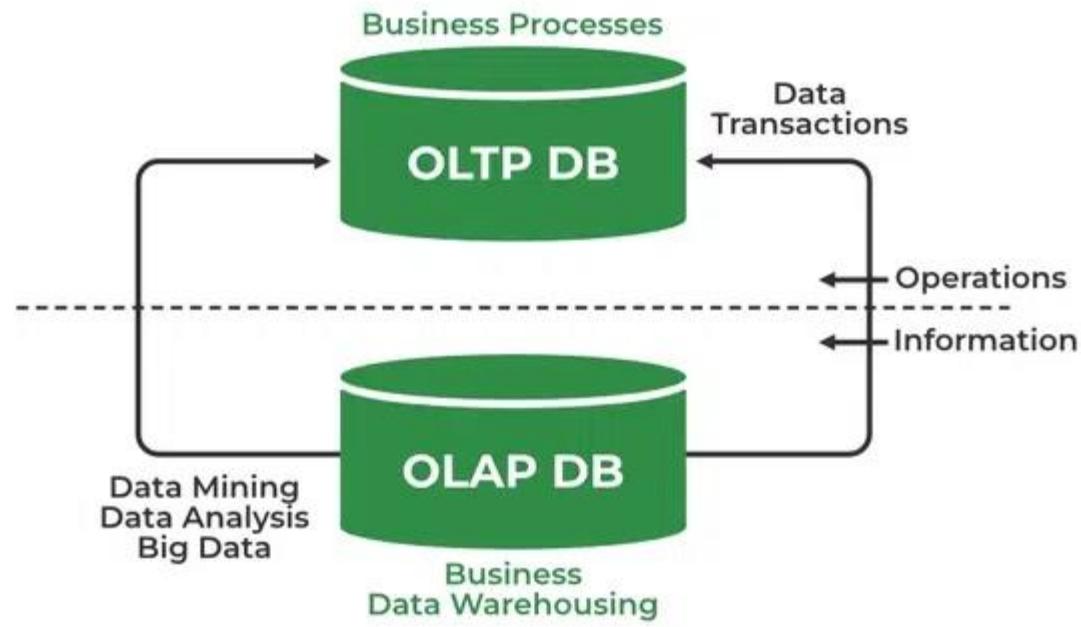
More often de-normalized with fewer tables, cubes utilized

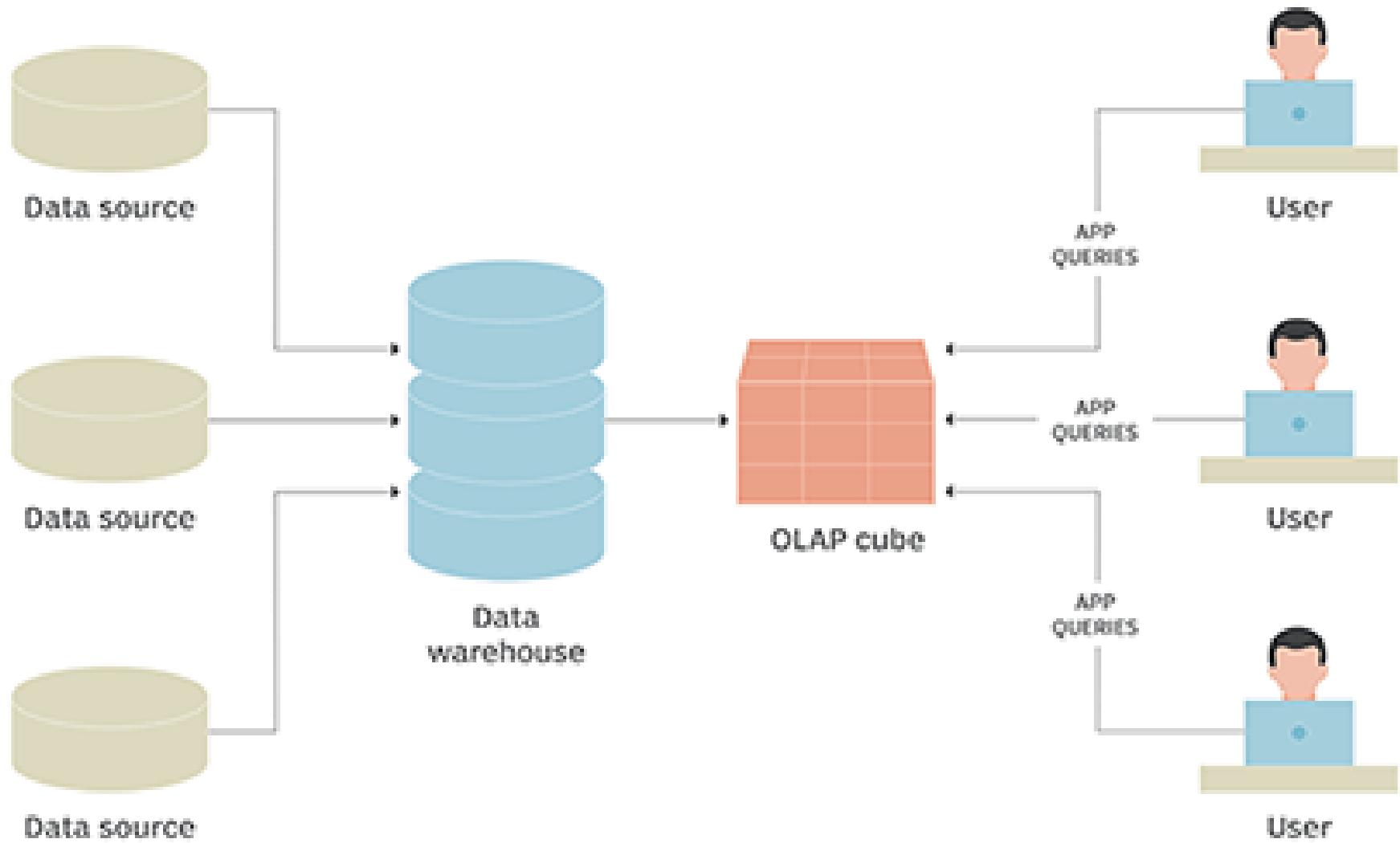
OLAP

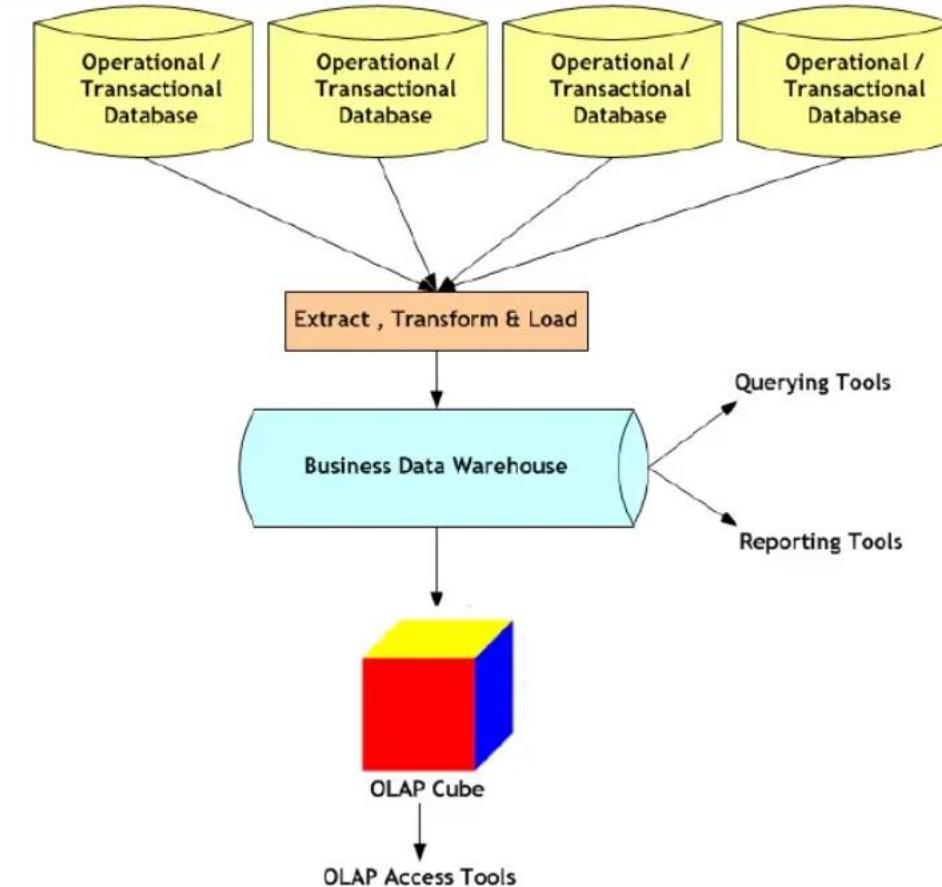


- Olap's are comprised of all necessary data from your OLTP system, where it is structured and aggregated to allow for detail intensive queries to be performed.
- Highly visual reports can be extracted and presented in a manner fit for end users
- A great benefit of an olap system is the potential for the system to be utilized as a 'backup' of the oltp by regularly reloading the data from the oltp to olap.

Aspect	Advantages	Limitations
Multidimensional Model	- Intuitive data representation	- Complex data modeling
Data Aggregation	- Flexible summarization of data	- Pre-aggregation might lead to data loss
Complex Queries	- Supports intricate analytical queries	- Slower query response with large datasets
Query Speed	- Rapid response to analytical queries	- Resource-intensive for complex queries
Read-Only Data	- Data integrity is maintained	- Limited for transactional processing
Data Warehouses	- Centralized, historical data storage	- Requires ETL (Extract, Transform, Load)
Schema Types	- Star and snowflake schemas simplify modeling	- Schema design can be complex
Reporting and Visualization	- Enables effective data presentation	- Tools may require training and integration
Examples in Various Domains	- Wide range of applications	- Initial setup and maintenance can be costly
Types of OLAP	- Allows choice of OLAP system based on needs	- Different types have varying performance
Scalability	- Scalable to accommodate growing data volumes	- Hardware and licensing costs can increase
Security	- Supports security measures for data access	- Requires robust security management









VS
Complimentary



While it is very important to ensure you are collecting data as efficiently as possible, your ability to leverage that data to make decisions ensures operational longevity and success. The data created by your OLTP can be seen as 'fuel' for your enterprise, where an OLTP system is the vehicle which filters, extracts, and consumes that fuel to analyze, predict and propel best business practices.

Types of OLAP –ROLAP, MOLAP, HOLAP

There are three different types of OLAP based on how data is stored in the database.

ROLAP : stands for Relational Online Analytical Processing. It stores data in the form of rows and columns. ROLAP does not pre-compute data; it can be accessed through SQL queries on demand. Thus, ROLAP empowers users to analyze and view data, and is capable of saving storage space while working with massive historical datasets that are not often queried. It can deal with large datasets, but the larger is the dataset more is the processing time. Thus, performance becomes an issue with rising data volumes and concurrencies.

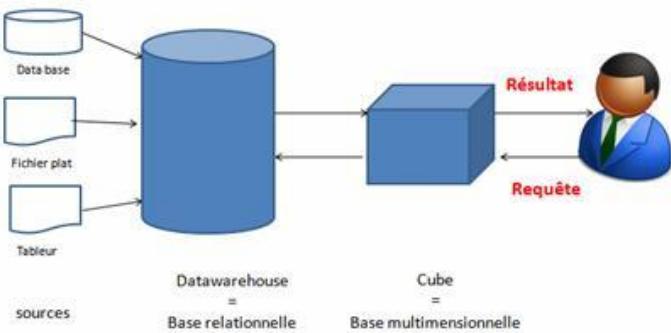
MOLAP: MOLAP is an acronym for Multidimensional Online Analytical Processing. In MOLAP, data is pre-aggregated, summarized, and stored in the form of a multidimensional array. It enables users to model data and visualize it from multiple viewpoints. Since all the complex calculations are done in advance, users can easily perform slice and dice operations on their data with fast response times. However, traditional MOLAP is less scalable than ROLAP, as a limited amount of data can be stored in a multidimensional cube.

	MOLAP	HOLAP	ROLAP
Cube Structure			
Preprocessed Aggregates			
Detail-Level Values			

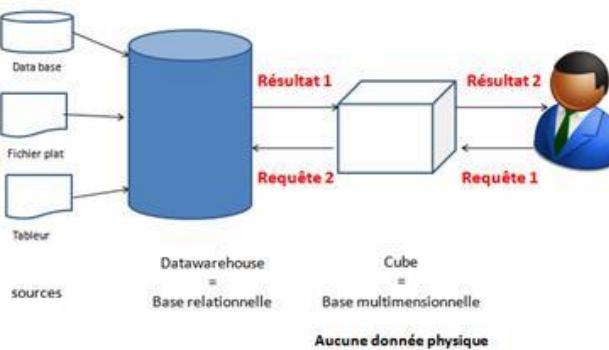
Multidimensional Storage Relational Storage

HOLAP : Hybrid OLAP is a combination of both MOLAP and ROLAP features. It uses both relational and multidimensional structures to store data, and which one should be used to access data depends on the processing application. Thus, HOLAP provides a mid-way approach to both the methods described above.

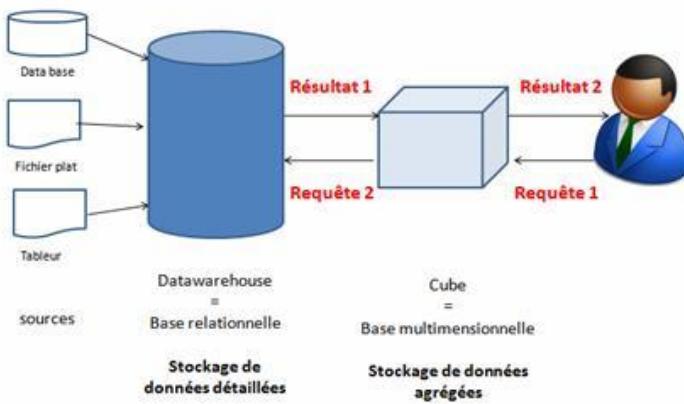
MOLAP



ROLAP

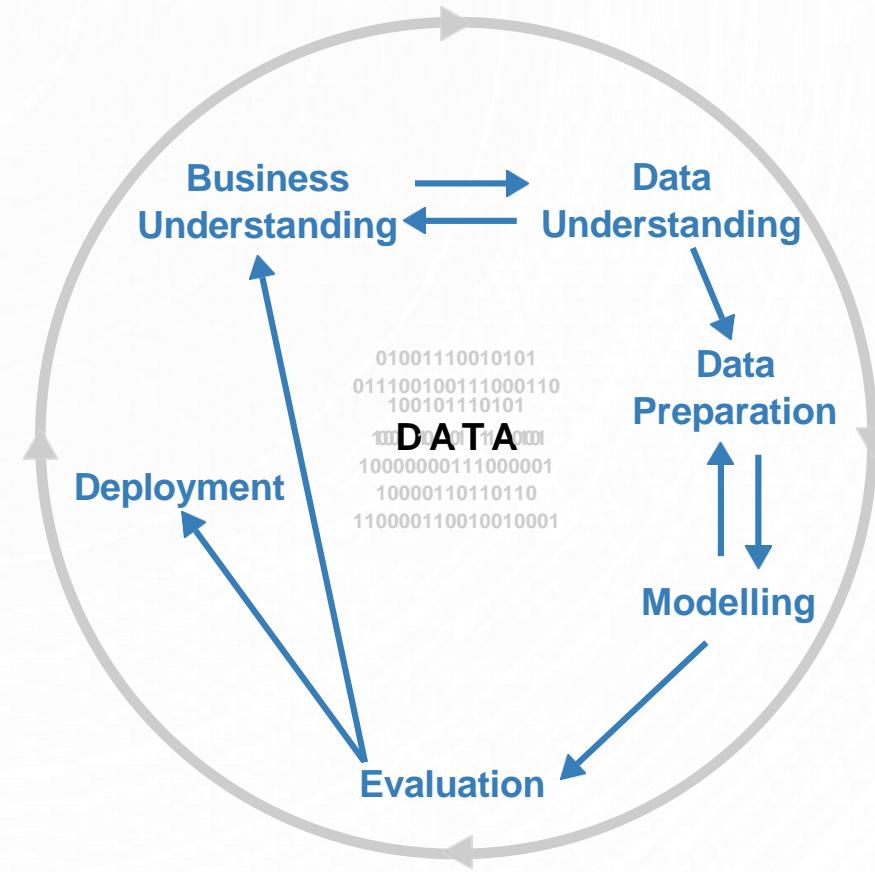


HOLAP



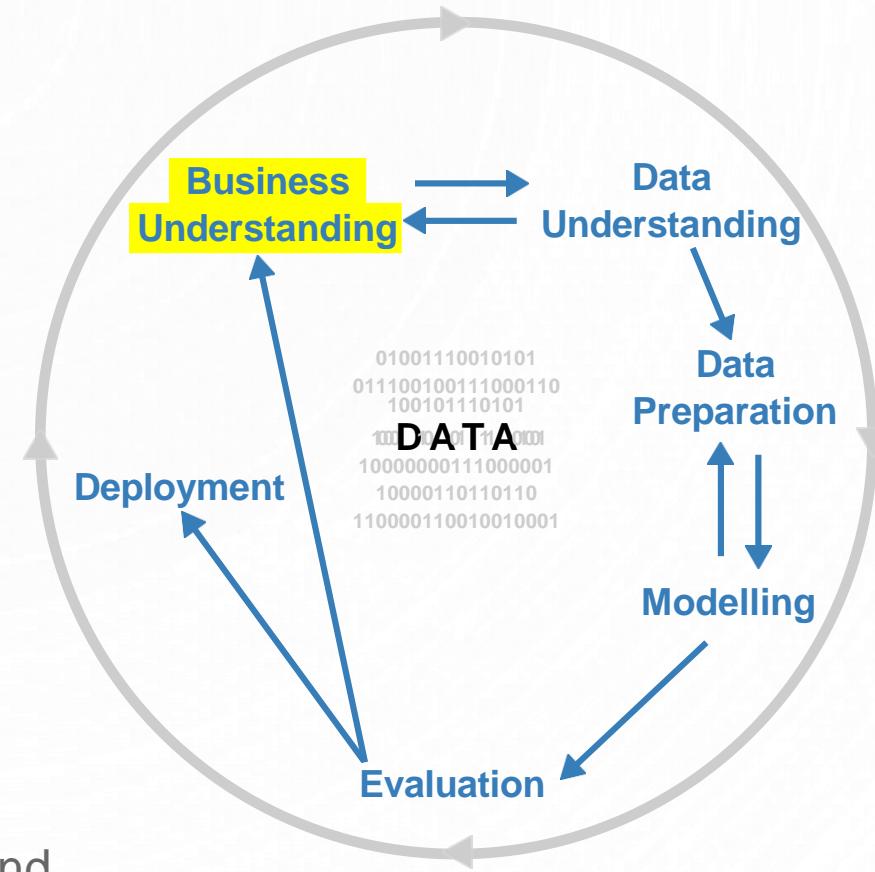
WHAT IS CRISP-DM?

- Cross Industry Standard Process for Data Mining
- Developed in 1996 by **big players** in **data analysis**
SPSS, Teradata, Daimler, OCHRA, NCR
- **Most popular** methodology for **data-centric projects**
- It can be regarded as **agile**
 - Introduces **almost no overhead**
 - Emphasizes adaptive transitions between project phases



BUSINESS UNDERSTANDING

- Determine **business objectives**
- **Assess** situation
Resources (data!), risks, costs & benefits
- Determine **data mining goals**
Ideally with quantitative success criteria
- Develop **project plan**
Estimate time line, budget, but also tools and techniques



BUSINESS UNDERSTANDING

Determining Business Objectives

1. Gather background information

- Compiling the business background
- Defining business objectives
- Business success criteria

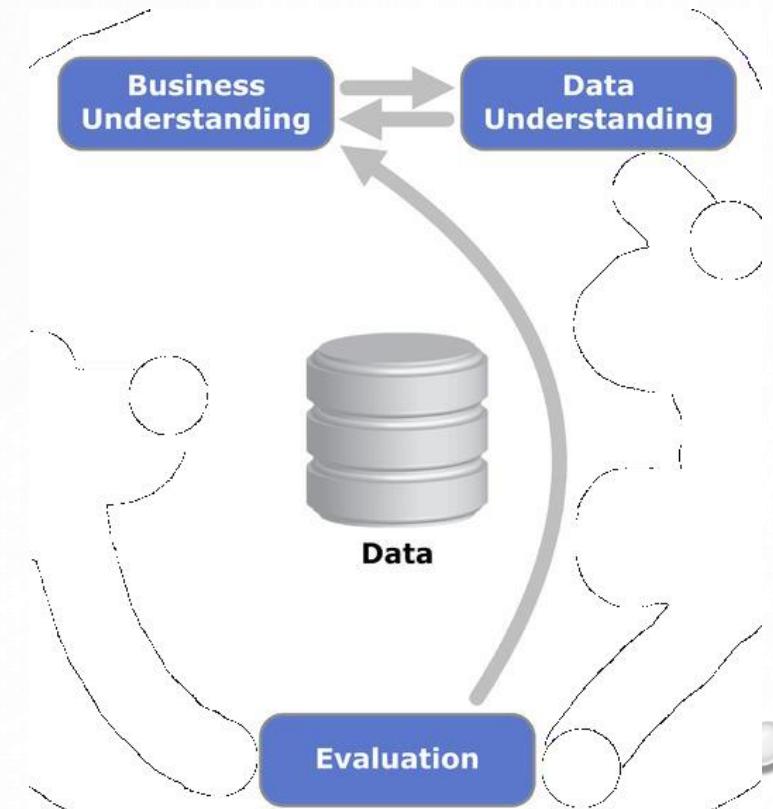
2. Assessing the situation

- Resource Inventory
- Requirements, Assumptions, and Constraints
- Risks and Contingencies
- Cost/Benefit Analysis

4. Determining data science goals

- Data science goals
- Data science success criteria

4. Producing a Project Plan



EXAMPLE OF THE PROJECT PLAN

Phase	Time	Resources	Risks
Business understanding	1 week	All analysts	Economic change
Data understanding	3 weeks	All analysts	Data problems, technology problems
Data preparation	5 weeks	Data scientists, DB engineers	Data problems, technology problems
Modeling	2 weeks	Data scientists	Technology problems, inability to build adequate model
Evaluation	1 week	All analysts	Economic change, inability to implement results
Deployment	1 week	Data scientist, DB engineers, implementation team	Economic change, inability to implement results

BUSINESS UNDERSTANDING

- **Difficult!**
- Often, you have to enter a **new field**
- You have to explain **data science limitations** to **non-experts**
 - No, performance will not be 100%
 - We need much more data to train an accurate model
 - For tomorrow, it is impossible



IN CS, IT CAN BE HARD TO EXPLAIN
THE DIFFERENCE BETWEEN THE EASY
AND THE VIRTUALLY IMPOSSIBLE.

Source: <http://xkcd.com/1425>

BUSINESS UNDERSTANDING – DOS AND DON'TS

- Have a lot of **patience** for **vaguely defined problems**
- Learn to **concretize** or even **reduce** the scope of the **initial idea**
 - Data sample
 - Real-life use cases
 - Quantitative success metrics
- Do not waste your time on **ill-defined, unrealistic projects**

READY FOR THE DATA UNDERSTANDING?

From a business perspective:

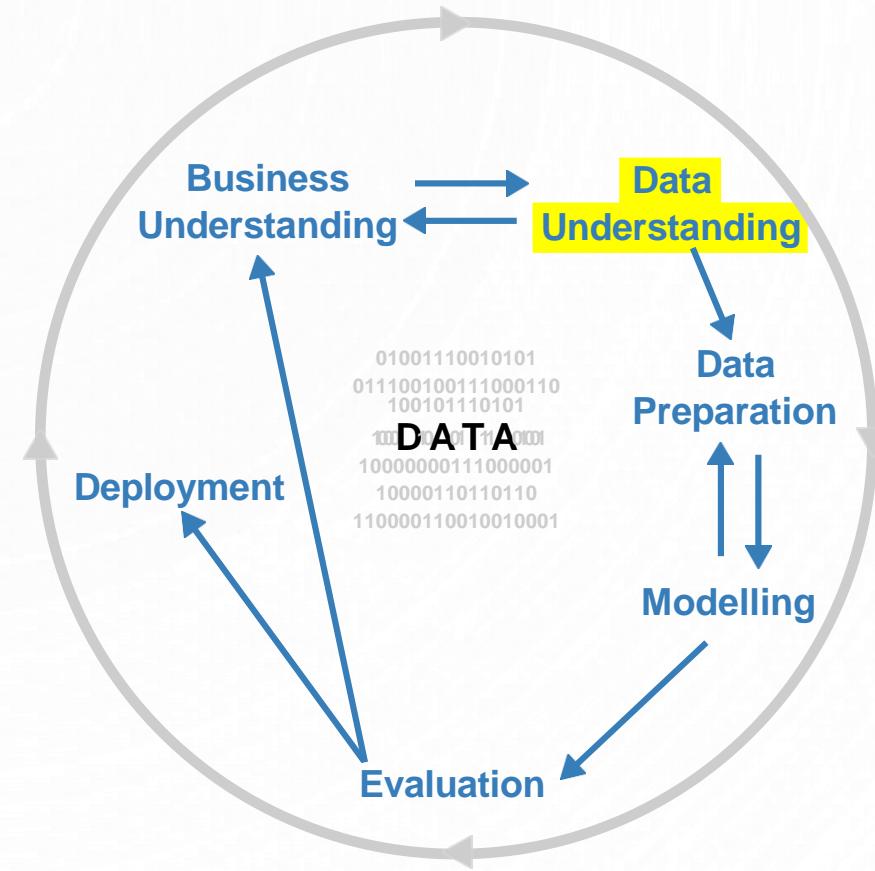
- ✓ What does your business hope to gain from this project?
- ✓ How will you define the successful completion of our efforts?
- ✓ Do you have the budget and resources needed to reach our goals?
- ✓ Do you have access to all the data needed for this project?
- ✓ Have you and your team discussed the risks and contingencies associated with this project?
- ✓ Do the results of your cost/benefit analysis make this project worthwhile?

From a data science perspective:

- ✓ How specifically can data mining help you meet your business goals?
- ✓ Do you have an idea about which data mining techniques might produce the best results?
- ✓ How will you know when your results are accurate or effective enough? (Have we set a measurement of data mining success?)
- ✓ How will the modeling results be deployed? Have you considered deployment in your project plan?
- ✓ Does the project plan include all phases of CRISP-DM?
- ✓ Are risks and dependencies called out in the plan?

DATA UNDERSTANDING

- 1. Collect initial data**
 - Existing data
 - Purchased data
 - Additional data
- 2. Describe data**
 - Amount of data
 - Value types
 - Coding schemes
- 3. Explore data**
- 4. Verify data quality**
 - Missing data
 - Data errors
 - Coding inconsistencies
 - Bad metadata



DATA UNDERSTANDING –DOS AND DON'TS

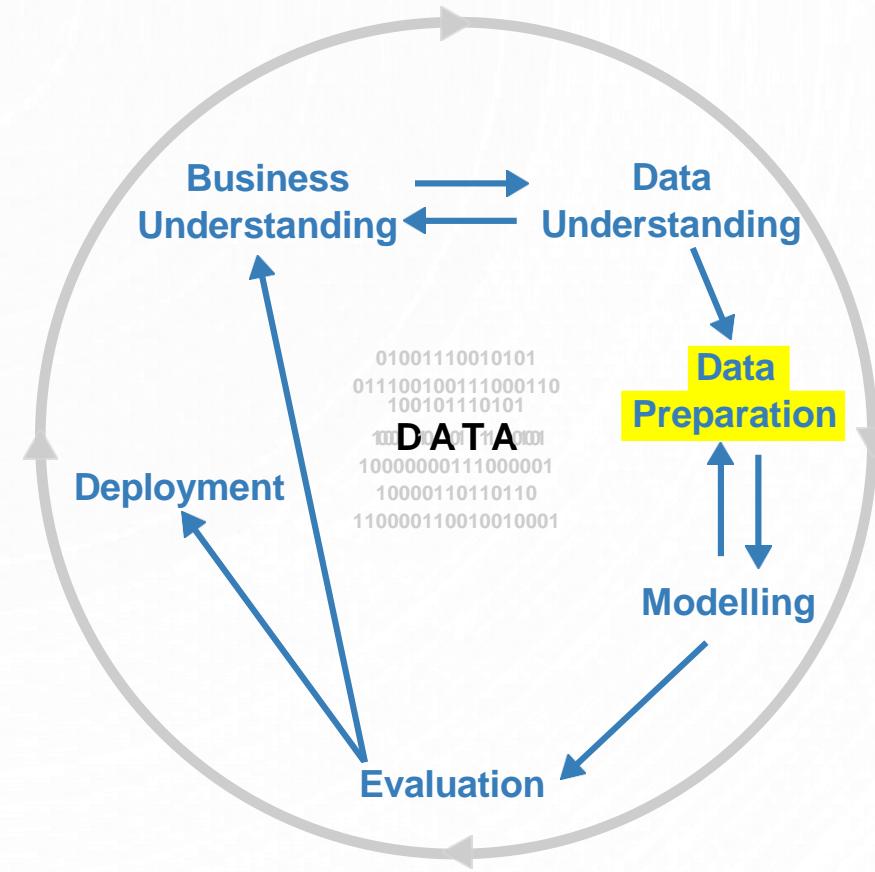
- Do not **economize on this phase**
 - The earlier you discover issues with your data the better (yes, your data will have issues!)
 - Data understanding leads to domain understanding, it will pay off in the modelling phase
- Do not trust **data quality estimates** provided by your **customer**
- Verify as far as you can, if your data is **correct, complete, coherent, deduplicated, representative, independent, up-to-date, stationary...**
- Investigate what sort of **processing** was applied to the **raw data**
- Understand **anomalies and outliers**

READY FOR THE DATA PREPARATION?

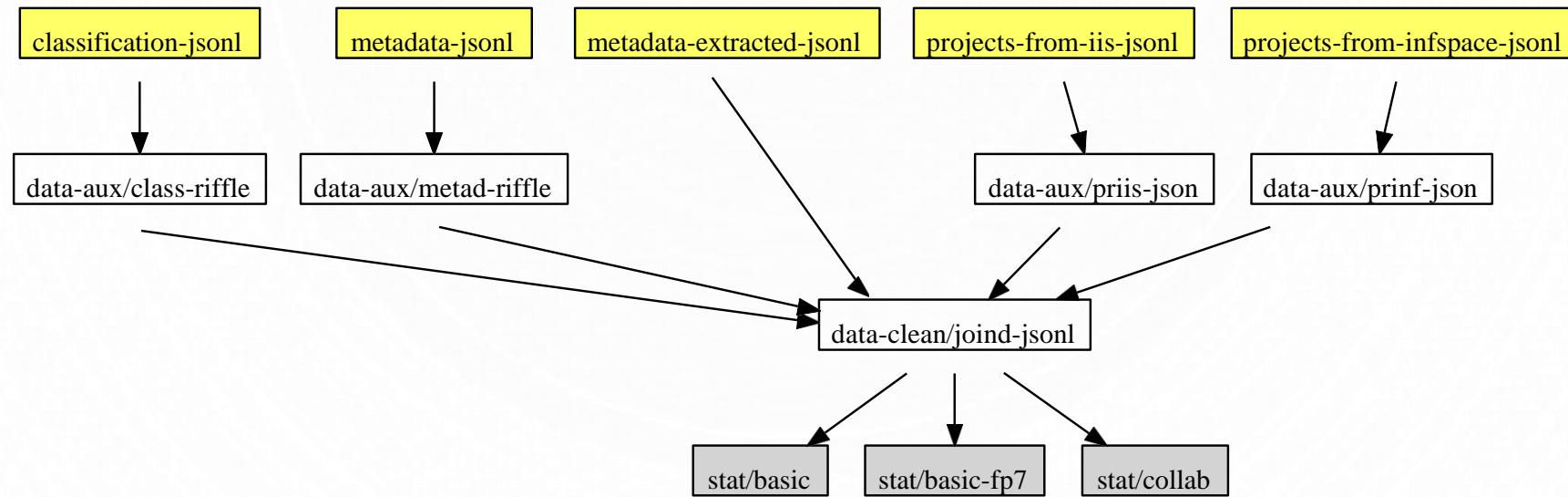
- ✓ Are all data sources clearly identified and accessed? Are you aware of any problems or restrictions?
- ✓ Have you identified key attributes from the available data?
- ✓ Did these attributes help you to formulate hypotheses?
- ✓ Have you noted the size of all data sources?
- ✓ Are you able to use a subset of data where appropriate?
- ✓ Have you computed basic statistics for each attribute of interest? Did meaningful information emerge?
- ✓ Did you use exploratory graphics to gain further insight into key attributes? Did this insight reshape any of your hypotheses?
- ✓ What are the data quality issues for this project? Do you have a plan to address these issues?
- ✓ Are the data preparation steps clear? For instance, do you know which data sources to merge and which attributes to filter or select?

DATA PREPARATION

- 1. Select right data**
 - Select training examples
 - Select features
- 2. Clean data**
 - Fill in missed data
 - Correct data errors
 - Make coding consistent
- 3. Extend data**
 - Extend training examples
 - Extend features
- 4. Format data**
 - Put data in a format for training the model

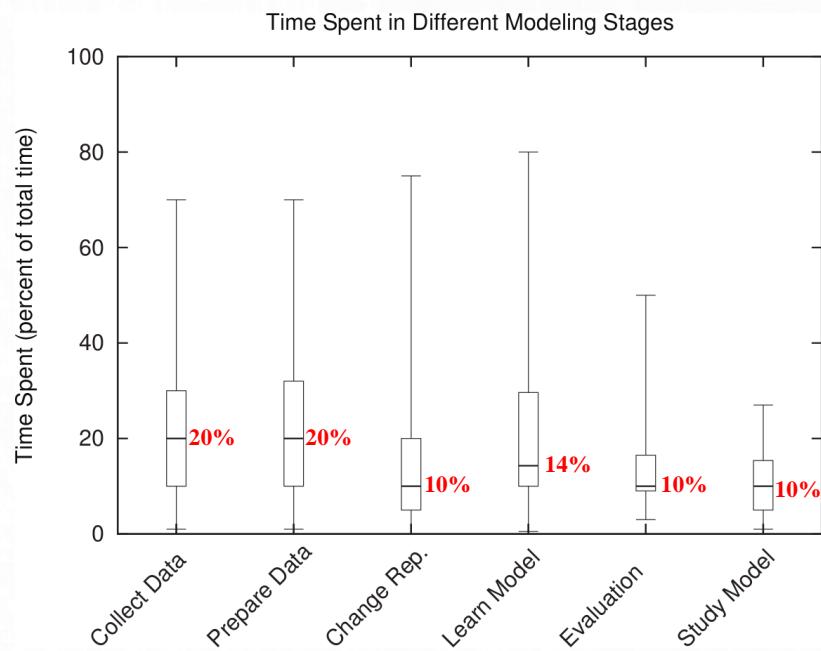


- **Tedious!**

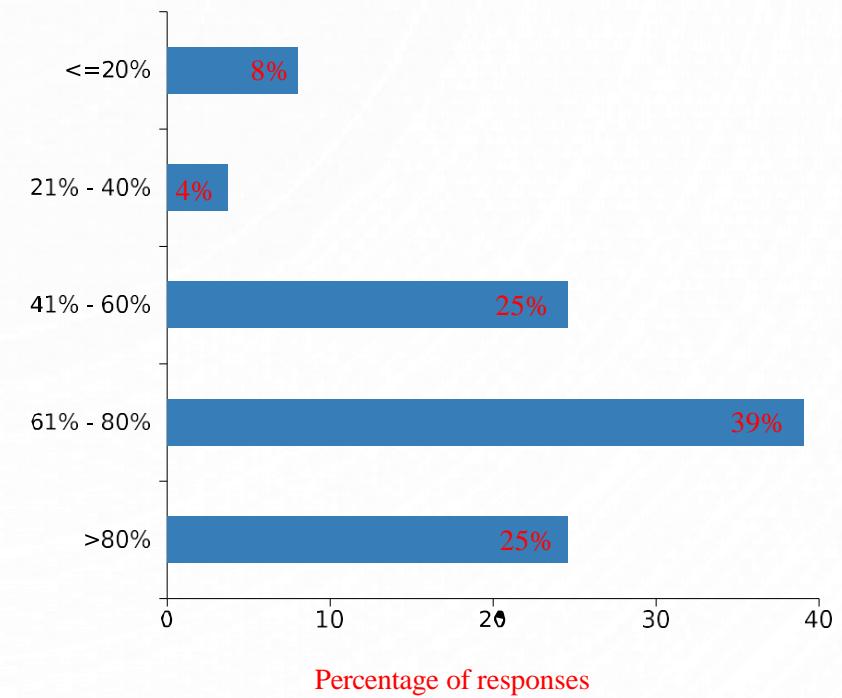


- Use **workflow tools** to document, automate & parallelize data prep.

- **Data understanding and preparation** will usually consume **half or more** of your project **time!**



What % of time in your data mining project(s) is spent on data cleaning and preparation?



DATA PREPARATION – DOS AND DON'TS

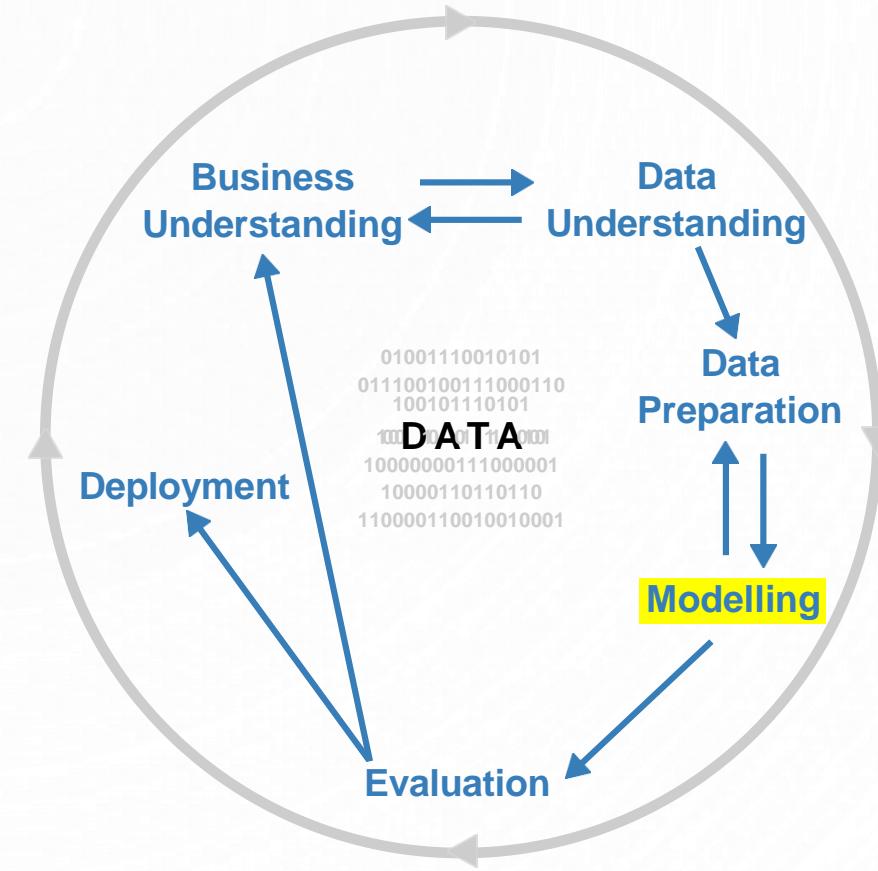
- **Automate** this phase as far as possible
- When merging multiple sources, track **provenance** of your data
- Use **workflow tools** to help you with the above
- Prepare your customer that **data understanding** and **preparation** take **considerable amount of time**

READY FOR THE MODELING?

- ✓ Based upon your initial exploration and understanding, were you able to select relevant subsets of data?
- ✓ Have you cleaned the data effectively or removed unsalvageable items? Document any decisions in the final report.
- ✓ Are multiple data sets integrated properly? Were there any merging problems that should be documented?
- ✓ Have you researched the requirements of the modeling tools that you plan to use?
- ✓ Are there any formatting issues you can address before modeling? This includes both required formatting concerns as well as tasks that may reduce modeling time.

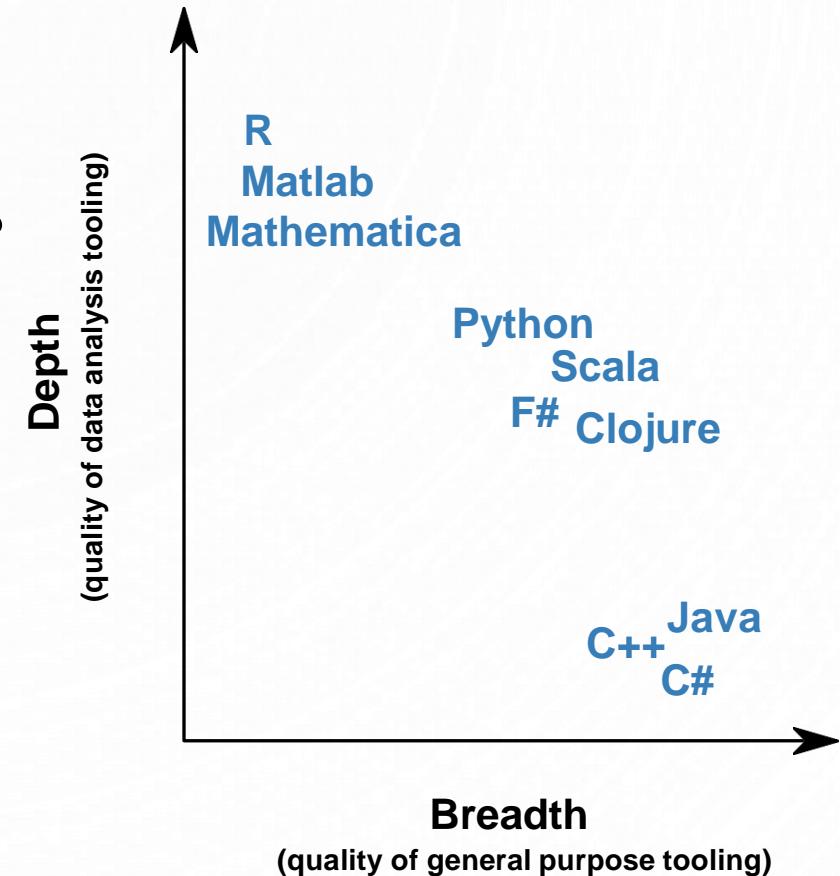
MODELLING

- Select **modelling technique**
Assumptions, measure of accuracy
- Generate **test design**
- Build **model**
Feature eng., optimize model parameters
- Assess **model**
Iterate the above



MODELLING – TOOLING SELECTION

- Should I use **general purpose language**?
Breadth = performance, lots of general purpose libraries and tooling, easy creation of web services
- Should I use **data analysis language**?
Depth = easy data manipulation, latest models and statistical techniques available
- Where your model will be **deployed**?
- Do you need to **distribute** your computations? (avoid!)
- Can I afford a **prototype**?



MODELLING – MY DOS AND DON'TS

- Be creative with **your features** (feature engineering)
 - Esp. from **textual data** or **time-series** you can generate a lot of std. features
 - Make conscious decision about **missing data** (NAs) and **outliers** (regression!)
- Allocate time for **hyperparameter optimization**
- Whenever possible, **peek inside your model** and consult it with **domain expert**
 - Assess **feature importance**
 - Run your model on **simulated data**
- Develop your model with **deployment conditions** in mind

READY FOR THE EVALUATION?

- ✓ Are you able to understand the results of the models?
- ✓ Do the model results make sense to you from a purely logical perspective? Are there apparent inconsistencies that need further exploration?
- ✓ From your initial glance, do the results seem to address your organization's business question?
- ✓ Have you used analysis nodes and lift or gains charts to compare and evaluate model accuracy?
- ✓ Have you explored more than one type of model and compared the results?
- ✓ Are the results of your model deployable?

EVALUATION

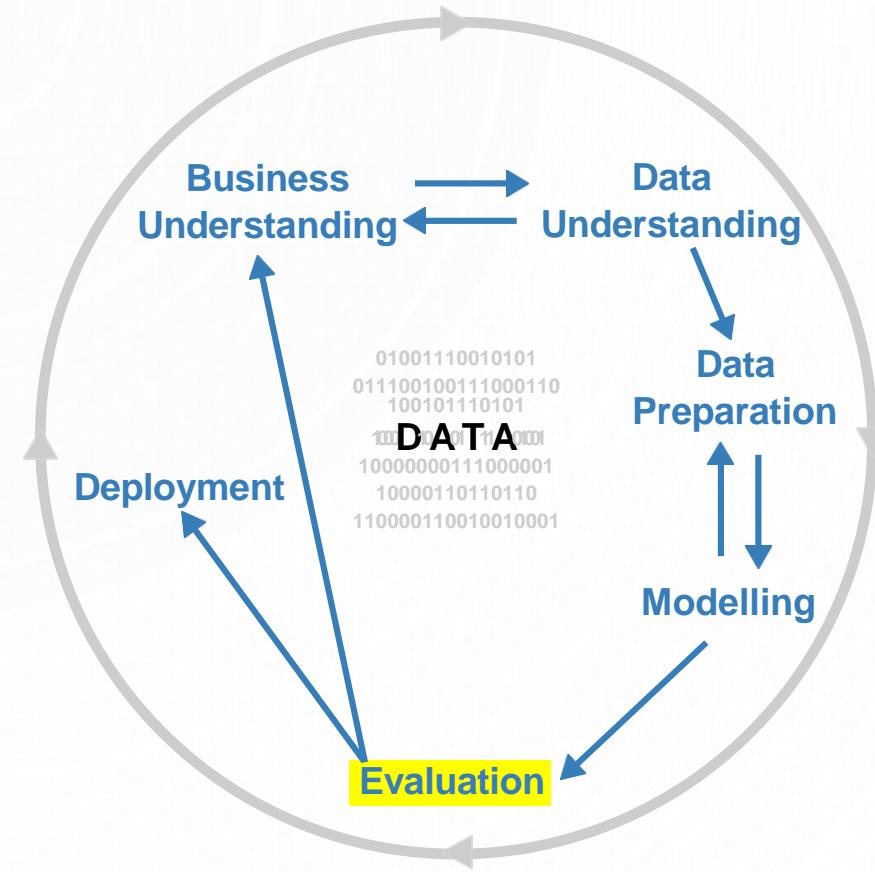
1. Evaluate the results

- Are results presented clearly?
- Are there any novel findings?
- Can models and findings be applicable to business goals?
- How well do the models and findings answer business goals?
- What additional questions the modeling results have risen?

2. Review the process

- Did the stage contribute to the value of the results?
- What went wrong and how it can be fixed?
- Are there alternative decisions which could have been executed?

3. Determine the next steps

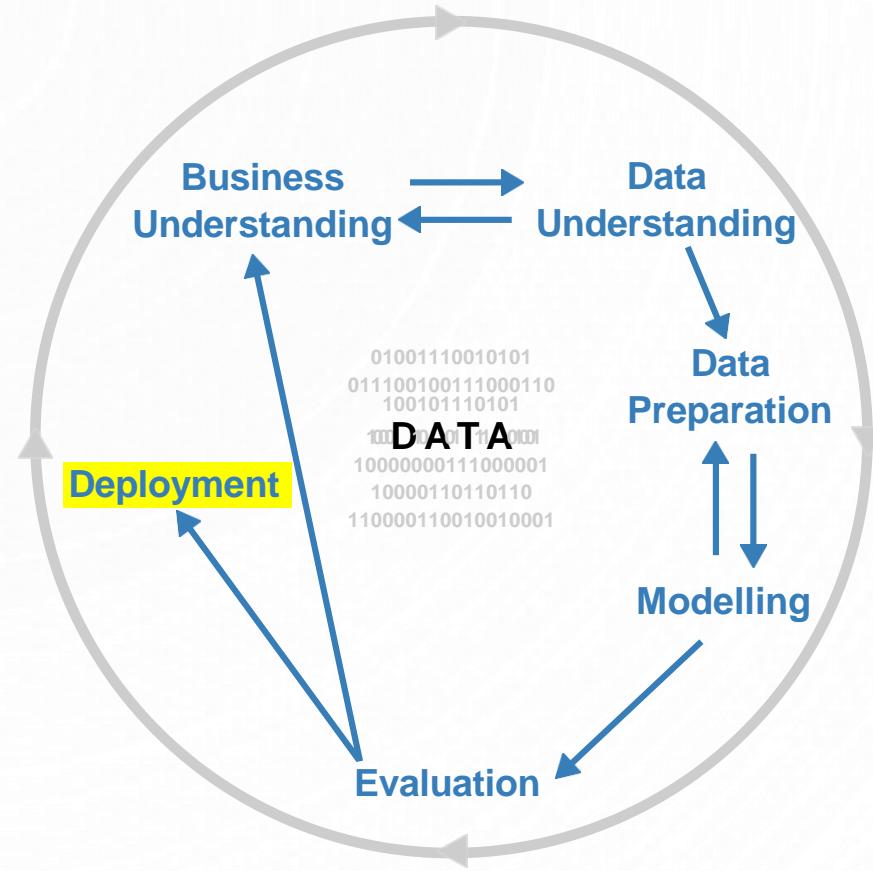


EVALUATION –DOS AND DON'TS

- WORK WITH THE PERFORMANCE CRITERIA DICTATED BY YOUR CUSTOMER'S BUSINESS MODEL
- ASSESS NOT ONLY PERFORMANCE, BUT ALSO PRACTICAL ASPECTS, RELATED TO DEPLOYMENT, FOR EXAMPLE:
 - Training and prediction **speed**
 - Robustness** and **Maintainability**
(tooling, dependence on other subsystems, library vs. homegrown code)
- Watch out for **data leakage**, for example:
 - Time series – mixing **past** and **future**
 - Meaningful **Identifiers**
 - Other nasty ways of **artificially introducing extra information**, not available in production

DEPLOYMENT

- Plan deployment
- Plan monitoring and maintenance
- Produce final report
- Review project
Collect lessons learned!



WHAT IS KPI?

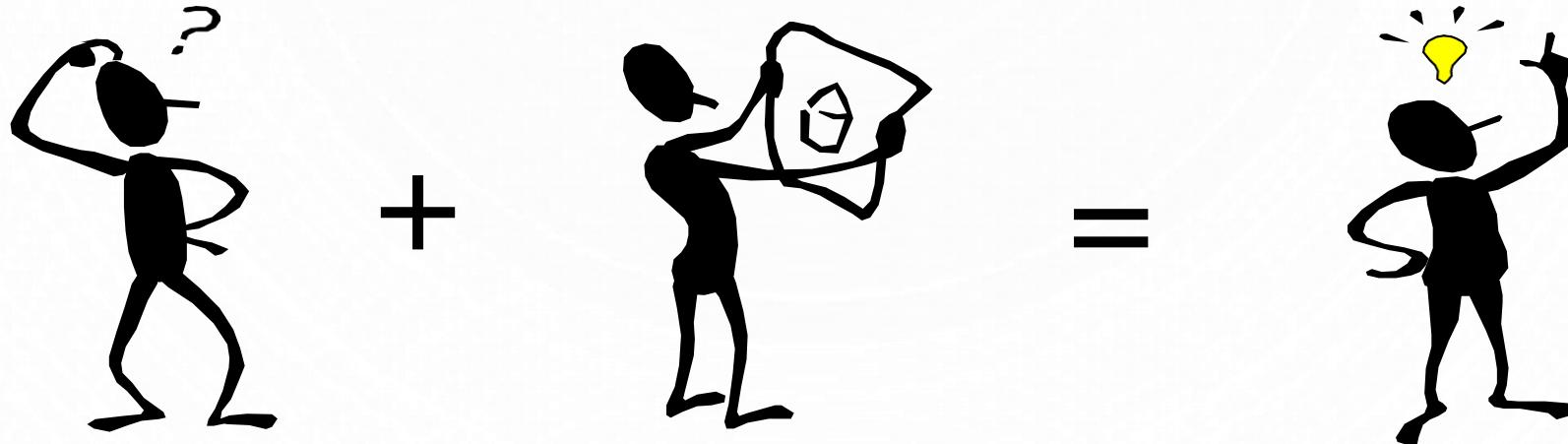
Definition of 'Key Performance Indicators - KPI'



A set of quantifiable measures that a company or industry uses to gauge or compare performance in terms of meeting their strategic and operational goals. KPIs vary between companies and industries, depending on their priorities or performance criteria. Also referred to as "key success indicators (KSI)".

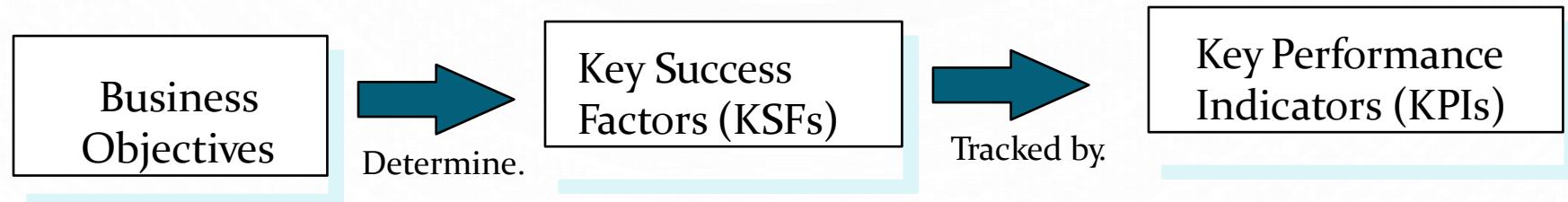
OBJECTIVES OF KPI

- Improve personnel's understanding of KPIs.



- Improve personnel's awareness of maintenance performance.

- KPIs are directly linked to the overall goals of the company.
- KPIs are measurements that define and track specific business goals and objectives.



- The larger or smaller organizational strategies require monitoring, improvement, and evaluation.
- Once an organization has analyzed its mission, identified all its stakeholders, and defined its goals, it needs a way to measure progress toward those goals.
- KPIs are utilized to track or measure actual performance against key success factors.

- Key Success Factors (KSFs) only change if there is a fundamental shift in business objectives.
- Key Performance Indicators (KPIs) change as objectives are met, or management focus shifts.

WHY USE KPI'S?

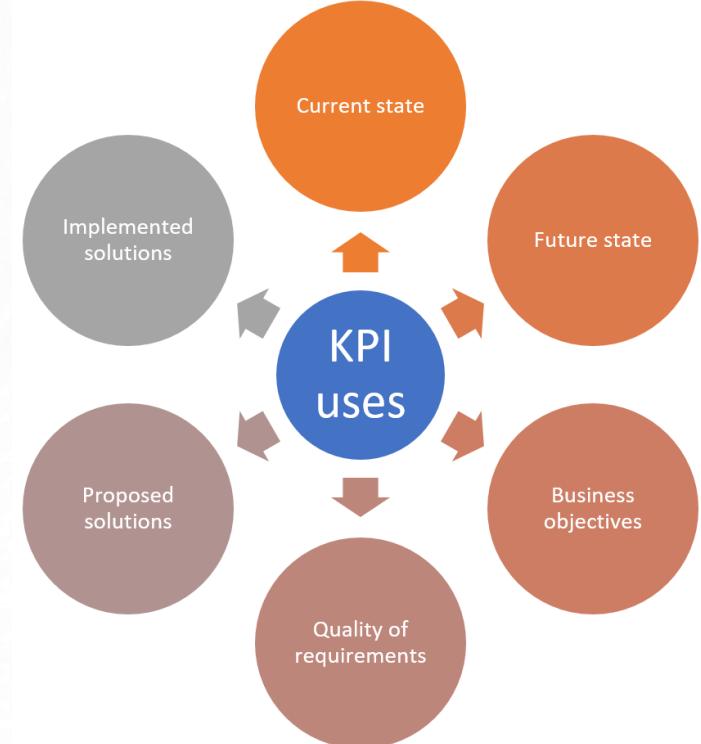
- Performance effectiveness.
- For the accuracy, actual reflection of the process, efficacy in delivering the outcome.
- The effects of a change can be monitored reliably, repeatedly and accurately by KPI.



- A KPI can be used to closely monitor the results of actions.
- Detect potential problems and it can drive improvement.
- It is reasonable to use the KPI as a tool to improve ongoing process performance.

USES OF KPI

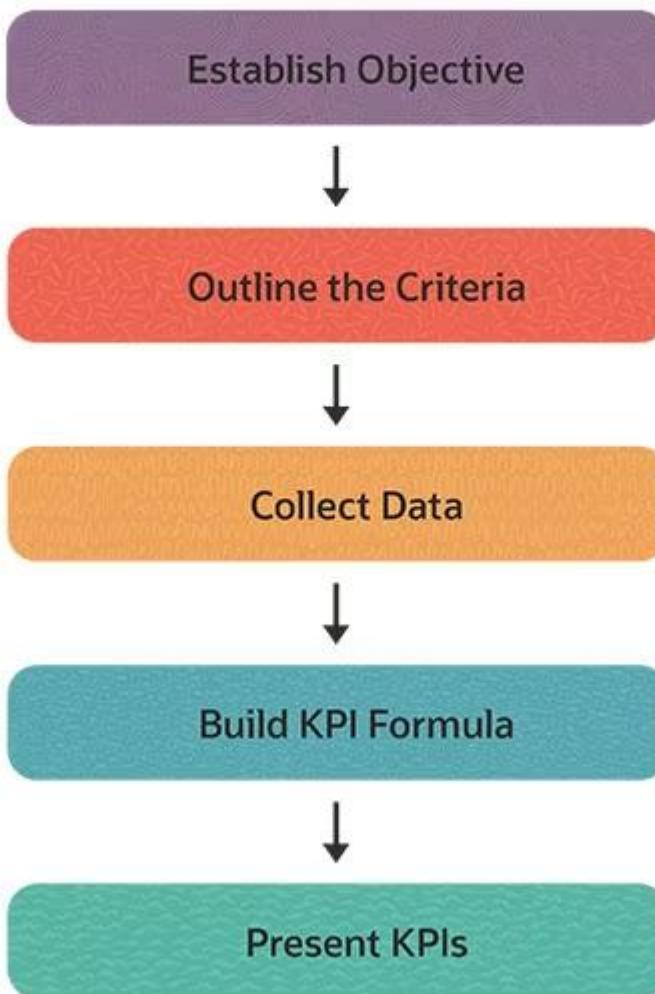
- A key performance indicator (KPI) or performance indicator is used to periodically measure and assess the performances of organizations, business units, and their division, departments and employees.
- To make the decision making process easier.
- It helps organizations to understand how well they are performing in relation to their strategic goals and objectives, i.e. helps in Promoting Accountability.
- They are used by an organization to evaluate its success or the success of a particular activity in the organization.
- To analyze the operational details of the organization.
- It helps to focus on the facts clearly.
- It helps in creating a Culture of Learning.



HOW TO DESIGN KPI'S

- KPIs should be clearly linked to the strategy, i.e. the things that matter the most.
- KPIs have to provide the answers to our most important questions.
- KPIs should be primarily designed to empower employees and provide them with the relevant information to learn.

How to Create a KPI



IDENTIFYING THE KPI'S

- Related to strategic aims.
- Identify what makes the organization success or failures.
- Controllable and accountable.
- Qualitative and quantitative.
- Long term and short term.
- Consider Stakeholder needs.
- Identify important aspects.
- Establish Company Goals and KPIs.
- Select Performance Indicators and Metrics.
- Set Targets and Track Performance.

TYPES OF KPI

Quantitative indicators: Quantitative indicators are represented by continuous or discrete numbers, which can be ratios, percentages, or whole numbers that represent values like rating scales, dollars, or weight. These indicators are the most straightforward quantifiable measures of performance, as they present direct numerical values.

Qualitative indicators: These indicators are not expressed numerically but through feelings or opinions. An employee satisfaction survey can be an example of qualitative data where performance is based on feedback.

Leading indicators: Leading indicators are variables that can help identify long-term trends and possibly predict successful future outcomes of your business processes.

Lagging indicators: Lagging KPIs compare a business' current performance in a particular field with their past performance in the same field.

Input indicators: Input indicators are a type of KPI that track the resources necessary to produce the intended outcome, such as funding or extra staff. Input indicators can help companies keep track of how efficiently they are using their resources.

Output indicators: Output indicators measure the success or failure of your business activities, like the number of goods or services created through a particular process. Revenue growth and new customer acquisition also indicate how well your business is performing.

Process indicators: Process indicators represent the efficiency of a business's process and how effectively it is functioning.

Practical indicators: Practical indicators explore the function of an existing process at a company, usually involving observation or feedback on that process.

Directional indicators: Directional indicators help determine the company's success in comparison with competitors, while practical indicators are specific to the company's process within itself.

Actionable indicators: Actionable KPIs measure a company's ability to enact change whether through political action or a shift in company culture.

Financial indicators: Financial indicators are a marker of a business's monetary growth and stability. When paired with other KPIs, this indicator can help paint a more complete picture of your company's financial viability.

Outcome indicators: These indicators are a marker of whether the program is meeting its goals via the short or long term.

CHARACTERISTICS OF A GOOD KPI

- KPI is always connected with the corporate goals.
- A KPI are decided by the management.
- They are the leading indicators of performance desired by the organization.
- Easy to understand

A KPI need to be:

- Specific
- Measurable
- Achievable
- Result-oriented or Relevant
- Time-bound

SHIPPING AND LOGISTICS

The main five KPI'S in shipping and logistic industries are:

- Sales forecasts.
- Inventory.
- Procurement and suppliers.
- Warehousing.
- Transportation.



INFRASTRUCTURE SECTOR

The main five KPI's in Infrastructure sector are:

- Client Satisfaction.
- Construction Time & Cost.
- Productivity.
- Defects.
- Profitability.

