

## Chapter 4:

### Business Reporting, Visual Analytics, and Business Performance Management

#### Business Reporting

##### Definitions and Concepts

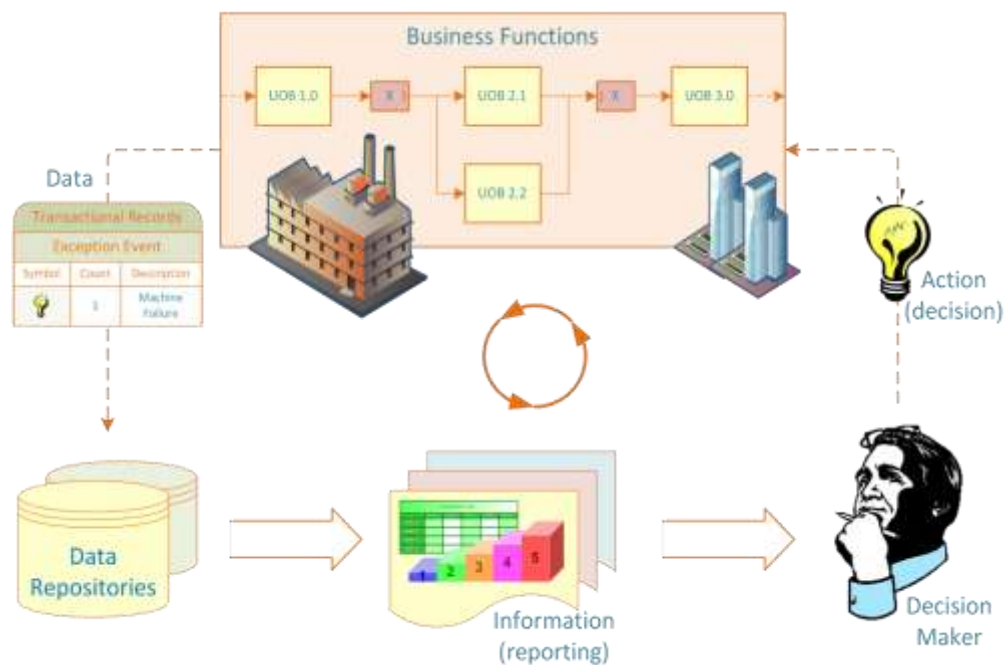
- Report = Information → Decision
- Report?
  - Any communication artifact prepared to convey specific information
- A report can fulfill many functions
  - To ensure proper departmental functioning
  - To provide information
  - To provide the results of an analysis
  - To persuade others to act
  - To create an organizational memory...

##### What is a Business Report?

- A written document that contains information regarding business matters.
- **Purpose:** to improve managerial decisions
- **Source:** data from inside and outside the organization (via the use of ETL)
- **Format:** text + tables + graphs/charts
- **Distribution:** in-print, email, portal/intranet

Data acquisition → Information generation → Decision making → Process management

##### Business Reporting



## Key to Any Successful Report

- Clarity ...
- Brevity ...
- Completeness ...
- Correctness ...
- **Report types** (in terms of content and format)
  - Informal – a single letter or a memo
  - Formal – 10-100 pages; cover + summary + text
  - Short report – periodic, informative, investigative

## Types of Business Reports

- Metric Management Reports
  - Help manage business performance through metrics (SLAs for externals; KPIs for internals)
  - Can be used as part of Six Sigma and/or TQM
- Dashboard-Type Reports
  - Graphical presentation of several performance indicators in a single page using dials/gauges
- Balanced Scorecard-Type Reports
  - Include financial, customer, business process, and learning & growth indicators

## Components of Business Reporting Systems

- Common characteristics
  - OLTP (online transaction processing)
    - ERP, POS, SCM, RFID, Sensors, Web, ...
  - Data supply (volume, variety, velocity, ...)
  - ETL
  - Data storage
  - Business logic
  - Publication medium
  - Assurance

## Data and Information Visualization

**The use of visual representations to explore, make sense of, and communicate data."**

- Data visualization vs. Information visualization
- Information = aggregation, summarization, and contextualization of data
- Related to information graphics, scientific visualization, and statistical graphics
- Often includes charts, graphs, illustrations, ...
-

## A Brief History of Data Visualization

- Data visualization can date back to the second century AD
- Most developments have occurred in the last two and a half centuries
- Until recently it was not recognized as a discipline
- Today's most popular visual forms date back a few centuries

## The First Pie Chart Created by William Playfair in 1801

William Playfair is widely credited as the inventor of the modern chart, having created the first line and pie charts.

## Decimation of Napoleon's Army During the 1812 Russian Campaign

- Arguably the most popular multi-dimensional chart

## A Brief History of Data Visualization

- 1900s –
  - more formal attitude toward visualization
  - focus on color, value scales, and labeling
  - Publication of the book *Semiologie Graphique*
- 2000s –
  - Emergence of Internet as the medium for information visualization → raising visual literacy
  - Incorporate interaction, animation, 3D graphics-rendering, virtual worlds, real-time data feed
- 2010s and beyond – ?

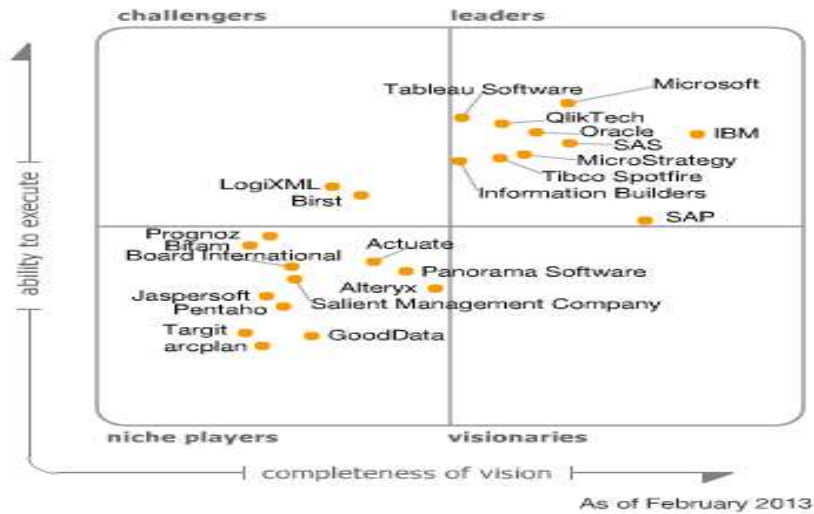
## Different Types of Charts and Graphs

- Which one to use? Where and when?
  - Basic Charts and Graphs
    - Line Chart
    - Bar Chart
    - Pie Chart
    - Scatter Plot
    - Bubble Chart
  - Specialized Charts and Graphs
    - Histogram
    - Gantt Chart
    - PERT Chart
    - Geographic Map
    - Bullet Graph
    - Heat Map / Tree Map
    - Highlight Table

## The Emergence of Data Visualization And Visual Analytics

Magic Quadrant for Business Intelligence and Analytics Platforms (Source: Gartner.com)

- Many data visualization companies are in the 4<sup>th</sup> quadrant
- There is a move toward visualization



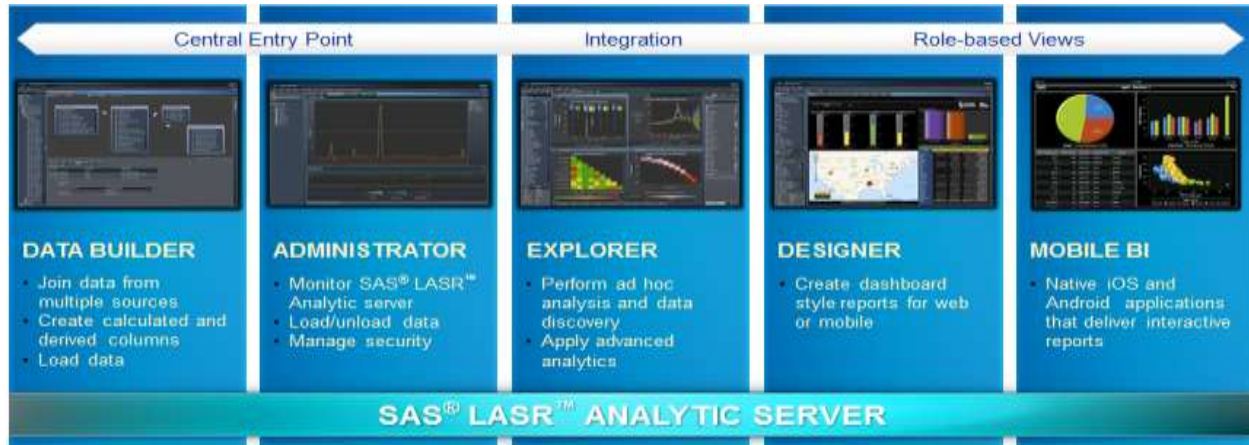
## The Emergence of Data Visualization And Visual Analytics

- Emergence of new companies
  - Tableau, Spotfire, QlikView, ...
- Increased focus by the big players
  - MicroStrategy improved Visual Insight
  - SAP launched Visual Intelligence
  - SAS launched Visual Analytics
  - Microsoft bolstered PowerPivot with Power View
  - IBM launched Cognos Insight
  - Oracle acquired Endeca

## Visual Analytics

- A recently coined term
  - Information visualization + predictive analytics
- Information visualization
  - Descriptive, backward focused
  - "what happened" "what is happening"
- Predictive analytics
  - Predictive, future focused
  - "what will happen" "why will it happen"
- There is a strong move toward **visual analytics**

## Visual Analytics by SAS Institute



- SAS Visual Analytics Architecture
  - Big data + In memory + Massively parallel processing + ..

### Performance Dashboards

- Performance dashboards are commonly used in BPM software suites and BI platforms
- Dashboards provide visual displays of important information that is consolidated and arranged on a single screen so that information can be digested at a single glance and easily drilled in and further explored

### Performance Dashboards

- Dashboard design
  - The fundamental challenge of dashboard design is to display all the required information on a single screen, clearly and without distraction, in a manner that can be assimilated quickly
- Three layer of information
  - Monitoring
  - Analysis
  - Management

### Performance Dashboards

- What to look for in a dashboard
  - Use of visual components to highlight data and exceptions that require action.
  - Transparent to the user, meaning that they require minimal training and are extremely easy to use
  - Combine data from a variety of systems into a single, summarized, unified view of the business
  - Enable drill-down or drill-through to underlying data sources or reports
  - Present a dynamic, real-world view with timely data
  - Require little coding to implement/deploy/maintain

### Best Practices in Dashboard Design

- Benchmark KPIs with Industry Standards
- Wrap the Metrics with Contextual Metadata
- Validate the Design by a Usability Specialist
- Prioritize and Rank Alerts and Exceptions
- Enrich Dashboard with Business-User Comments
- Present Information in Three Different Levels
- Pick the Right Visual Constructs
- Provide for Guided Analytics

### Business Performance Management (BPM)

- Business Performance Management (BPM) is...

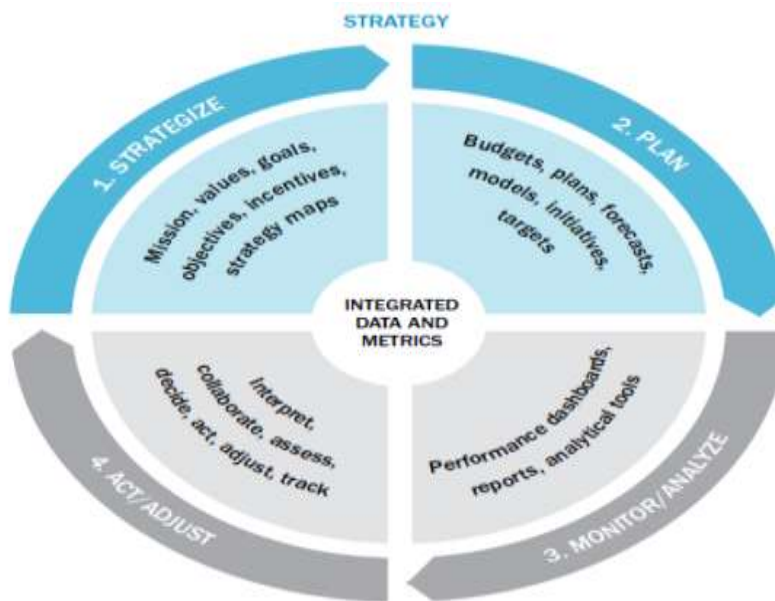
A real-time system that alerts managers to potential opportunities, impending problems and threats, and then empowers them to react through models and collaboration.

- Also called corporate performance management (CPM by Gartner Group), enterprise performance management (EPM by Oracle), strategic enterprise management (SEM by SAP)

### Business Performance Management (BPM)

- BPM refers to the business processes, methodologies, metrics, and technologies used by enterprises to measure, monitor, and manage business performance.
- BPM encompasses three key components
  - A set of integrated, closed-loop management and analytic processes, supported by technology ...
  - Tools for businesses to define strategic goals and then measure/manage performance against them
  - Methods and tools for monitoring key performance indicators (KPIs), linked to organizational strategy

## A Closed-Loop Process to Optimize Business Performance



- Process Steps
  1. Strategize
  2. Plan
  3. Monitor/analyze
  4. Act/adjust

Each with its own process steps

**Strategize:**

**Where Do We Want to Go?**

- Strategic planning
  - Common tasks for the strategic planning process:
    1. Conduct a current situation analysis
    2. Determine the planning horizon
    3. Conduct an environment scan
    4. Identify critical success factors
    5. Complete a gap analysis
    6. Create a strategic vision
    7. Develop a business strategy
    8. Identify strategic objectives and goals

**Plan: How Do We Get There?**

- Operational planning
  - **Operational plan:** plan that translates an organization's strategic objectives and goals into a set of well-defined tactics and initiatives, resources requirements, and expected results for some future time period (usually a year).
- Operational planning can be

- Tactic-centric (operationally focused)

### Monitor/Analyze: How Are We Doing?

- A comprehensive framework for monitoring performance should address two key issues:
  - What to monitor?
    - Critical success factors
    - Strategic goals and targets
    - ...
  - How to monitor.

### Act and Adjust: What Do We Need to Do Differently?

- Success (or mere survival) depends on new projects: creating new products, entering new markets, acquiring new customers (or businesses), or streamlining some process.
- Many new projects and ventures fail!
- What is the chance of failure?
  - 60% of Hollywood movies fail
  - 70% of large IT projects fail, ...

### Performance Measurement

- **Performance measurement system**

A system that assists managers in tracking the implementations of business strategy by comparing actual results against strategic goals and objectives

- Comprises systematic comparative methods that indicate progress (or lack thereof) against goals

### KPIs and Operational Metrics

- **Key performance indicator (KPI)**

A KPI represents a strategic objective and metrics that measure performance against a goal

- Distinguishing features of KPIs
  - Strategy
  - Targets
  - Ranges
  - Encodings
  - Time frames
  - Benchmarks



## Performance Measurement

- **Key performance indicator (KBI)**

Outcome KPIs vs.

(lagging indicators

e.g., revenues)

Driver KPIs

(leading indicators

e.g., sales leads)

- Operational areas covered by driver KPIs

- Customer performance
- Service performance
- Sales operations

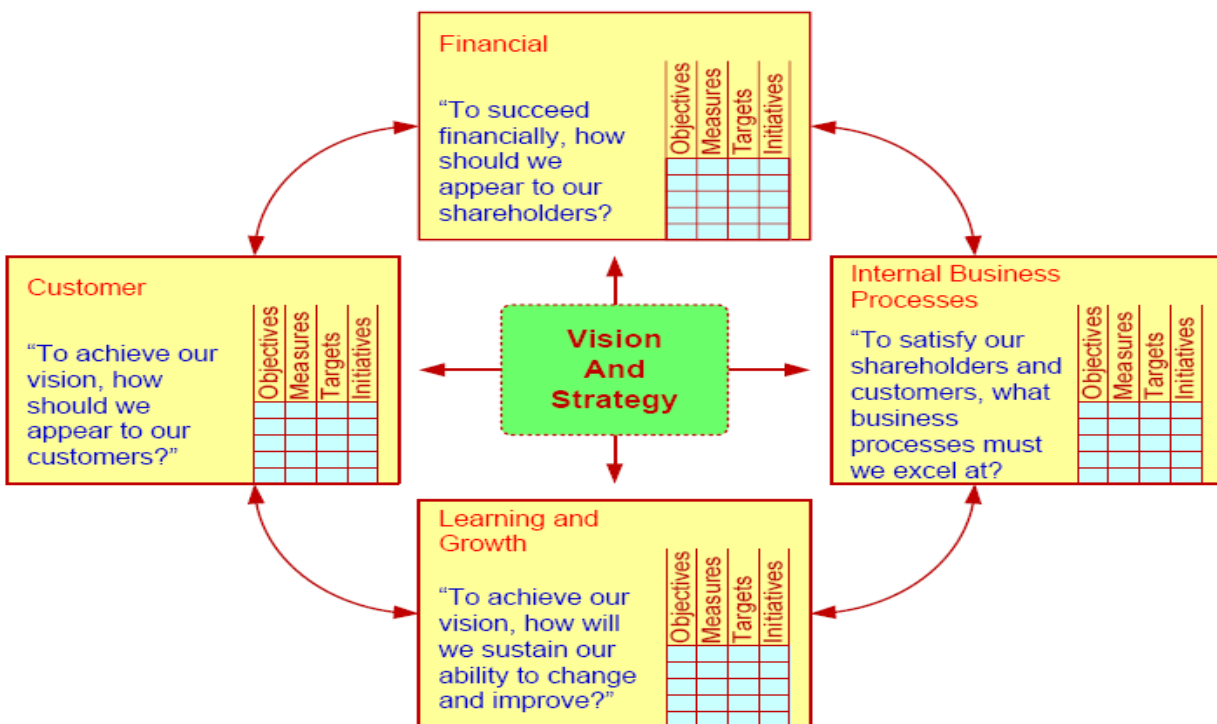
## Performance Measurement System

- **Balanced Scorecard (BSC)**

A performance measurement and management methodology that helps translate an organization's financial, customer, internal process, and learning and growth objectives and targets into a set of actionable initiatives

### "The Balanced Scorecard: Measures That Drive Performance"

## Balanced Scorecard



## Six Sigma as a Performance Measurement System

### ■ Six Sigma

A performance management methodology aimed at reducing the number of defects in a business process to as close to zero defects per million opportunities (DPMO) as possible

## Six Sigma as a Performance Measurement System

### ■ The DMAIC performance model

A closed-loop business improvement model that encompasses the steps of **defining, measuring, analyzing, improving, and controlling** a process

### ■ Lean Six Sigma

■ Lean manufacturing / lean production

■ Lean production versus six sigma?

## Comparison of Balanced Scorecard and Six Sigma

**TABLE 4.1** Comparison of Balanced Scorecard and Six Sigma

Balanced Scorecard	Six Sigma
Strategic management system	Performance measurement system
Relates to the longer-term view of the business	Provides snapshot of business's performance and identifies measures that drive performance toward profitability
Designed to develop balanced set of measures	Designed to identify a set of measurements that impact profitability
Identifies measurements around vision and values	Establishes accountability for leadership for wellness and profitability
Critical management processes are to clarify vision/strategy, communicate, plan, set targets, align strategic initiatives, and enhance feedback	Includes all business processes—management and operational
Balances customer and internal operations without a clearly defined leadership role	Balances management and employees' roles; balances costs and revenue of heavy processes