商業智慧實務
Practices of Business Intelligence

企業績效管理
(Business Performance Management)

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Business Intelligence

Data Mining, Data Warehouses

Increasing potential to support business decisions

- Decision Making
  - Data Presentation
    - Visualization Techniques
    - Data Mining
      - Information Discovery
      - Data Exploration
        - Statistical Summary, Querying, and Reporting
  - Data Preprocessing/Integration, Data Warehouses
    - Data Sources
      - Paper, Files, Web documents, Scientific experiments, Database Systems

End User
  - Business Analyst
  - Data Analyst
  - DBA

Source: Han & Kamber (2006)
The Evolution of BI Capabilities

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
A High-Level Architecture of BI

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Decision Support and Business Intelligence Systems

Chapter 9:
Business Performance Management

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Learning Objectives

• Business Performance Management (BPM)
  • BPM = BI + Planning
• Closed-Loop Process to Optimize Business Performance
  – Strategize, Plan, Monitor, Act /Adjust
• Performance Measurement
• BPM Methodologies
  – Balanced scorecard (BSC)
  – Six Sigma
• BPM Architecture and Applications
• Performance Dashboards

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Business Performance Management (BPM) Overview

• Business Performance Management (BPM) is...
  A real-time system that alert 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)

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Business Performance Management (BPM) Overview

• 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

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM versus BI

• BPM is an outgrowth of BI and incorporates many of its technologies, applications, and techniques
  – Same companies market and sell them
  – BI has evolved so that many of the original differences between the two no longer exist (e.g., BI used to be focused on departmental rather than enterprise-wide projects)
  – BI is a crucial element of BPM

• BPM = BI + Planning (a unified solution)

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
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...

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
A Closed-Loop Process to Optimize Business Performance

1. Strategize: Where Do We Want to Go?
2. Plan: How Do We Get There?
3. Monitor: How Are We Doing?
4. Act /Adjust: What Do We Need to Do Differently?

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
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

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Strategize:
Where Do We Want to Go?

• **Strategic objective**
A broad statement or general course of action prescribing targeted directions for an organization

• **Strategic goal**
A quantified objective with a designated time period

• **Strategic vision**
A picture or mental image of what the organization should look like in the future

• **Critical success factors (CSF)**
Key factors that delineate the things that an organization must excel at to be successful

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Strategize: Where Do We Want to Go?

“90 percent of organizations fail to execute their strategies”

- The strategy gap
  - Four sources for the gap between strategy and execution:
    1. Communication (enterprise-wide)
    2. Alignment of rewards and incentives
    3. Focus (concentrating on the core elements)
    4. Resources

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
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)
  - Budget-centric plan (financially focused)

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Plan: How Do We Get There?

• Financial planning and budgeting
  – An organization’s strategic objectives and key metrics should serve as top-down drivers for the allocation of an organization’s tangible and intangible assets
  – Resource allocations should be carefully aligned with the organization’s strategic objectives and tactics in order to achieve strategic success

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Monitor: 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

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Monitor: How Are We Doing?

- **Diagnostic control system**

A cybernetic system that has inputs, a process for transforming the inputs into outputs, a standard or benchmark against which to compare the outputs, and a feedback channel to allow information on variances between the outputs and the standard to be communicated and acted upon.

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Monitor: How Are We Doing?

- Pitfalls of variance analysis
  - The vast majority of the exception analysis focuses on negative variances when functional groups or departments fail to meet their targets.
  - Rarely are positive variances reviewed for potential opportunities, and rarely does the analysis focus on assumptions underlying the variance patterns.

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Monitor:
How Are We Doing?

What if strategic assumptions (not the operations) are wrong?

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
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.

- Most new projects and ventures fail!
  - Hollywood movies: 60% chance of failure
  - Mergers and acquisitions: 60%
  - IT projects (large-scale): 70%
  - New food products: 80%
  - New pharmaceutical products: 90% ...
Act and Adjust:
What Do We Need to Do Differently?

Harrah’s Closed-Loop Marketing Model

1. Define Campaign Objectives & Test Outcomes
2. Execute Marketing Campaign
3. Track Linked Transactions
4. Evaluate Campaign Effectiveness
5. Learn & Refine Campaigns & Approaches

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Act and Adjust: What Do We Need to Do Differently?

• The Hackett Group’s benchmarking results indicate that world class companies:
  – Are significantly more efficient than their peers at managing costs
  – Focus on operational excellence and experience significantly reduced rates of employee turnover
  – Provide management with the tools and training to leverage corporate information and to guide strategic planning, budgeting, and forecasting
  – Closely align strategic and tactical plans, enabling functional areas to contribute more effectively...

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
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

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Measurement

- **Key performance indicator (KPI)**
  A KPI represents a strategic objective and metrics that measures performance against a goal

- **Distinguishing features of KPIs**

  - Strategy
  - Targets
  - Ranges
  - Encodings
  - Time frames
  - Benchmarks

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Measurement

• Key performance indicator (KPI)

  Outcome KPIs vs. Driver KPIs
  (lagging indicators) (leading indicators)
  e.g., revenues e.g., sales leads

• Operational areas covered by driver KPIs
  – Customer performance
  – Service performance
  – Sales operations
  – Sales plan/forecast

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Measurement

• Problems with existing performance measurement systems
  – The most popular system in use is some variant of the balanced scorecard (BSC)
    • 50-90% of all companies implemented BSC
  – BSC methodology is a holistic vision of a measurement system tied to the strategic direction of the organization and based on a four-perspective view of the world:
    • Financial measures supported by customer, internal, and learning and growth metrics

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
The drawbacks of using financial data as the core of a performance measurement:

- Financial measures are usually reported by organizational structures and not by the processes that produced them
- Financial measures are lagging indicators, telling us what happened, not why it happened or what is likely to happen in the future
- Financial measures are often the product of allocations that are not related to the underlying processes that generated them
- Financial measures are focused on the short-term returns...

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Measurement

• Good performance measures should:
  – Be focused on key factors
  – Be a mix of past, present, and future
  – Balance the needs of all stakeholders (shareholders, employees, partners, suppliers, ...)
  – Start at the top and trickle down to the bottom
  – Have targets that are based on research and reality rather than be arbitrary

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• An effective performance measurement system should help:
  – Align top-level strategic objectives and bottom-level initiatives
  – Identify opportunities and problems in a timely fashion
  – Determine priorities and allocate resources accordingly
  – Change measurements when the underlying processes and strategies change
  – Delineate responsibilities, understand actual performance relative to responsibilities, and reward and recognize accomplishments
  – Take action to improve processes and procedures when the data warrant it
  – Plan and forecast in a more reliable and timely fashion

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• **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" (HBR, 1992)

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• The meaning of “balance”
  – BSC is designed to overcome the limitations of systems that are financially focused
  – Nonfinancial objectives fall into one of three perspectives:
    1. Customer
    2. Internal business process
    3. Learning and growth

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
In BSC, the term “balance” arises because the combined set of measures are supposed to encompass indicators that are:

- Financial and nonfinancial
- Leading and lagging
- Internal and external
- Quantitative and qualitative
- Short term and long term

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• Aligning strategies and actions
• A six-step process
  1. Developing and formulating a strategy
  2. Planning the strategy
  3. Aligning the organization
  4. Planning the operations
  5. Monitoring and learning
  6. Testing and adapting the strategy

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

- **Strategy map**
  A visual display that delineates the relationships among the key organizational objectives for all four BSC perspectives

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
## Strategy Map and Balanced Scorecard

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<td><strong>Financial</strong></td>
<td>Net Income Growth</td>
<td>Increase 25%</td>
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<td>Increase Net Income</td>
<td><strong>Customer</strong></td>
<td>Change licensing and maintenance contracts</td>
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<tr>
<td>Increase Customer Retention</td>
<td>Maintenance retention rate</td>
<td>Increase 15%</td>
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<td><strong>Internal Business Process</strong></td>
<td><strong>Internal Business Process</strong></td>
<td><strong>Internal Business Process</strong></td>
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<tr>
<td>Improve Call Center Performance</td>
<td>Issue turnaround time</td>
<td>Improve 30%</td>
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<tr>
<td>Reduce Employee Turnover</td>
<td>Voluntary turnover rate</td>
<td>Reduce 25%</td>
</tr>
<tr>
<td><strong>Learning and Growth</strong></td>
<td></td>
<td>Salary and bonus upgrade</td>
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Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• 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.

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• Six Sigma
  – 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

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• **How to Succeed in Six Sigma**
  – Six Sigma is integrated with business strategy
  – Six Sigma supports business objectives
  – Key executives are engaged in the process
  – Project selection is based on value potential
  – There is a critical mass of projects and resources
  – Projects-in-process are actively managed
  – Team leadership skills are emphasized
  – Results are rigorously tracked

• **BSC + Six Sigma = Success**

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Methodologies

• Integrating six sigma with BSC by
  – Translating their strategy into quantifiable objectives
  – Cascading objectives through the organization
  – Setting targets based on the voice of the customer
  – Implementing strategic projects using Six Sigma
  – Executing processes in a consistent fashion to deliver business results

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Architecture and Applications

• BPM architecture
  – The logical and physical design of a system
  – BPM system consists of three logical parts:
    1. BPM Applications
    2. Information Hub
    3. Source Systems
  – BPM system consists of three physical parts:
    1. Database tier
    2. Application tier
    3. Client or user interface

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Architecture and Applications

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Architecture and Applications

- BPM applications
  1. Strategy management
  2. Budgeting, planning, and forecasting
  3. Financial consolidation
  4. Profitability modeling and optimization
  5. Financial, statutory, and management reporting

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
BPM Architecture and Applications

• Leading BPM Application Suits/Vendors
  – SAP Business Objects Enterprise Performance Management
  – Oracle Hyperion Performance Management
  – IBM Cognos BI and Financial Performance Management
  – Microstrategy
  – Microsoft
  – SAS Business Intelligence

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Dashboards

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Dashboards

• Dashboards and scorecards both 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 explored

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Dashboards

• Dashboards versus scorecards
  – **Performance dashboards**
    Visual display used to monitor operational performance (free form...)
  – **Performance scorecards**
    Visual display used to chart progress against strategic and tactical goals and targets (predetermined measures...)

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Dashboards

• Dashboards versus scorecards
  – Performance dashboard is a multilayered application built on a business intelligence and data integration infrastructure that enables organizations to measure, monitor, and manage business performance more effectively

  - Eckerson

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Performance Dashboards

• Three types of performance dashboards:
  1. Operational dashboards
  2. Tactical dashboards
  3. Strategic dashboards

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
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"  
  
(Few, 2005)
Performance Dashboards

• What to look for in a dashboard
  – Use of visual components (e.g., charts, performance bars, spark lines, gauges, meters, stoplights) to highlight, at a glance, the 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 updates
  – Require little, if any, customized coding to implement, deploy, and maintain

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
Summary

• Business Performance Management (BPM)
  • BPM = BI + Planning

• Closed-Loop Process to Optimize Business Performance
  – Strategize, Plan, Monitor, Act /Adjust

• Performance Measurement

• BPM Methodologies
  – Balanced scorecard (BSC)
  – Six Sigma

• BPM Architecture and Applications

• Performance Dashboards

Source: Turban et al. (2011), Decision Support and Business Intelligence Systems
References