



Marketing Information Systems:

part 2

Course code: PV250

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Faculty of Informatics, Lasaris lab.,
ERCIM research program

Autumn, 2012

Timetable

Part 1: Oct.22 Mon 14:00–17:50 C525

Part 2: Oct.23 Tue 8:00–11:50 G101

Part 3: Nov. 05 Mon 14:00–17:50 C525

Part 4: Nov. 05 Tue 8:00–11:50 G101

Part 5: Dec.10 Mon 14:00–17:50 C525

Part 6: Dec.11 Tue 8:00–11:50 G101

Assessment session: 1-2nd week of January

Syllabus 2

- ∞ Types and functions of management information systems
- ∞ Their usage for the marketing purposes: operational, analytical, OLAP, expert, executive, decision-support systems.
- ∞ Applying ERP, business intelligence, integrated software for marketing tasks.
- ∞ Cloud based and open source solutions
- ∞ Big Data issues
- ∞ Dashboards (static & dynamics)
- ∞ ERP, BI demo (MS Axapta Dyn)

Tools & software: Sugar CRM

Lab work training for cloud-based marketing application Sugar CRM

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Interrelationship of MIS, MkIS and IT concepts

Marketing IS concepts	Management IS creation concepts (O'Brien, 1990)	IT concepts (O'Brien, 1990), Zikmund et al 2003)
1 Integration of functional modules	Management operations processing	Transactional processing
2 Project and campaign	Creating strategic advantage ERP (enterprise resource planning) CRM	Analytic applications, EAI (enterprise application integration), CRM
3 Value chain system		
4 Competitive system		
5 End-user „ad hoc“ support		
6 Support for marketing management processes	Decision making support (DSS) Expert systems (ES) Executive information systems (EIS) Business intelligence systems (BI)	data warehouses, data mining, OLAP (online analytical processing)
7 Marketing intelligence system		
8 Multidimensional MkIS		



Systems

- Definition
 - a collection of interrelated parts which taken together forms a whole such that:
 - The collection has some purpose.
 - A change in any of the parts leads to or results from a change in some other part(s).
- Characteristics
 - inputs, outputs, processes, storage
- Control: feedback, feedforward

Feedback control

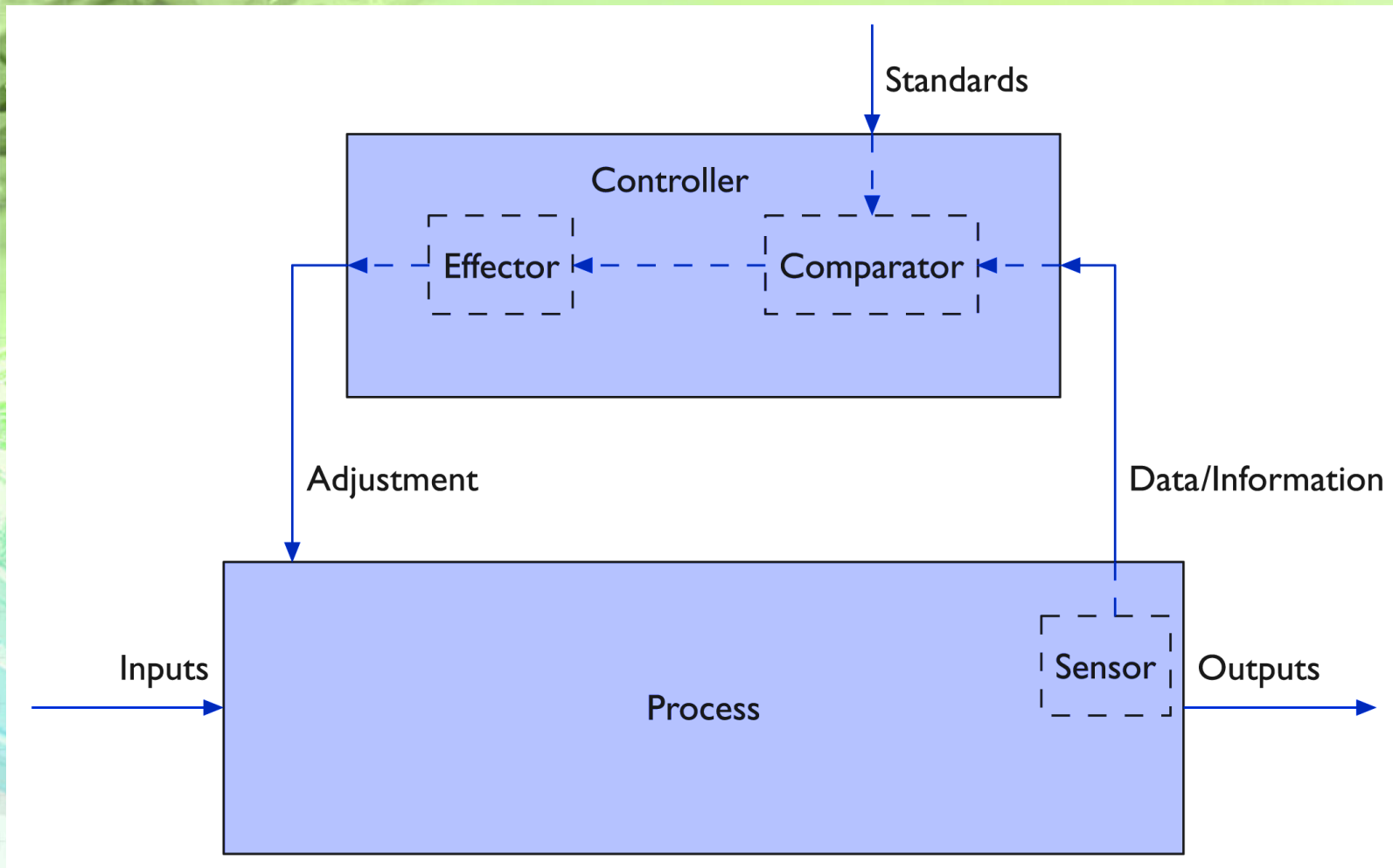


Figure 9.1 Feedback control

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Feedforward control

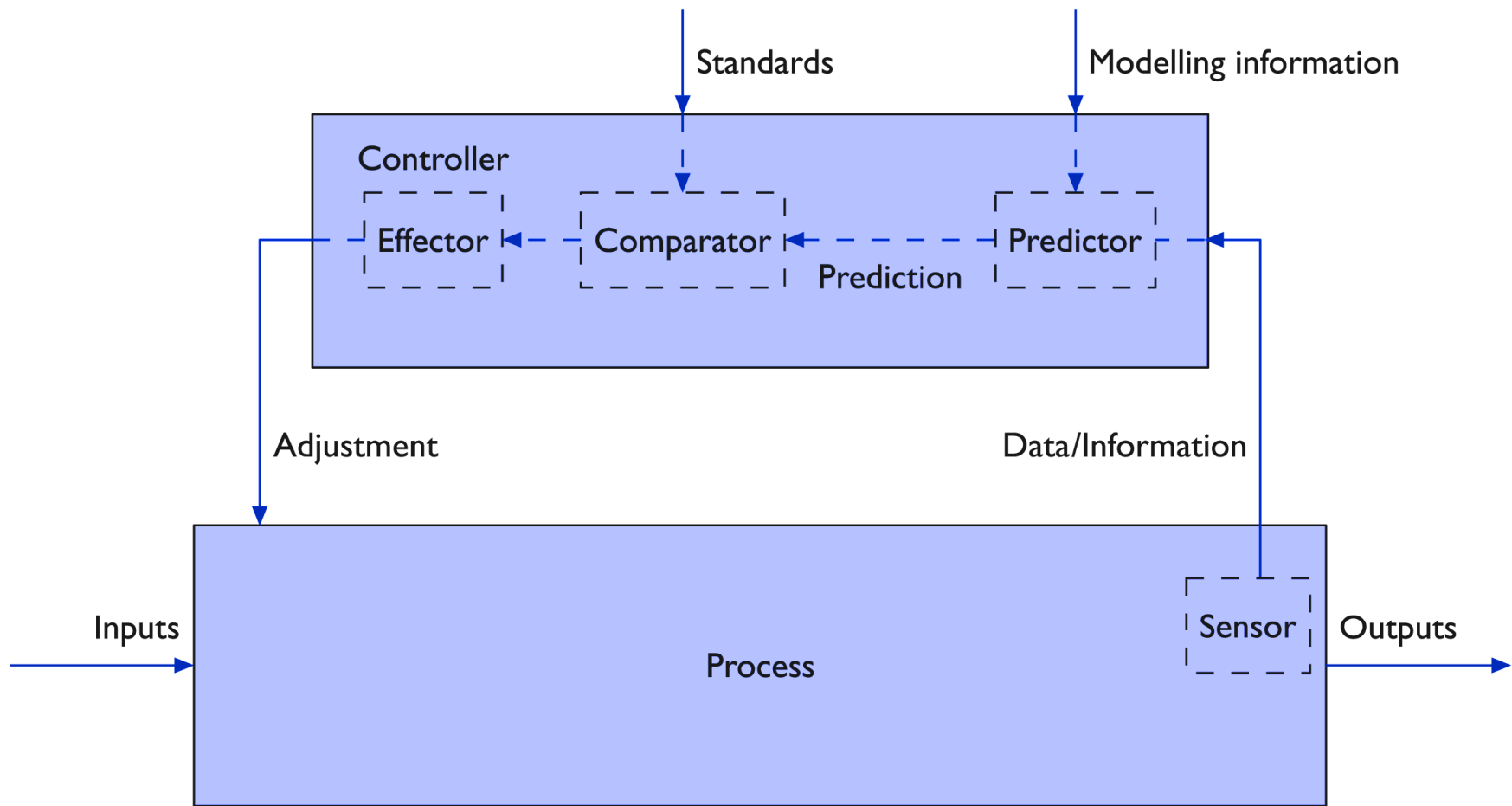


Figure 9.2 Feedforward control

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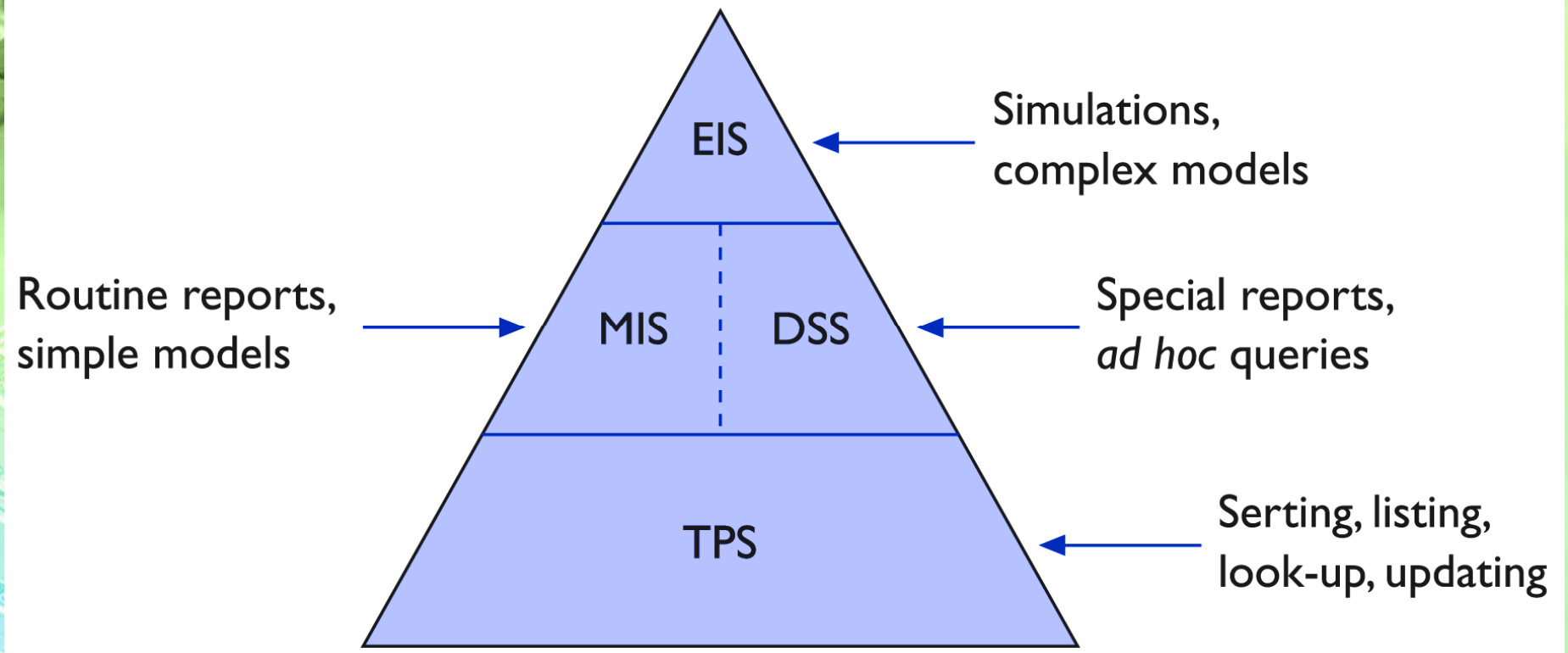
Systems

- Systems objectives
 - objective(s)
 - measure of performance
- Inputs and outputs
 - one system's output is another's input
- Systems environment
- Boundary
- Open and Closed Systems

Analyzing Data and Information

- Decision support systems (DSS)
- Expert systems (ES)
- Executive information systems (EIS)
- Group decision support (GDS)
- Transaction processing systems (TPS)
- Document management systems
- Digital dashboards
- OnLine analytical processing (OLAP)
- Data warehousing,
- Data mining

Analyzing Data and Information



Simon's model of Decision Making

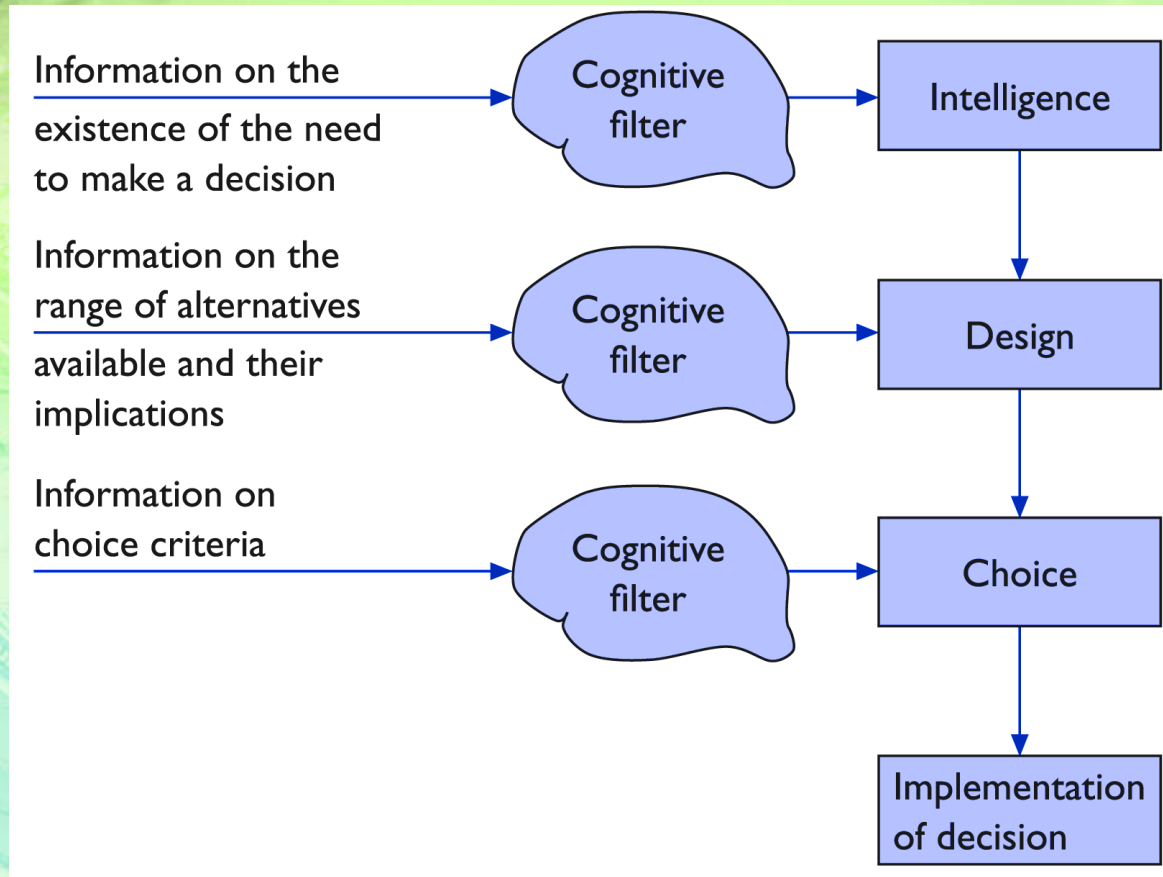
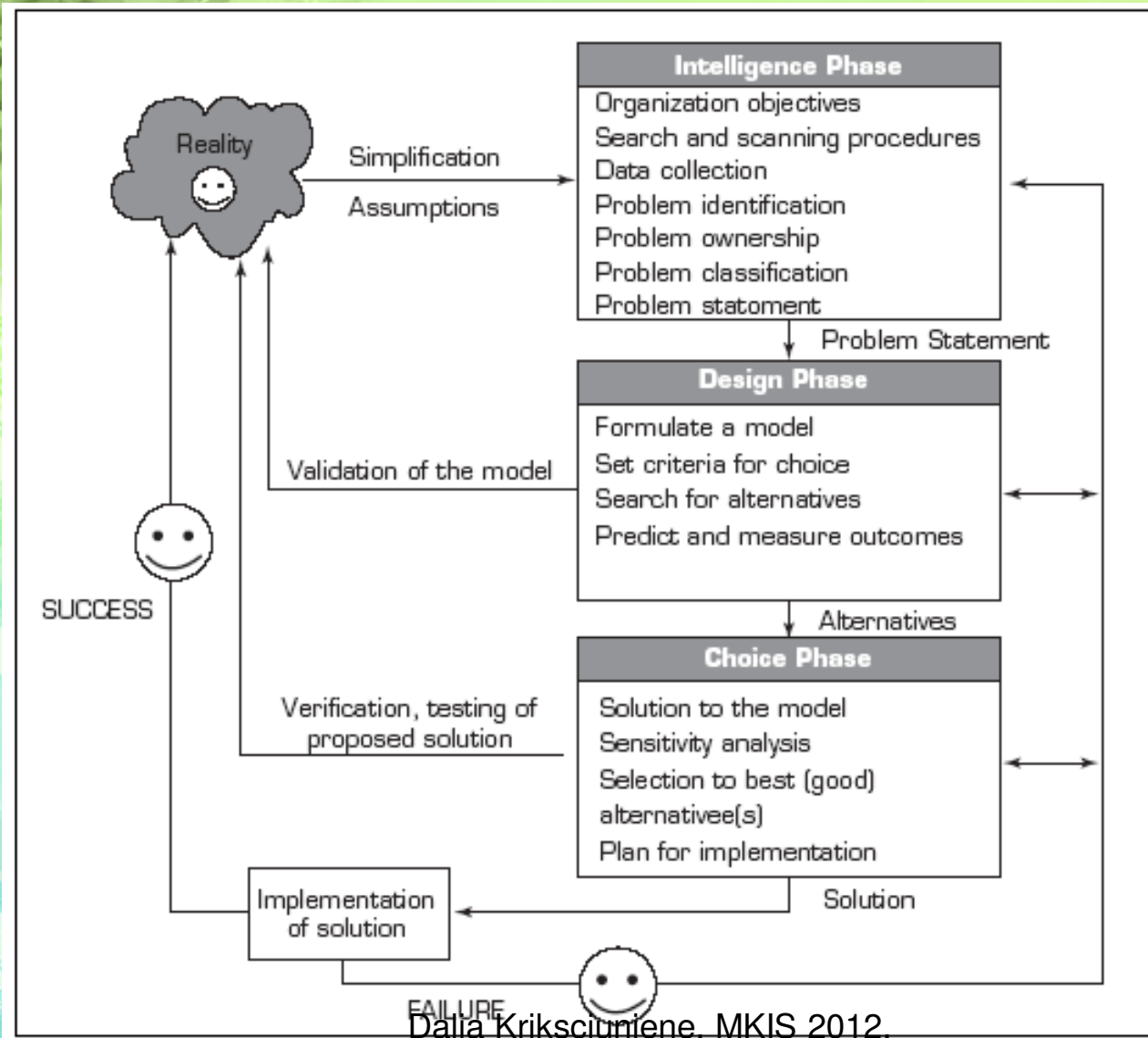


Figure 1.3 Stages in making a decision

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Phases of the Decision-Making Process



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FIGURE 2.1 The Decision Making/Modeling Process

Decision Making: The Implementation Phase

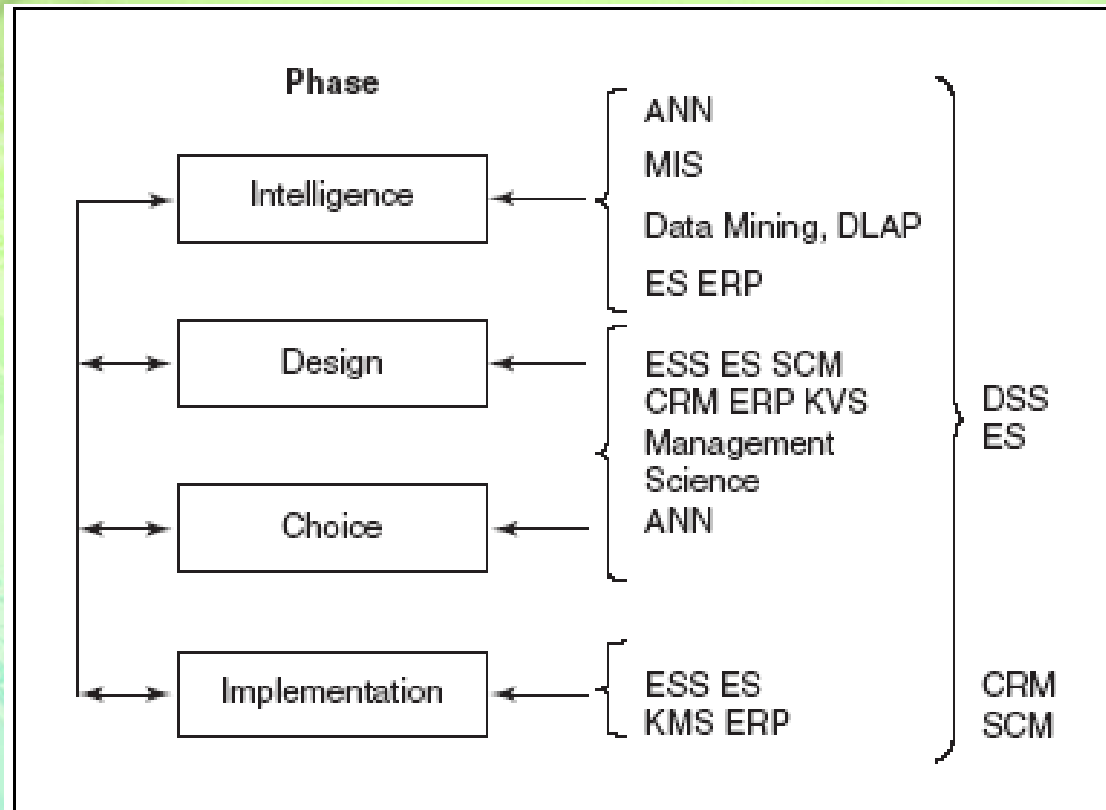


FIGURE 2.2 DSS Support

How Decisions Are Supported

- Support for the intelligence phase
 - The ability to scan external and internal information sources for opportunities and problems and to interpret what the scanning discovers
 - Web tools and sources are extremely useful for environmental scanning
 - Web browsers provide useful front ends for a variety of tools (OLAP, data mining, data warehouses)
 - Internal data sources may be accessible via a corporate intranet
 - External sources are many and varied

How Decisions Are Supported

- Support for the design phase
 - The generation of alternatives for complex problems requires expertise that can be provided only by a human, brainstorming software, or an ES

How Decisions Are Supported

- Support for the choice phase
 - DSS can support the choice phase through what-if and goal-seeking analyses
 - Different scenarios can be tested for the selected option to reinforce the final decision
 - KMS helps identify similar past experiences
 - CRM, ERP, and SCM systems are used to test the impacts of decisions in establishing their value, leading to an intelligent choice
 - An ES can be used to assess the desirability of certain solutions and to recommend an appropriate solution
 - A GSS can provide support to lead to consensus in a group

How Decisions Are Supported

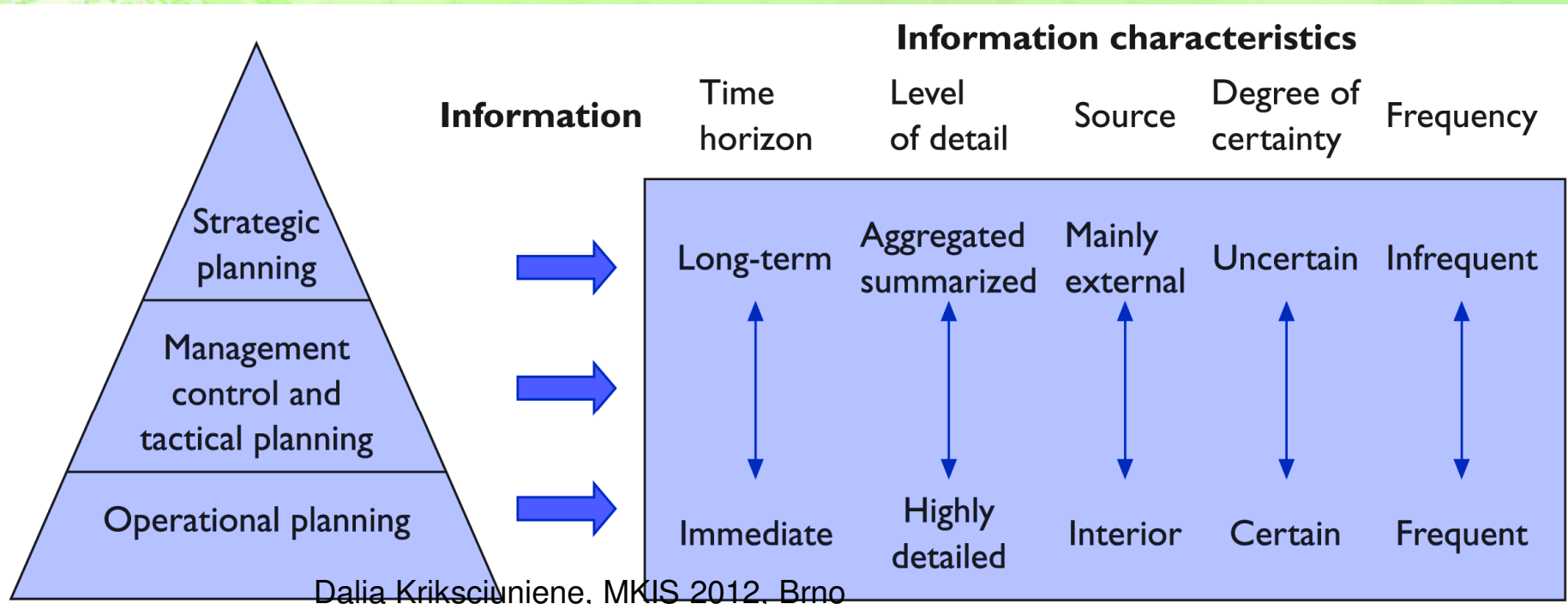
- Support for the implementation phase
 - DSS can be used in implementation activities such as decision communication, explanation, and justification
 - DSS benefits are partly due to the vividness and detail of analyses and reports

How Decisions Are Supported

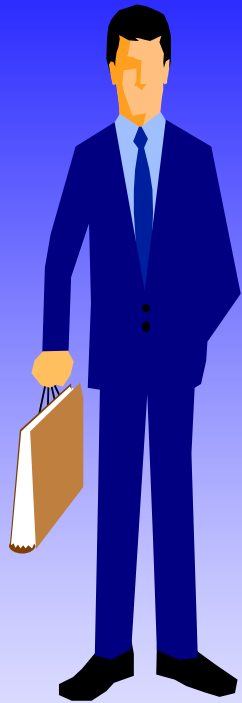
- New technology support for decision making
 - Mobile commerce (m-commerce)
 - Personal devices
 - Personal digital assistants [PDAs]
 - Cell phones
 - Tablet computers
 - Laptop computers

Levels of Decision Making

- Strategic Planning
- Tactical Planning and Control
- Operational Planning and Control



A DECISION SUPPORT SYSTEM (DSS)



MARKETING
MANAGER

Formulates question

Generates response

Acts or formulates new question

Generates response

Acts or formulates new question

Generates response



DSS

Personal
computer
with
access to
databases
and
analytical
methods

Decision Support Systems

- Interactive support
 - what if?
 - goal seeking
 - optimization
- Flexible access to data
- DSS are often fragmented systems
- DSS development and end users

Types of Decision Support Systems

- Data retrieval and analysis
 - simple entry and enquiry systems
 - data analysis systems
 - accounting information systems
- Computational support for structured decisions
- Modelling
 - spreadsheet models
 - probabilistic models
 - optimization modeling

The Major Tools and Techniques of Managerial Decision Support

Computerized Tools for Decision Support

- Data management
- Reporting status tracking
- Visualization
- Business analytics
- Strategy and performance management
- Communication and collaboration
- Knowledge management
- Intelligent systems
- Enterprise systems

The Major Tools and Techniques of Managerial Decision Support

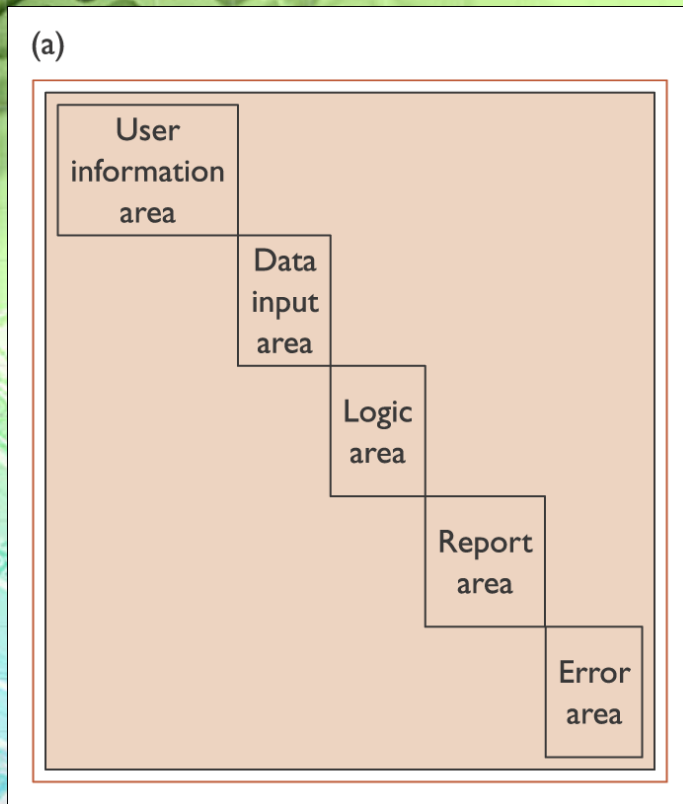
- Tools-Web connection
 - All of these tools are available in both web-based and non web-based formats
- **Hybrid (integrated) support systems**

A support system that uses several tools and techniques to assist management in solving managerial or organizational problems and assess opportunities and strategies

Spreadsheets in DSS

- Rows and columns format
- What if analysis?
- Standard and advanced mathematical functions
- Linked spreadsheets, worksheets
- Report production (e.g. P&L, balance sheet)

Spreadsheet Design



(b)

Microsoft Excel - The five main areas of spreadsheet design.xls

	A	B	C	D	E	F	G
1	DVD players TYPES DVD-a and DVD-b						
2	6 months projections from January						
3							
4	SALES	Jan	Feb	March	April	May	June
5	units DVD-a	43	43	44	44	45	45
6	units DVD-b	121	109	98	88	79	71
7							
8	price DVD-a	123	121	118	116	113	111
9	price DVD-b	278	306	336	370	407	448
10							
11	sales revenue DVD-a	5289	5235	5182	5129	5076	5025

Figure 7.3 The five main areas of spreadsheet design

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The Internet and DSS

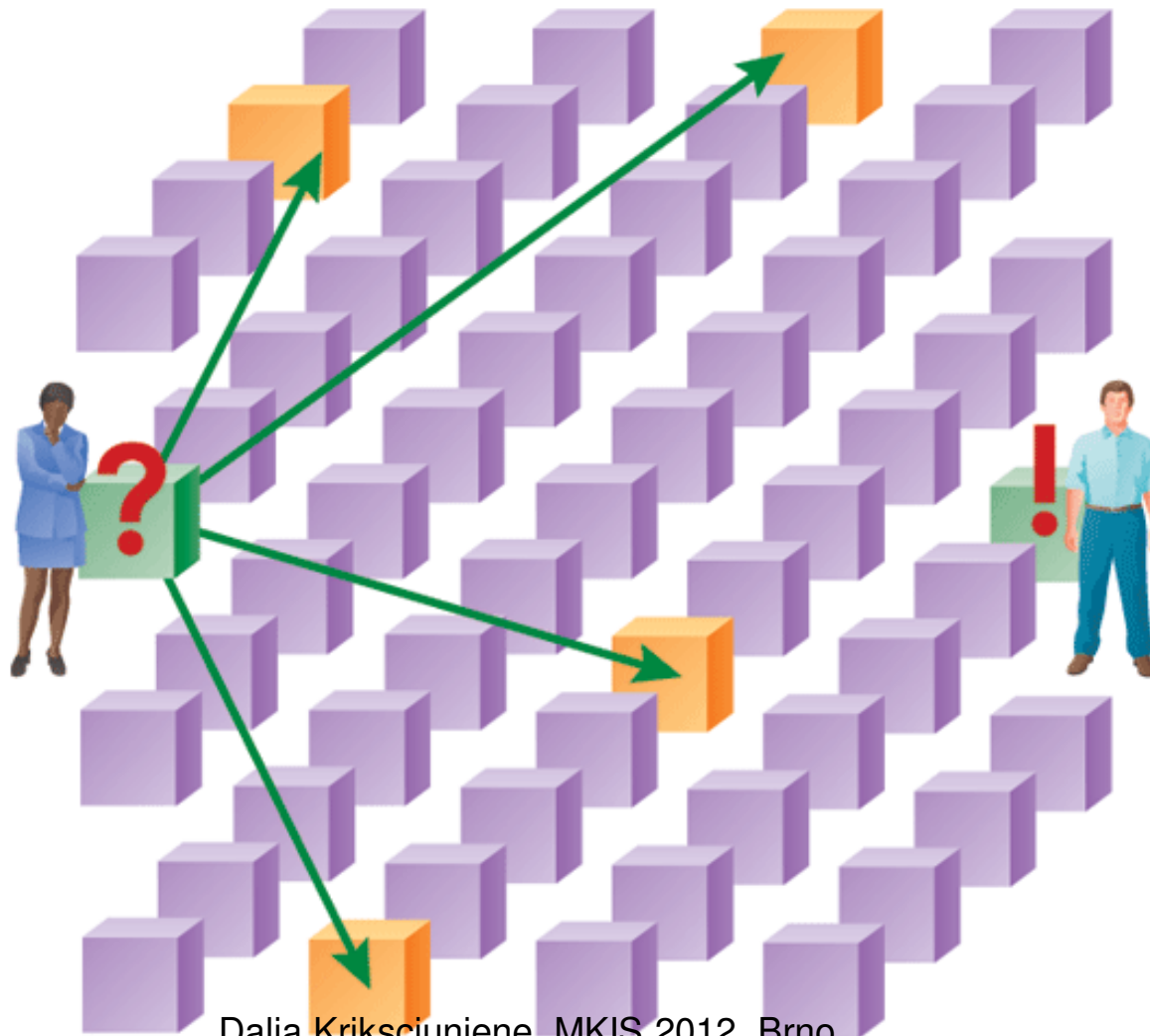
- Heterogeneous information sources
 - structured data (e.g. database table)
 - semi-structured data (e.g. HTML web pages)
 - unstructured (e.g. word processed document)
- Integrating data from different sources

Group Decision Support

- Group Decision Support Systems
 - decision networks
 - decision rooms
 - tele/computer conferencing
- Software support
 - brainstorming
 - voting
 - policy formation

Group Decision Support –shared expertise

The problem of distributed knowledge:
finding the right person who knows



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Enterprise knowledge taxonomy

Consequences of a change of the rate of exchange for hedging in export business

Actual rate of exchange

1 \$ = 1,09 €

,0 \$ 19 €
1 =

Knowledge

Information

Data

Signals



Pragmatic
(Integration, Application,
Context)

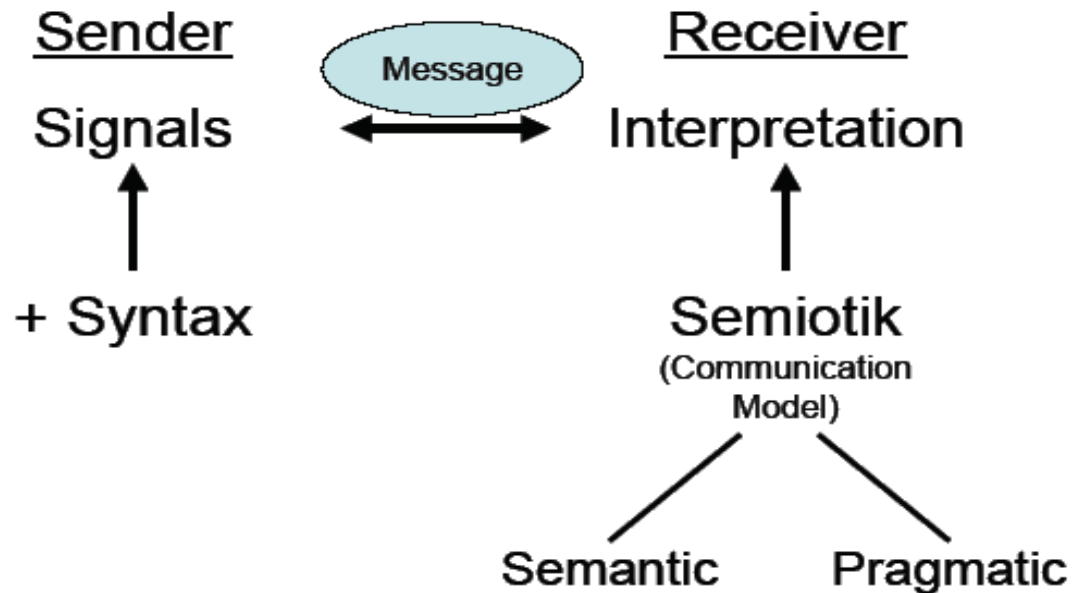
Semantic (Meaning)

Syntax (Formats)

© Rehäuser, Krcmar 1996

Knowledge taxonomy can be extended by adding “wisdom” .
Wisdom is a new stage of knowledge, created out of previous knowledge.

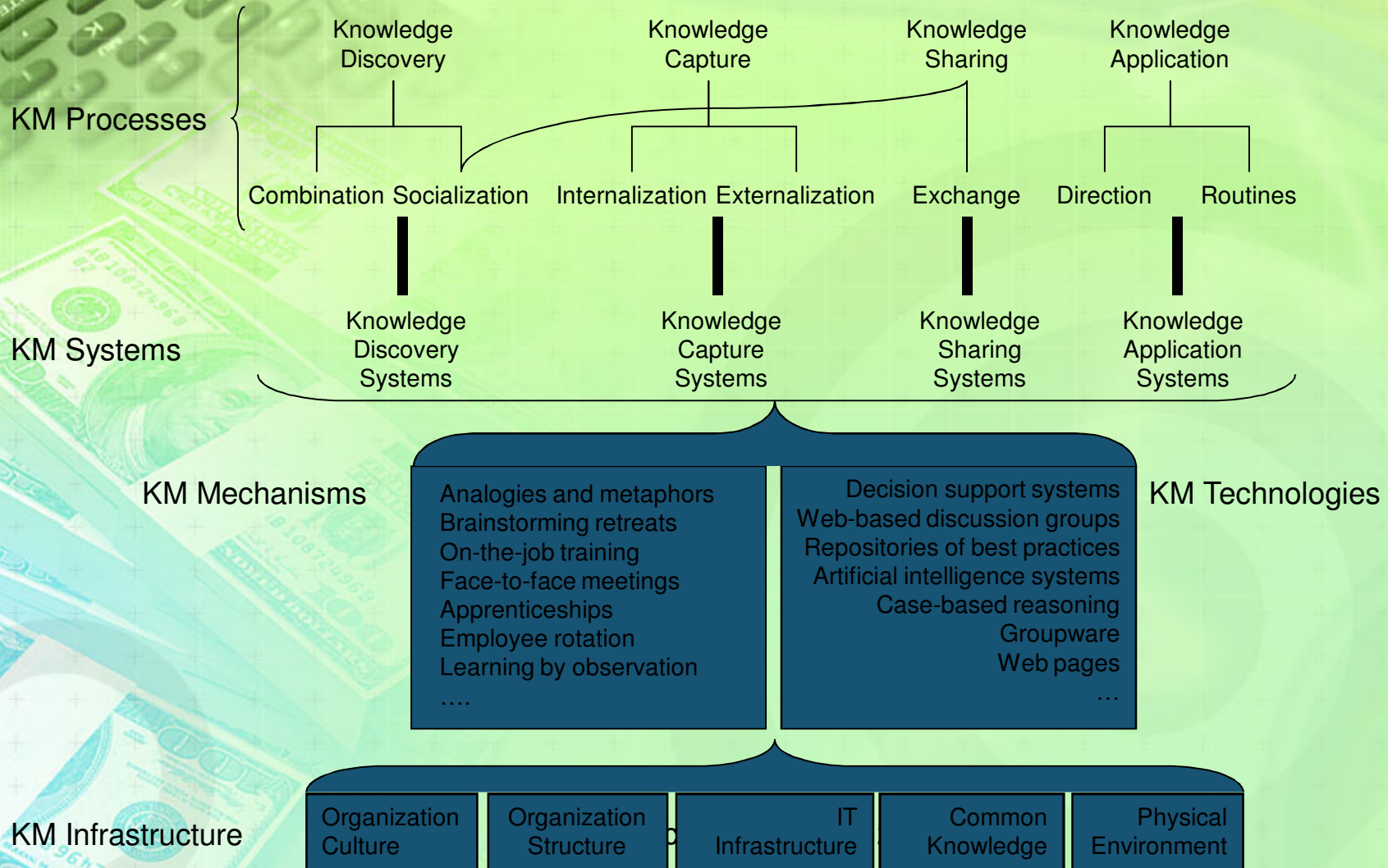
Model of Semiotic process



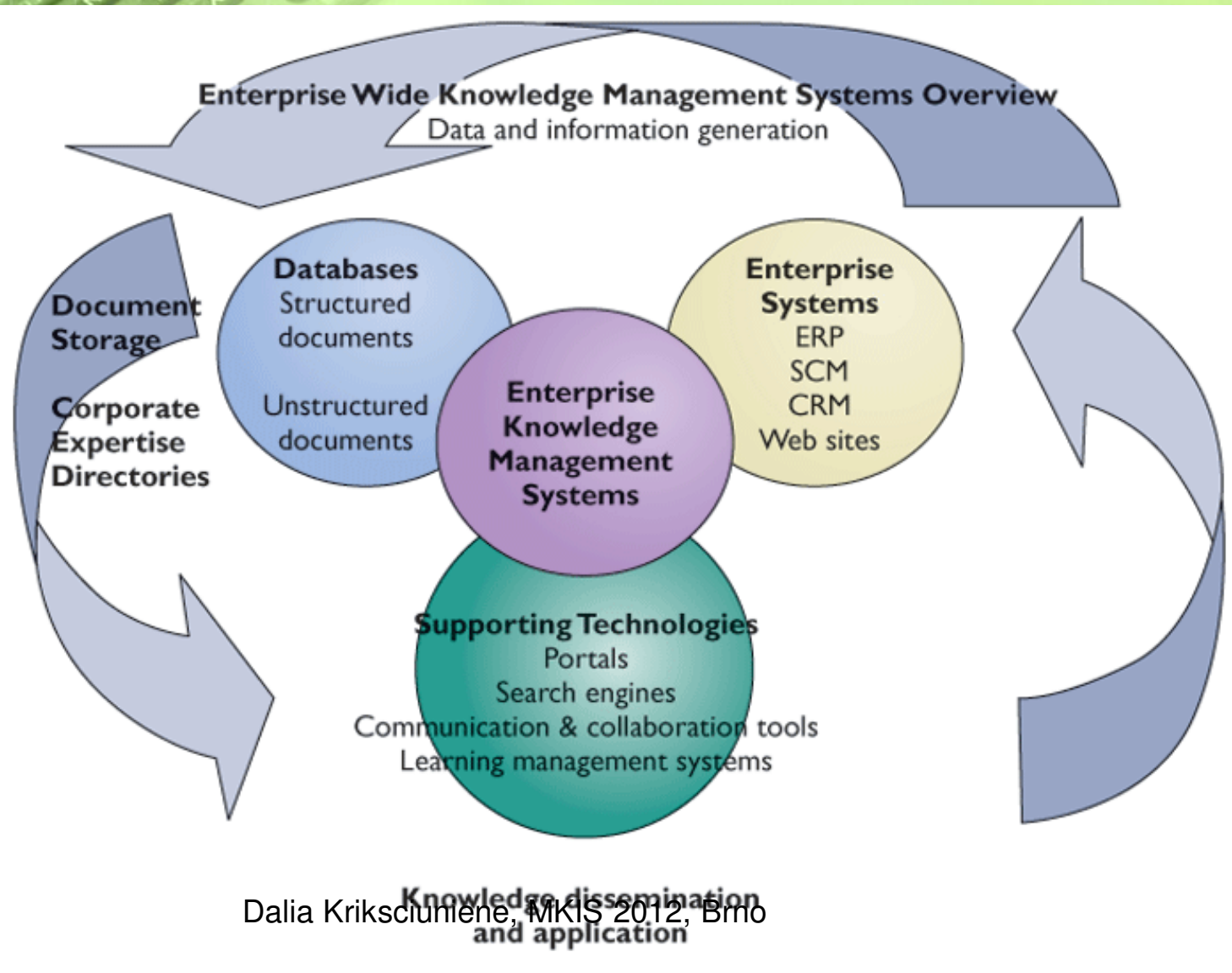
Ambiguity on receiver's side: Fuzziness caused by interpretation

- The participants of the process: sender(s) and receiver
- The problem of receiver: interpretation of the received message.
- The message can be assigned to various levels of knowledge taxonomy. The receiver needs high level of expertise to bring it to the level of knowledge and wisdom for making decision

Enterprise Knowledge Management Solutions



Enterprise-Wide Knowledge Management Systems

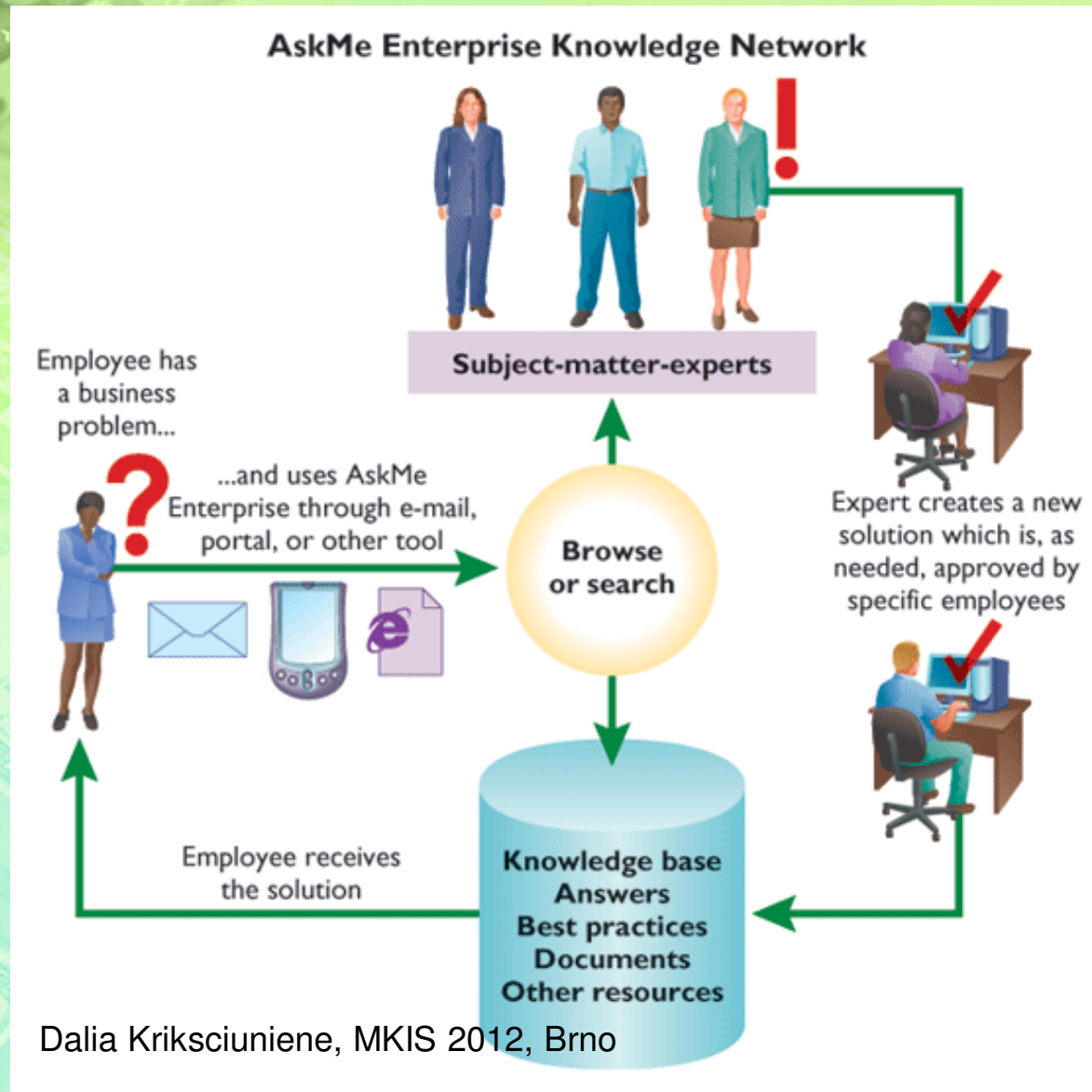


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Expert Systems

- Knowledge area or domain
- Mimic 'expert behaviour'
- Interconnected rules
- Reasoning rather than computation
- Development through
 - programming language
 - expert system shell

Expert systems



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Capturing Knowledge: Expert Systems

Knowledge Base: Model of human knowledge

The task: to elicit information and expertise from other professionals and translate it into set of rules for an expert system

Rule-based Expert System: Collection in an AI system represented in the the form of IF-THEN

Capturing knowledge in natural setting (by enterprise storytelling, observing, application of concept mapping)

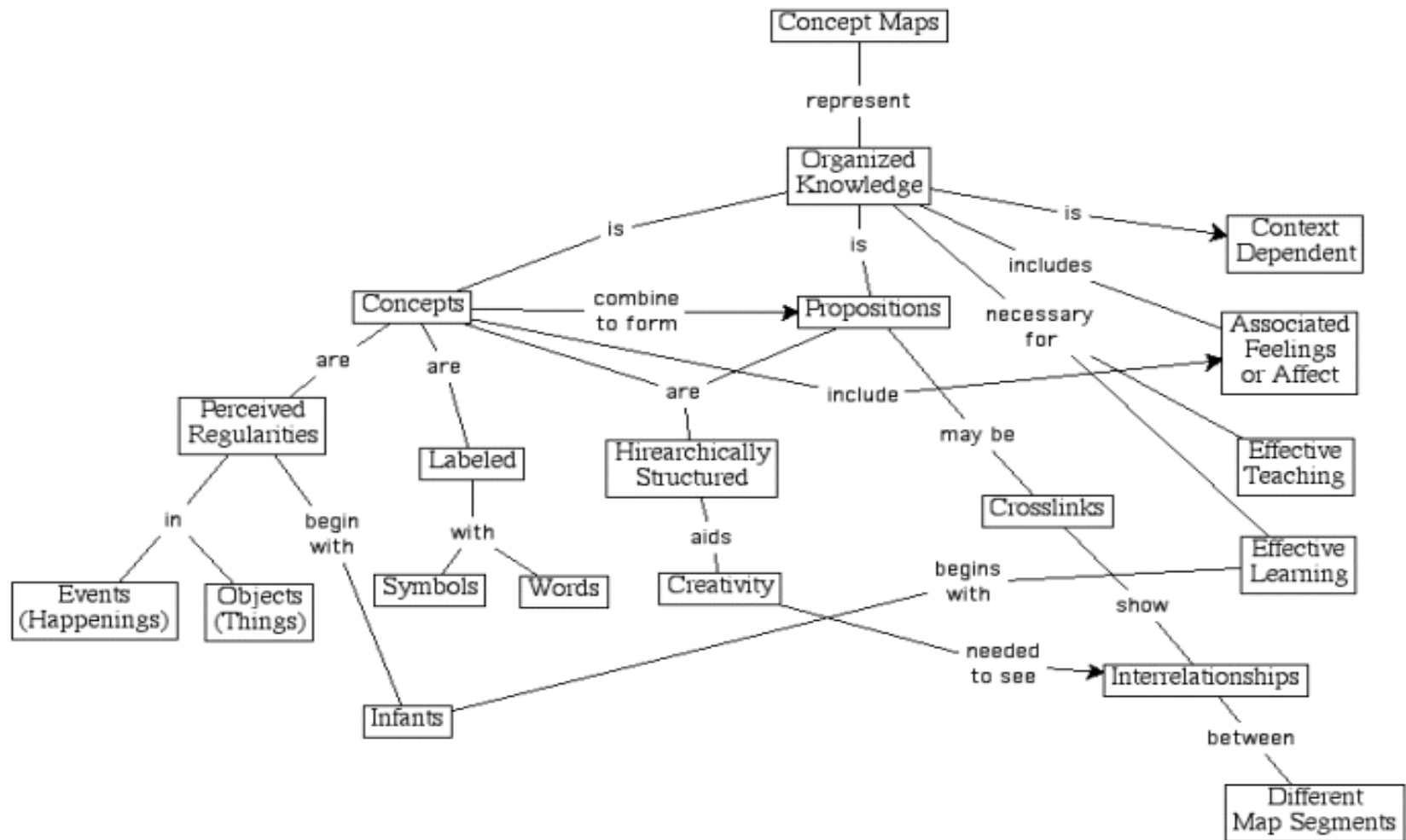
AI shell: programming environment

Inference Engine: strategy used to search through the rule base

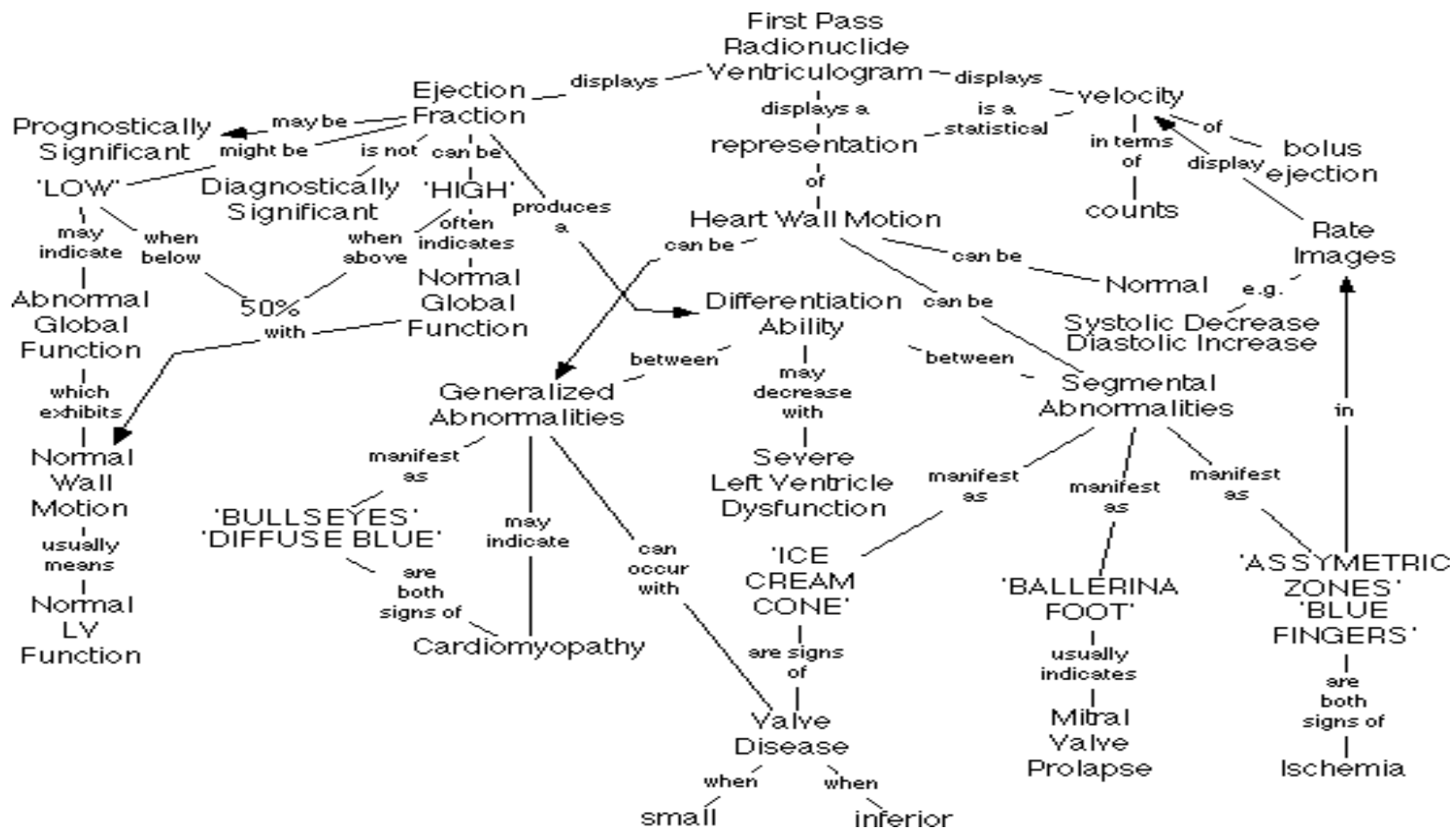
Forward Chaining: strategy for searching the rules base that begins with the information entered by user and searches the rule base to arrive at a conclusion

Backward Chaining: Strategy for searching the rule base in an expert system that acts as a problem solver

Concept Map about Concept Maps: Based on Ausubel's learning psychology theory



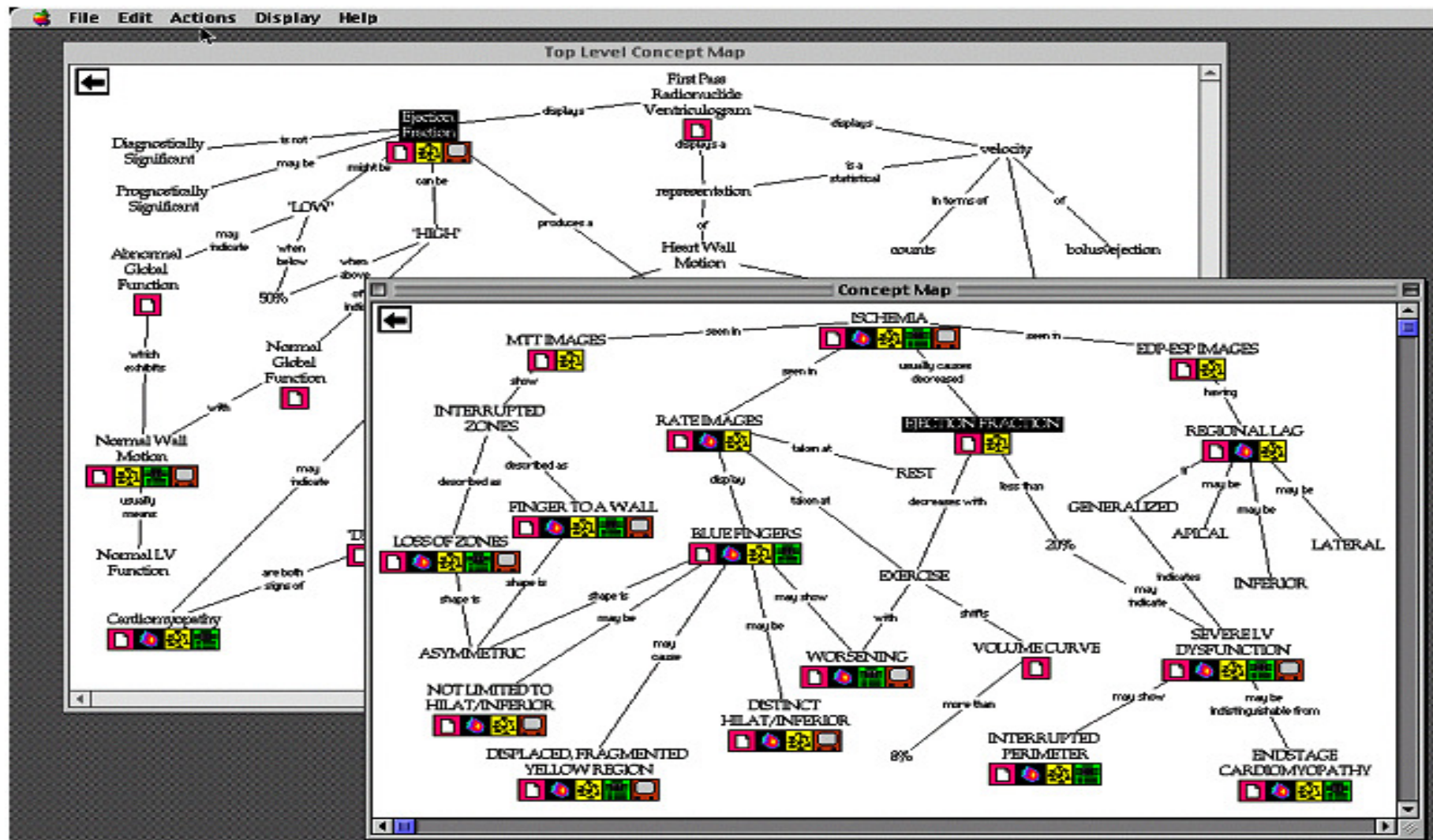
Example: A Concept Map Segment from Nuclear Cardiology Domain



Example: Knowledge Capture Systems: CmapTools

- To capture and formalize knowledge resulting in context rich knowledge representation models to be viewed and shared through the Internet
- Alleviates navigation problem with concept maps
- Serve as the browsing interface to a domain of knowledge
- Icons below the concept nodes provide access to auxiliary information
- Linked media resources and concept maps can be located anywhere on the Internet
- Browser provides a window showing the hierarchical ordering of maps

Example: Expert system (Nuclear Cardiology, application of CmapTools)



Expert knowledge explanation subsystem

The screenshot displays a software interface for an expert knowledge explanation subsystem. The main window is titled "Concept Map" and shows a hierarchical diagram of concepts. The central concept is "Ejection Fraction", which is linked to "First Pass Radionuclide Ventriculogram" (displayed as a document icon) and "Abnormal Global Function". "Ejection Fraction" is further categorized into "LOW" and "HIGH" states, with associated terms like "Diagnostically Significant", "Prognostically Significant", and "may indicate".

A "Text Window" titled "BLUE FINGERS" provides a detailed explanation: "If a region of the ventricle contracts 1 than it should, that region will be seen images as a blue region or blue finger. that produces the rate images may cau regions to occur in the High Lateral and regions in basically normal patients. Distinct blue fingers limited to the High Lateral/Inferior region require explanat". Below this, another text window explains: "Hypertension or to 10% of the ge in otherwise nor H1/Lat or Inferio blood vessel in of Ischemia."

Two image windows show "RATE IMAGES" and "BLUE FINGERS" as heatmaps of a heart cross-section. The "BLUE FINGERS" image shows distinct blue regions on the heart's surface.

On the right, a "Movie" window shows a portrait of a man in a suit and bow tie. Below it, a "NUCESModelIF" window displays a "Top Level Conce Map" hierarchy:

- Top Level Conce Map
 - Normal Wall Motion Map
 - Ischemia Concept Map
 - Ischemia Text Concept Map
 - Ischemia Picture Map
 - Card
 - Nonspecific Wall Motion Map

At the bottom of the hierarchy window, it says "Click on a box to select that".

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Application for marketing

- How to arrange goods in the shelves
- How to guide the customer in a shop, that he should visit more shelves
- Where to build a new store (according to people density, type of district , competitors)
- How to create new promotion idea related to pricing, buying behavior of selected customer segment
- What values make biggest impact for introducing new product ?

Features of Document Management Systems

- Hardware
- Document input
- Retrieval
- Integration and sharing
- Security
- Versioning

Benefits of Document Management Systems

- Reduced physical storage space
- Flexible retrieval
 - targeted search, speed of retrieval and availability
- Managed availability of documentation distribution
 - different entitlements for different users for different classes of documentation can easily be specified
- Improved security of access
 - compliance with data legislation
- Enhanced internal communication and operations
- Ability to implement workflow for the production and approval of documents
- Share knowledge within the enterprise

The Major Theories and Characteristics of Business Intelligence

- **online transaction processing systems (OLTP)**

Systems that handle a company's routine ongoing business

- **online analytic processing (OLAP)**

An information system that enables the user, while at a PC, to query the system, conduct an analysis, and so on. The result is generated in

OLAP

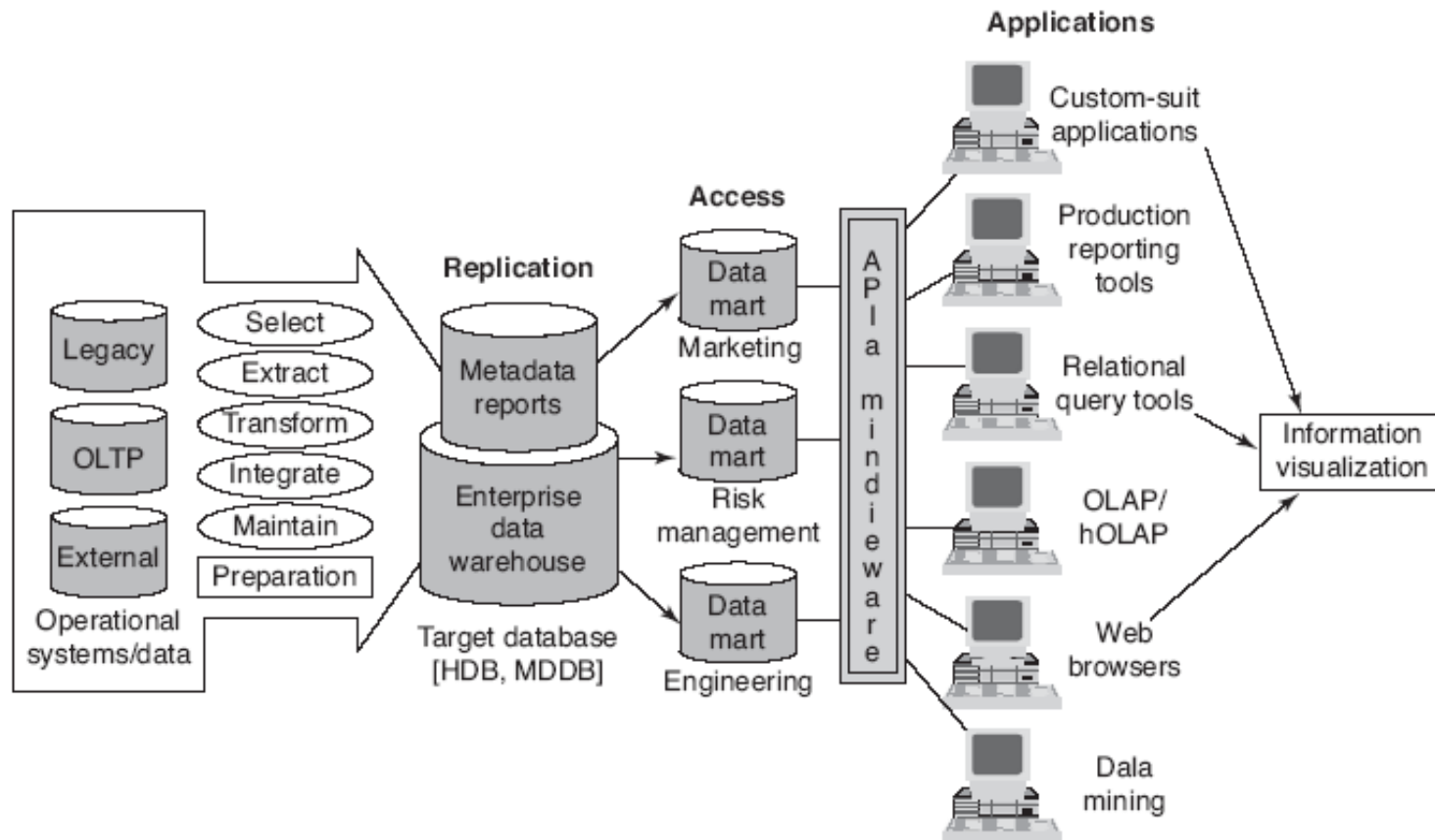
- Involves trend analysis and forecasting
- Uses summarized historical data (from operational databases)
- Entails complex queries, often building very large tables
- Is read-intensive
- The decisions it informs are strategic, so response is time-critical
- The users are managers/analysts

Data Warehousing : cube and processes

- **Cube is a** subset of highly interrelated data that is organized to allow users to combine any attributes in a cube (e.g., stores, products, customers, suppliers) with any metrics in the cube (e.g., sales, profit, units, age) to create various two-dimensional views, or *slices*, that can be displayed on a computer screen
- Processes:
 - Pivoting
 - Roll-up
 - Drill-down, drill-through, drill-across
 - **Slice and dice**

Data Warehousing: Process Overview

FIGURE 2.1 Data Warehouse Framework and Views



Data Warehousing (Processes)

Microsoft Excel - The five main areas of spreadsheet design.xls

(a)

	A	B	C	D	E
1	DVD players TYPES DVD-a and DVD-b				
2	6 months projections from January				
3					
4	SALES	Jan	Feb	March	April
5	units DVD-a	43	43	44	44
6	units DVD-b	121	109	98	88
7					
8	price DVD-a	123	121	118	116
9	price DVD-b	278	306	336	370
10					
11	sales revenue DVD-a	5289	5235	5182	5129

Microsoft Excel - pivot:3

	A	B	C	D	E	F	G
1	Sum of Commission		Agent				
2	Month	Region	Erikson	Hanson	Khan	Peters	Grand Total
3	May	North	3500	1600		2100	7200
4		South			2200		2200
5	May Total		3500	1600	2200	2100	9400
6	June	South	1060		2300		3360
7	June Total		1060		2300		3360
8	July	South	440		300		740
9	July Total		440		300		740
10	Grand Total		5000	1600	4800	2100	13500

Microsoft Excel - pivot:3

	A	B	C	D
1	Sum of Commission	Item		
2	Agent	Life	Property	Grand Total
3	Erikson	3500	1500	5000
4	Hanson	1600		1600
5	Khan	4500	300	4800
6	Peters		2100	2100
7	Grand Total	9600	3900	13500

Pivoting data to provide different perspectives
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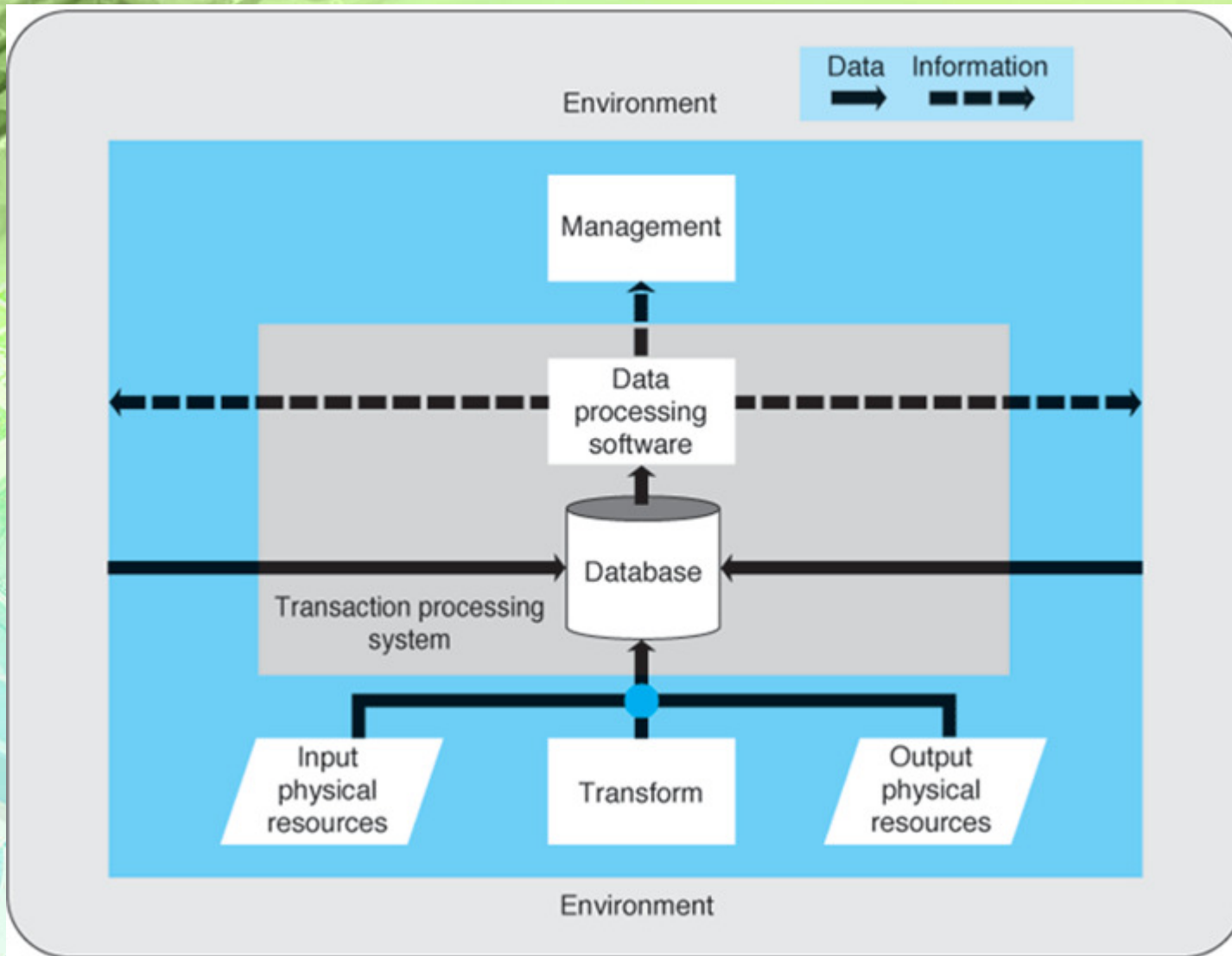
Data Mining

The non-trivial extraction of implicit, previously unknown, and potentially useful information from data.'

Uses machine learning, statistical and visualization techniques to discover and present knowledge in a form which is easily comprehensible to humans

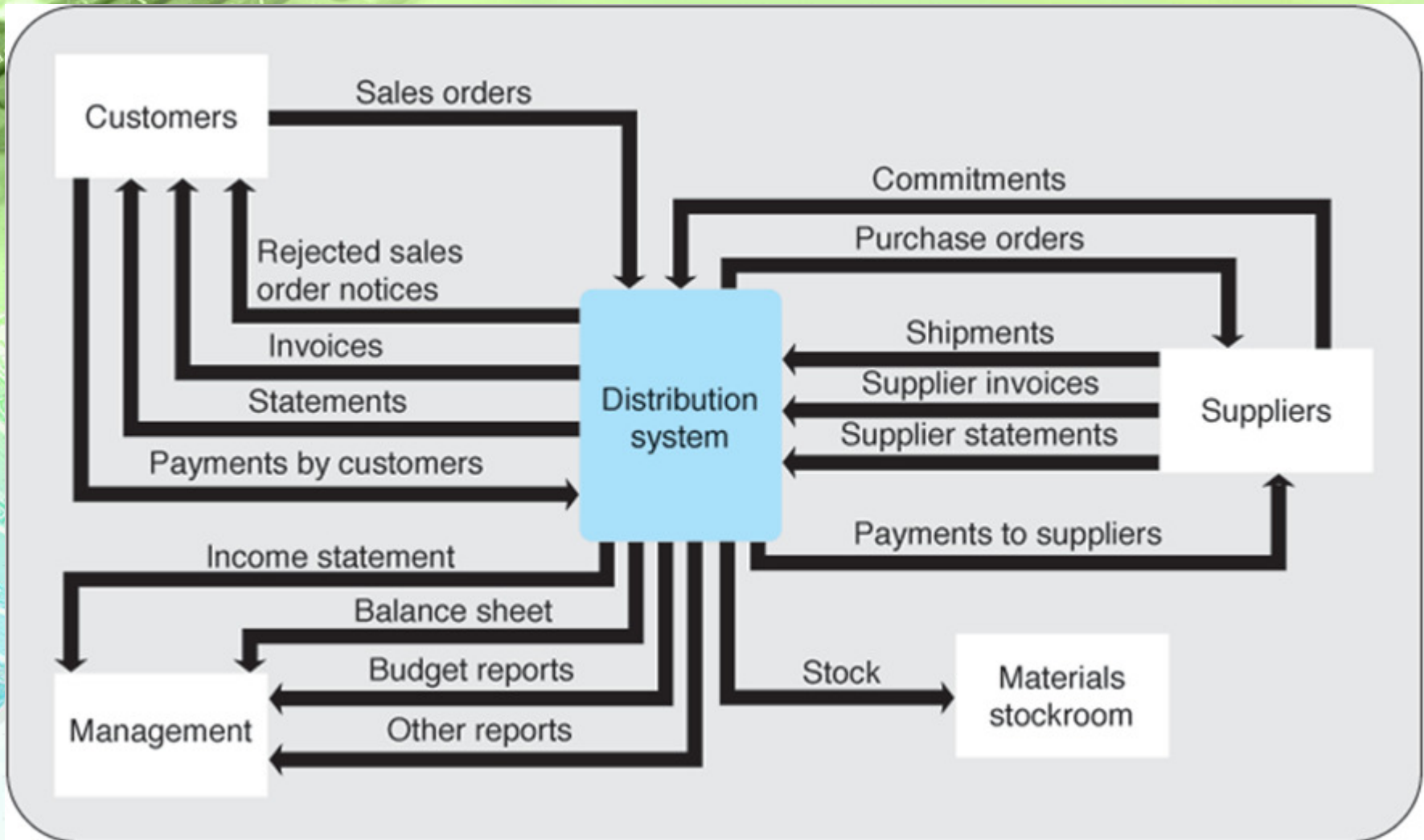
- Decision tables
- Nearest neighbour classification
- Neural networks
- Rule induction
- **K-means clustering**

Operation (transaction processing system)



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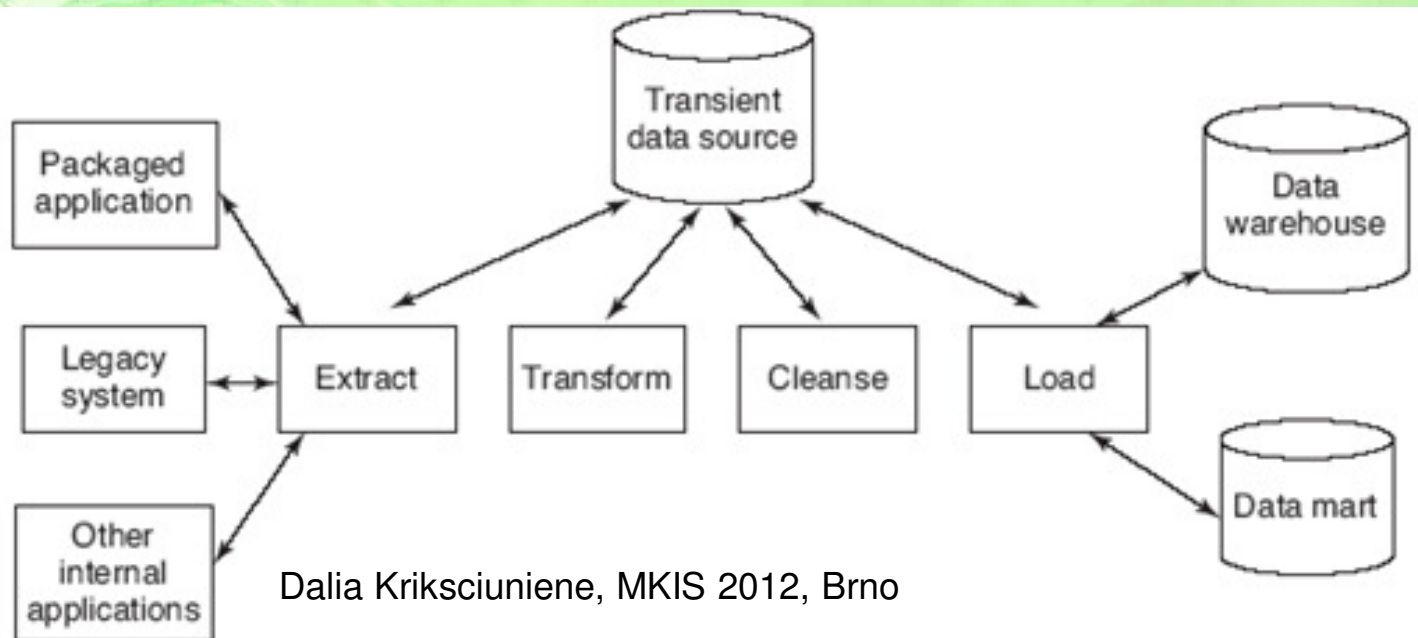
Transaction processing system: context diagram (system in the context of its environment)



Data Integration and the Extraction, Transformation, and Load (ETL) Process

Enterprise application integration (EAI) technology for pushing data from source systems into data warehouse

Enterprise information integration (EII) tool space that enables real-time data integration from a variety of sources, such as relational databases, Web services, and multidimensional databases



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Real-Time Data Warehousing

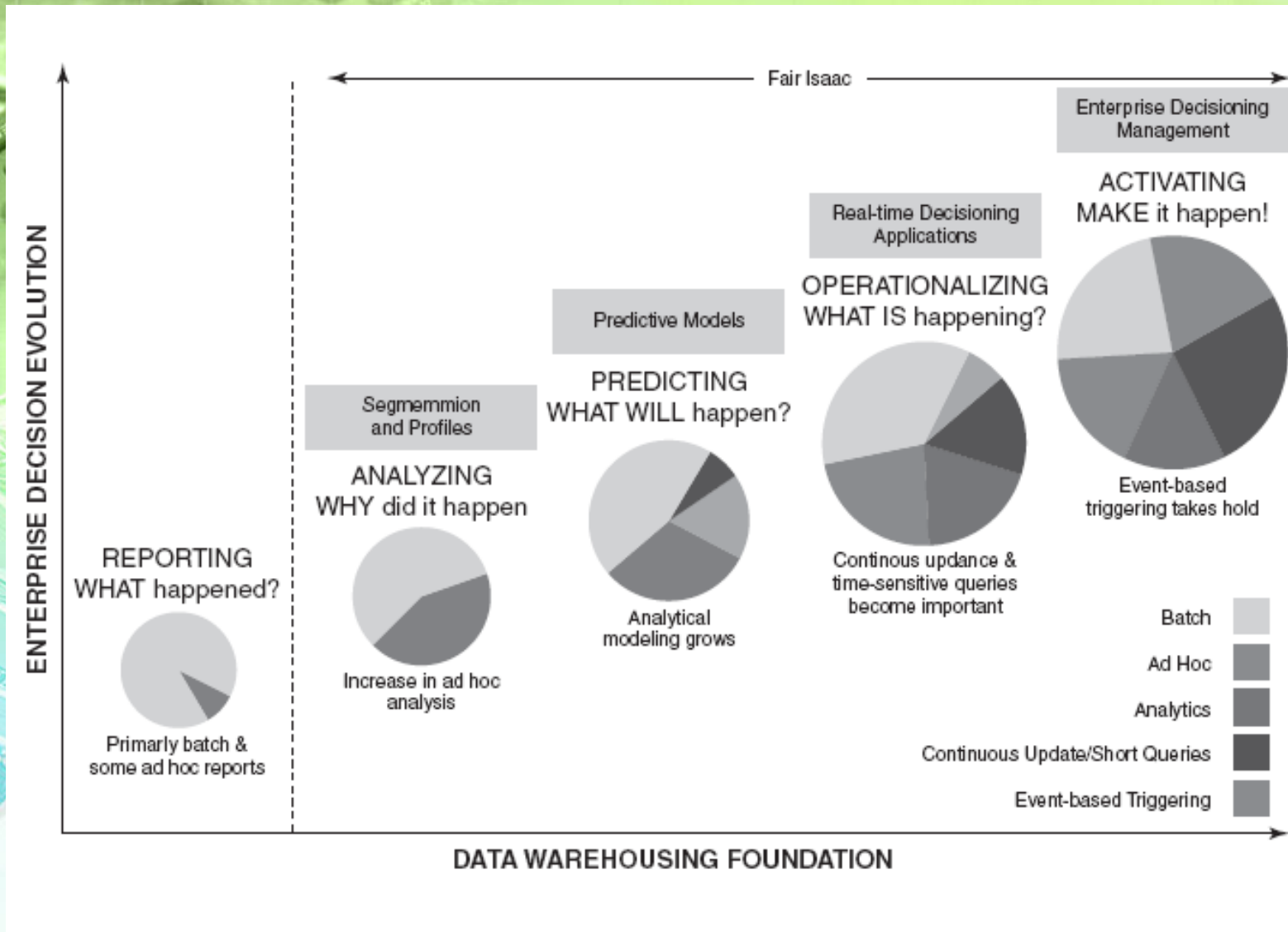
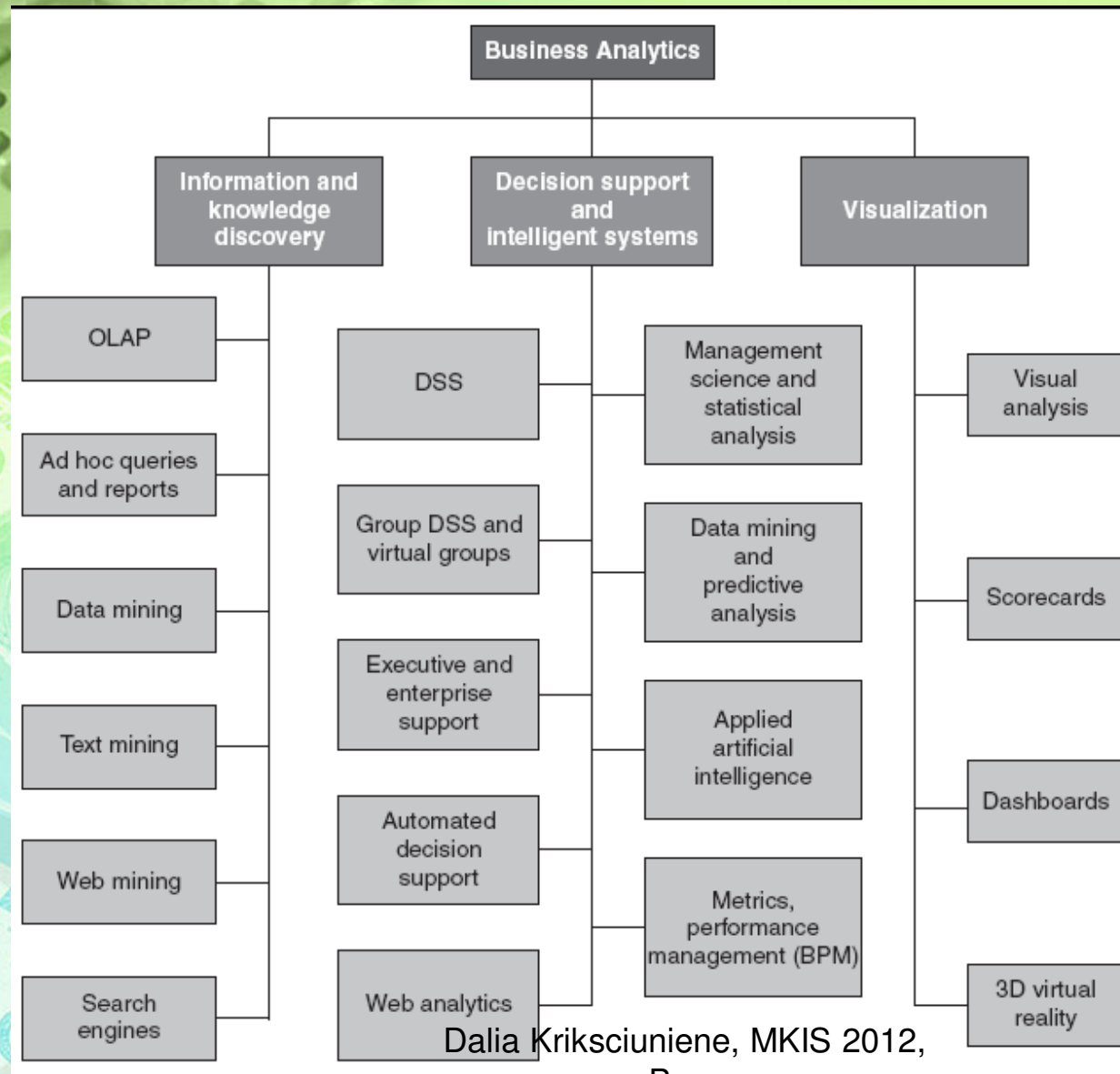


FIGURE 2.10 Enterprise Decision Evolution Dalia Kriksciuniene, MKIS 2012, Brno

Analytic applications

- Analytic applications (AA) are the packaged software products that provide value along three dimensions :
- **Process support:** structuring and automating business tasks for optimization of business operations and discovering opportunities
- **Separation of function:** functioning independently of organizations core transactional applications, yet dependent on transactional data and able to send results back to these applications.
- **Time-oriented, integrated data:** integrating data from multiple sources (internal or external to business), able of time-basis analysis. The integration of heterogeneous data enables organization to measure its performance against its own stated goals or industry benchmarks.

The Business Analytics (BA)



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FIGURE 3.1 Categories of Business Analytics

Business analytics: Gartner

- Business intelligence (BI) platforms enable all types of users from IT staff to consultants to business users to build applications
- that help organizations learn about and understand their business. Gartner defines a BI platform as a software platform that delivers
- the 14 capabilities listed in the document *. These capabilities are organized into three categories of functionality: integration, information delivery and analysis.

* <http://businessintelligence.info/docs/estudios/Magic-Quadrant-for-Business-Intelligence-Platforms-2012.pdf>

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Business analytics: Microstrategy

5 categories of business analytics :
(www.strategy.com)

- Scorecards & Dashboards
- Enterprise Reporting
- OLAP Analysis
- Adv. & Predictive Analysis
- Alerts & Notification

Reports and Queries

- **Reports**

- Routine reports
- Ad hoc (or on-demand) reports
- Multilingual support
- Scorecards and dashboards
- Report delivery and alerting
 - Report distribution through any touchpoint
 - Self-subscription as well as administrator-based distribution
 - Delivery on-demand, on-schedule, or on-event
 - Automatic content personalization

Data Visualization

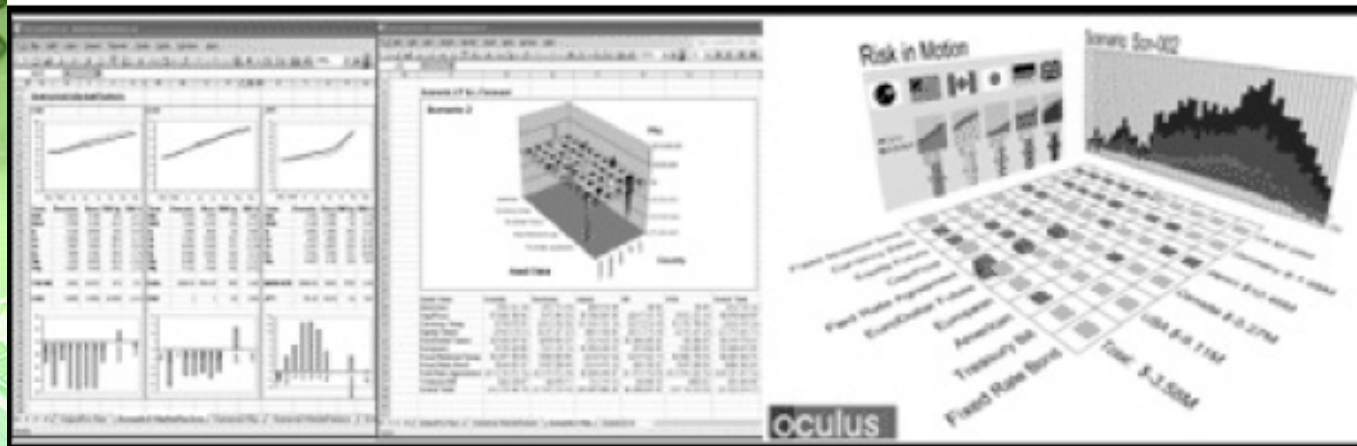
A graphical, animation, or video presentation of data and the results of data analysis

- The ability to quickly identify important trends in corporate and market data can provide competitive advantage
- Check their magnitude of trends by using predictive models that provide significant business advantages in applications that drive content, transactions, or processes
- Mainstream computing, where it is integrated with decision support tools and applications
- Intelligent visualization, which includes data (information) interpretation

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Data Visualization problem: how many dimensions is it possible to show in 2-dim space?

FIGURE 3.5 Visual Spreadsheet of Risk Analysis



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FIGURE 3.6 Visual Spreadsheet of Credit Modeling



Data Visualization

- Dashboards and scorecards
- Visual analysis
- Financial data visualization
- Interactive visualization
- Dynamic visualization

Geographic Information Systems (GIS)

An information system that uses spatial data, such as digitized maps. A GIS is a combination of text, graphics, icons, and symbols on maps

- As GIS tools become increasingly sophisticated and affordable, they help more companies and governments plan service for customer, the best distribution channels and gain competitive intelligence
- Some firms are deploying GIS on the Internet for internal use or for use by their customers (locate the closest store location, find hotels. Also link to mobile devices.
- E.g. ESRI solutions <http://www.esri.com/> aim to use maps for market research, mapping business competitors, resources, customer density, etc

Real-Time BI, Automated Decision Support, and Competitive Intelligence

ADS are most suitable for decisions that must be made frequently and/or rapidly, using information that is available electronically

Rapidly build rules-based applications and deploy them into almost any operating environment

Inject predictive analytics into rule-based applications, provide services to legacy systems

Combine business rules, predictive models, and optimization strategies flexibly into state-of-the-art decision-management applications

Ensure learning from decision criteria into strategy design, execution, and refinement

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Real-Time BI, Automated Decision Support, and Competitive Intelligence

Tasks:

- Product or service configuration, yield (price) optimization
- Routing or segmentation decisions
- Corporate and regulatory compliance
- Fraud detection
- Dynamic forecasting, operational control

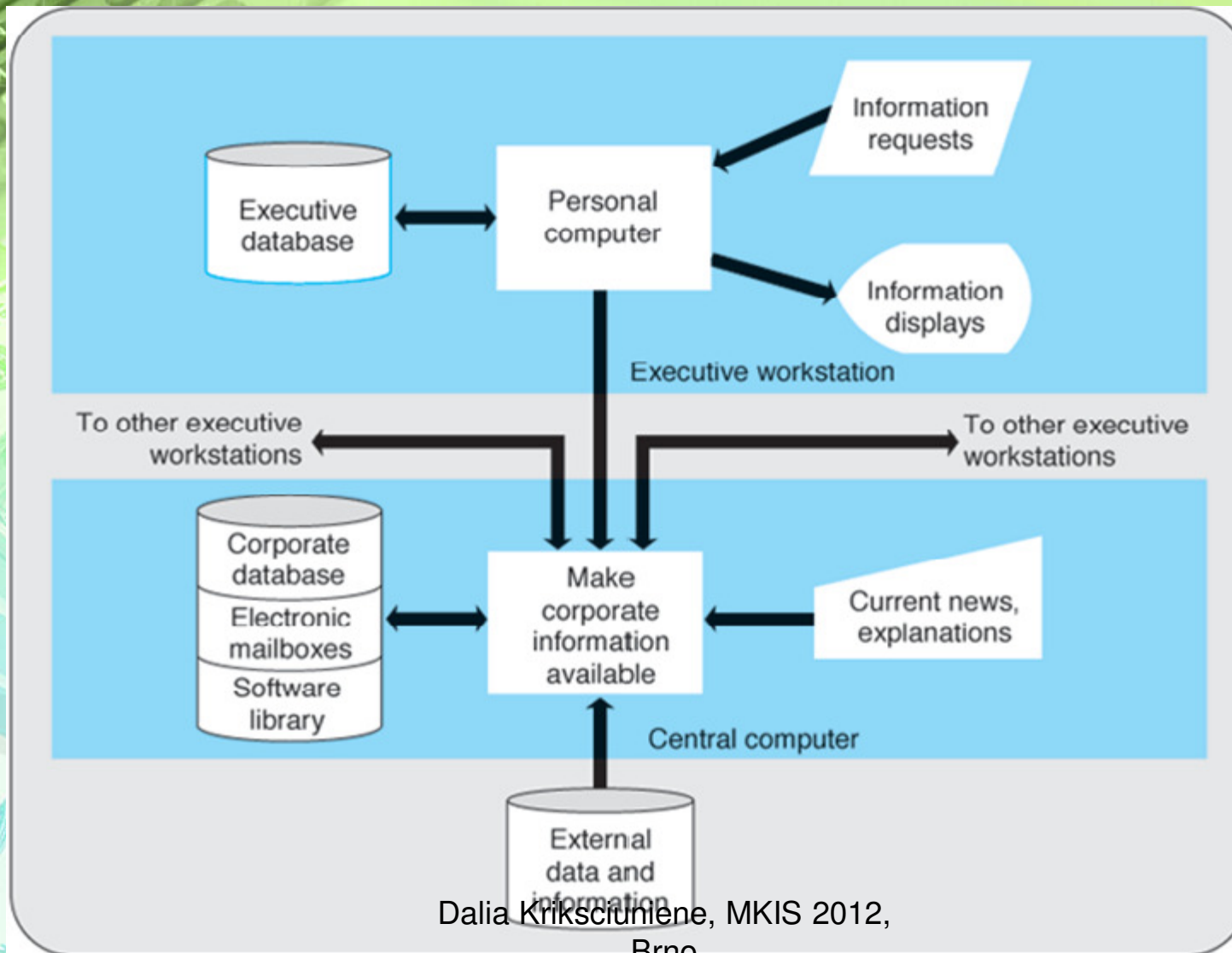
Software companies provide these components to ADS:

- Rule engines
- Mathematical and statistical algorithms
- Industry-specific packages
- Enterprise systems
- Workflow applications

BA, Web Intelligence and Analytics

- The application of business analytics activities to Web-based processes, including e-commerce
- **Clickstream analysis**
The analysis of data that occur in the Web environment.
- **Clickstream data**
Data that provide a trail of the user's activities and show the user's browsing patterns (e.g., which sites are visited, which pages, how long)
- **Social network data**
- Data emanating from natural communication among people, their personal interrelationships, attitudes to businesses and products. It is expected to be enormous wealth for marketing, however requiring new analytical skills

The Executive Information System



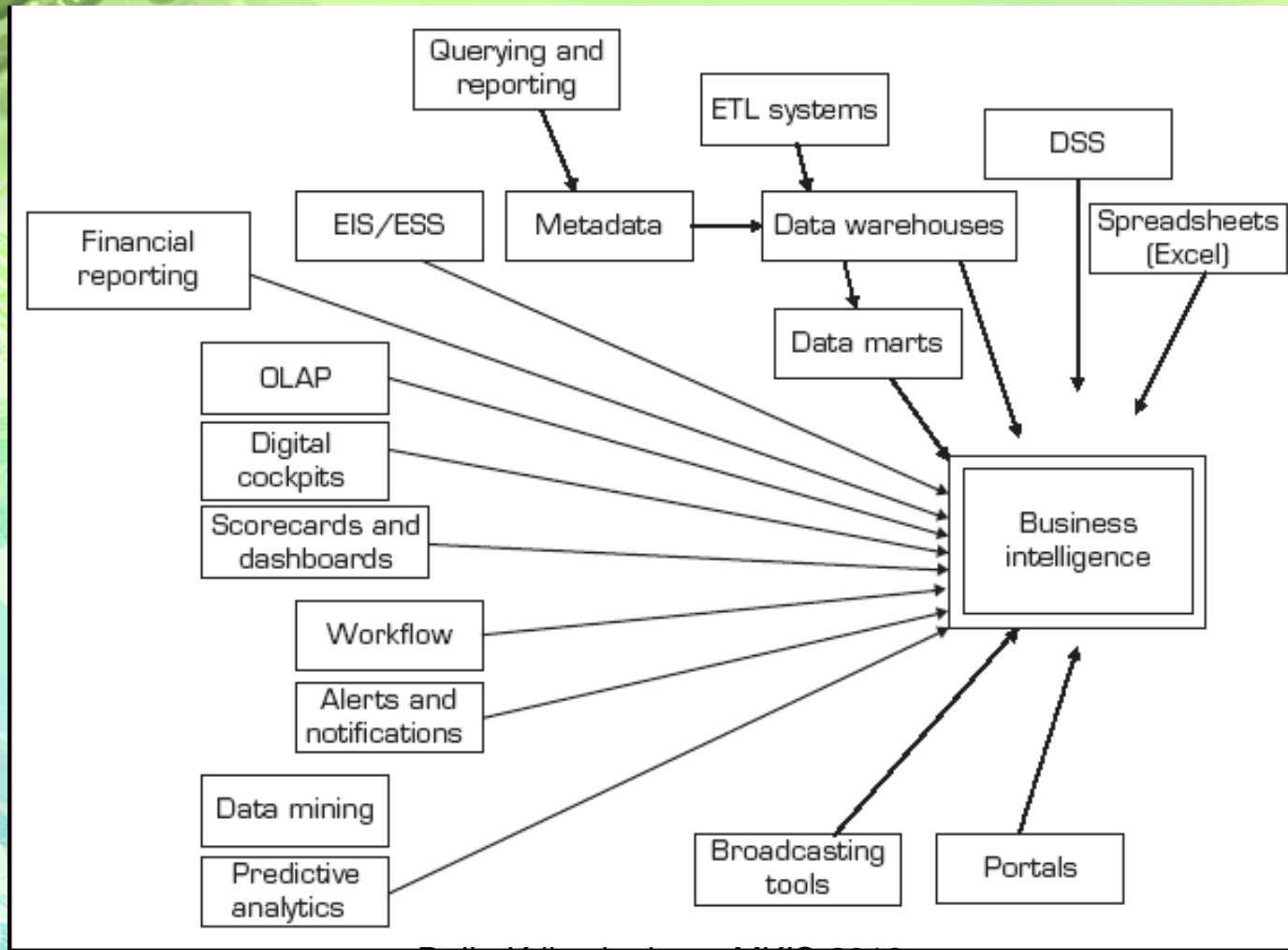
Executive systems

- **Executive information and support systems**

Provides rapid access to timely and relevant information aiding in monitoring an organization's performance

- A firm's EIS usually includes executive workstations networked to a central. Some executives prefer more detail, so EIS designers build in flexibility so their systems fit the preferences of all executives, whatever they are
- One approach is to provide a drill-down capability, giving executives the ability to bring up a summary display and then display successively greater levels of detail

A Framework for Business Intelligence



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FIGURE 1.2 Evolution of BI

A Framework for Business Intelligence (BI)

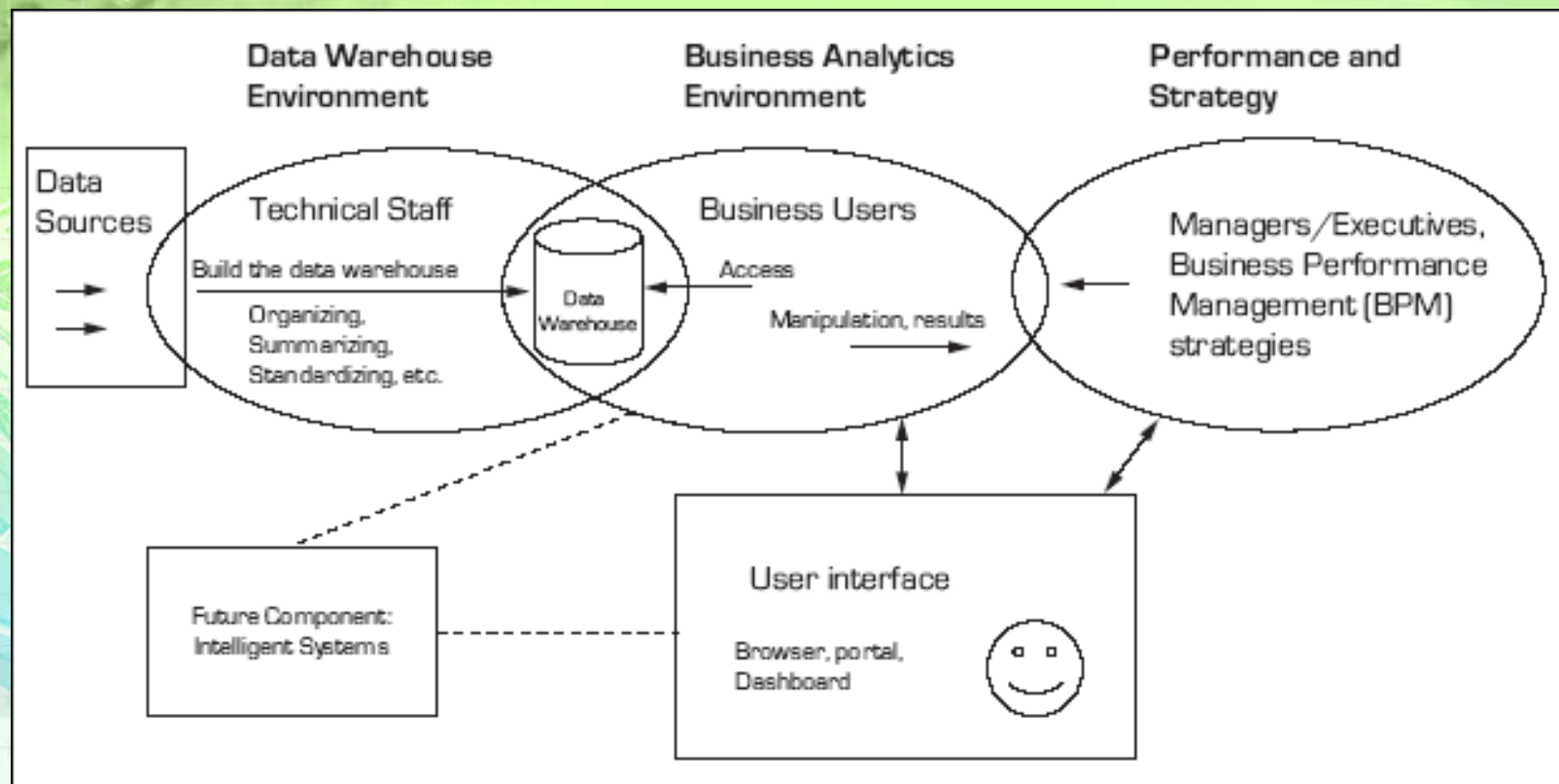


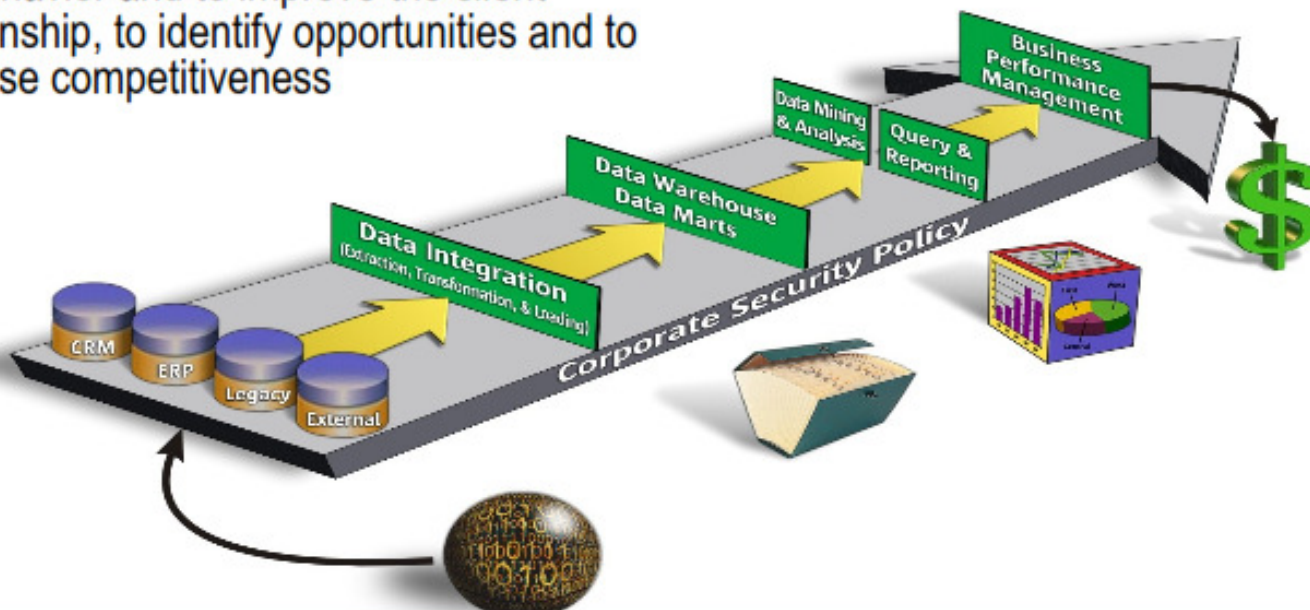
FIGURE 1.3 A High Level Architecture for BI

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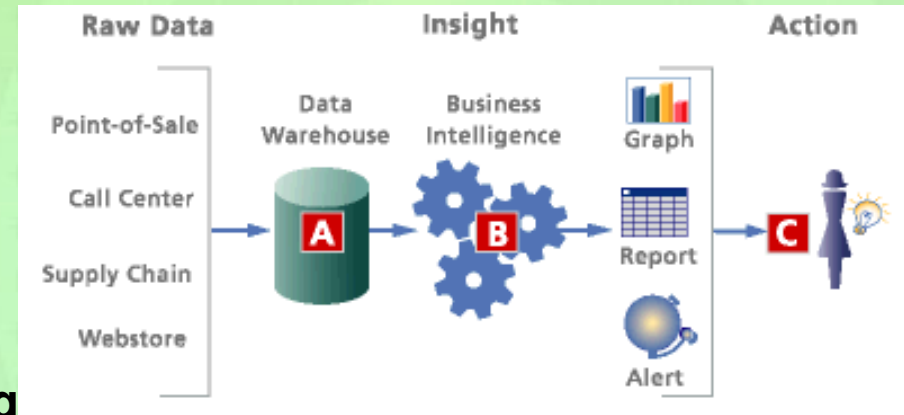
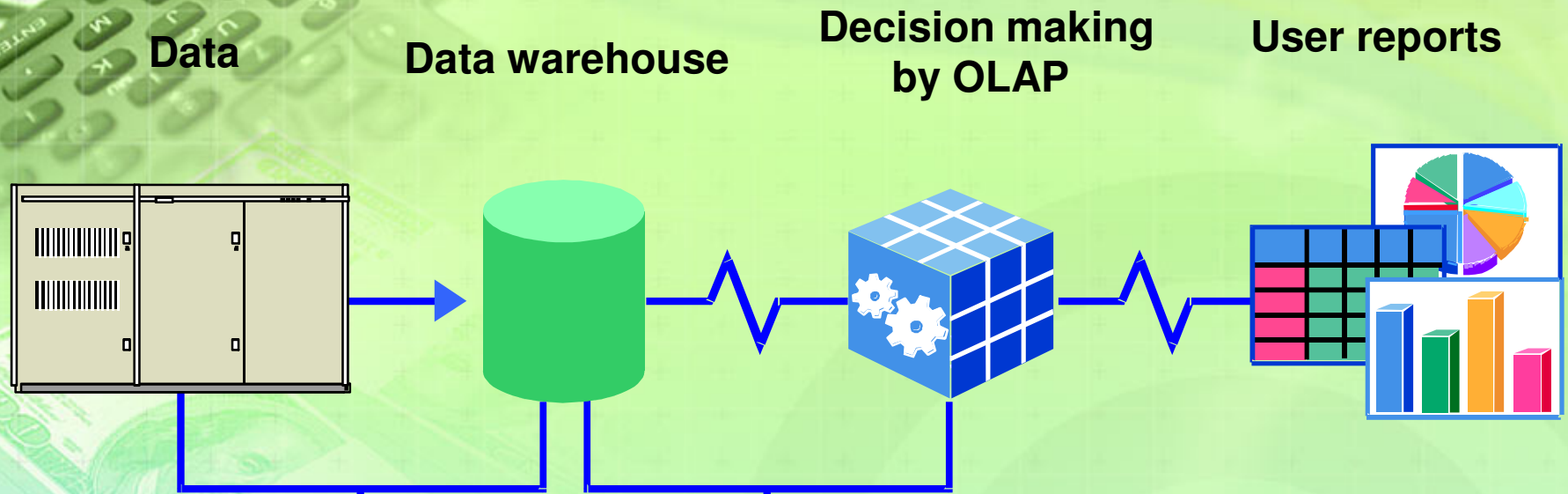
Business intelligence

Business Intelligence From Data To Information

- Analyze the various trades of the company to improve the processes, to increase the effectiveness and to reduce costs
- To detect the market trends, to understand the behavior and to improve the client relationship, to identify opportunities and to increase competitiveness



MkIS for decision making



**Meta data
(data about data)**

**Decision making
metadata**

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Digital Dashboards

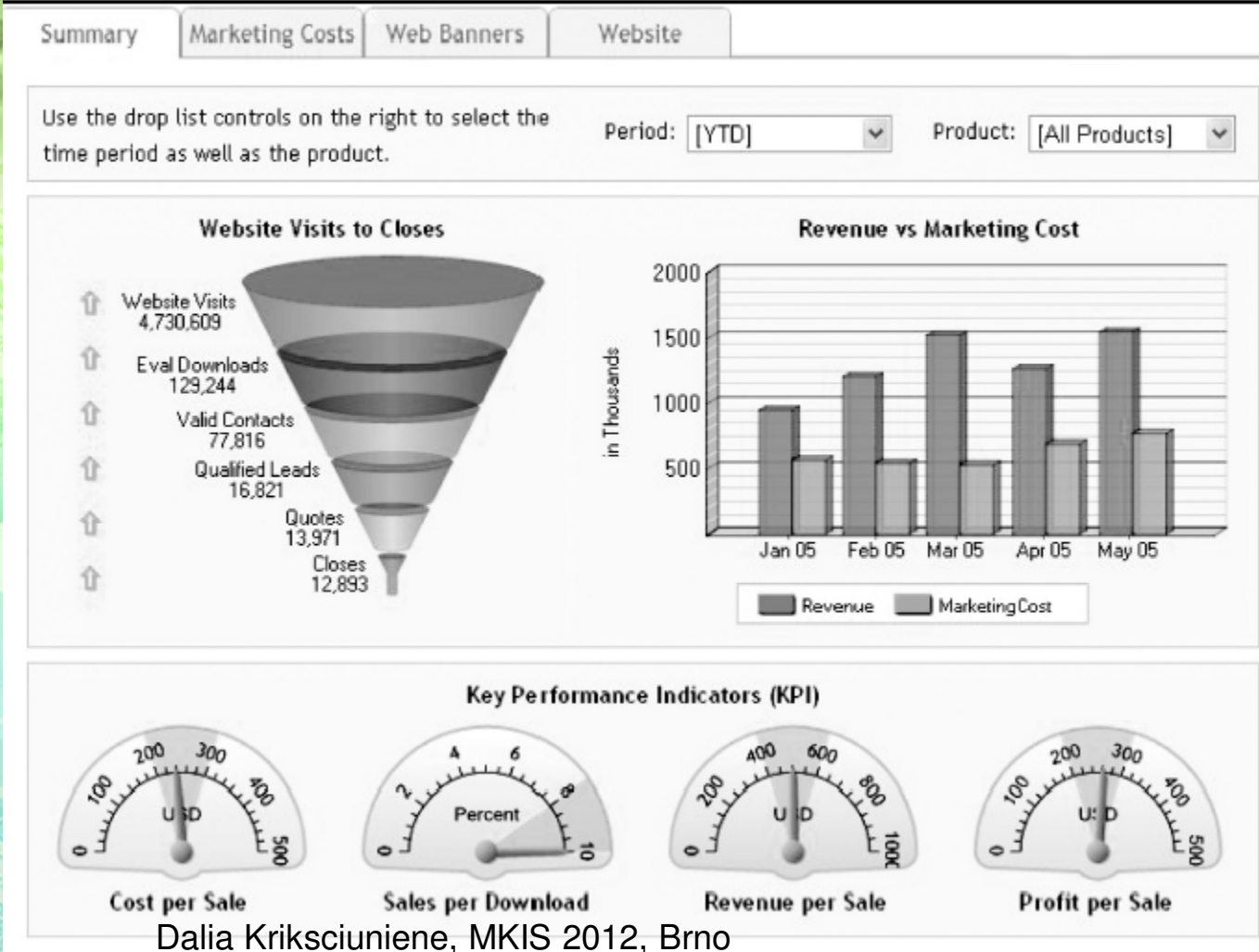


Figure 7.5 An example of a digital dashboard

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Performance dashboard sample

FIGURE 5.8 Sample Performance Dashboard



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Performance Dashboards

- What to look for in a dashboard
 - Use of visual components (e.g., charts, performance bars, sparklines, 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

Performance Dashboards

- Dashboards versus scorecards
 - Three types of performance dashboards:
 1. Operational dashboards
 2. Tactical dashboards
 3. Strategic 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
 - Enable drill-down or drill-through to underlying data sources or reports
 - Present a dynamic, real-world view with timely data refreshes, enabling the end user to stay up-to-date with any recent changes in the business.
 - Require little, if any, customized coding to implement, deploy, and maintain

Example: Microstrategy dashboards

<http://www.microstrategy.com/software/business-intelligence/dashboards-and-scorecards/>

The criteria:

Align the Organization

Polished and personalized

High Scale and Performance

Empower Operational Workers

Replace Dense Reports

Embedded Analytical Workflows

Performance Dashboards

- Dashboards versus scorecards

- **Performance dashboards**

- Visual display used to monitor operational performance

- **Performance scorecards**

- Visual display used to chart progress against strategic and tactical goals and targets

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)

Balanced scorecard model

The model suggested by Kaplan & Norton (1996).

The results of the Fortune 500 company survey revealed the “strategy gap” and importance to measure executing strategy:

Awareness

95% of the typical workforce does not understand the strategy

Resources

60% of organizations do not link budgets to strategy

They Don't Manage Strategy!

Incentives

70% of organizations do not link middle management incentives to strategy

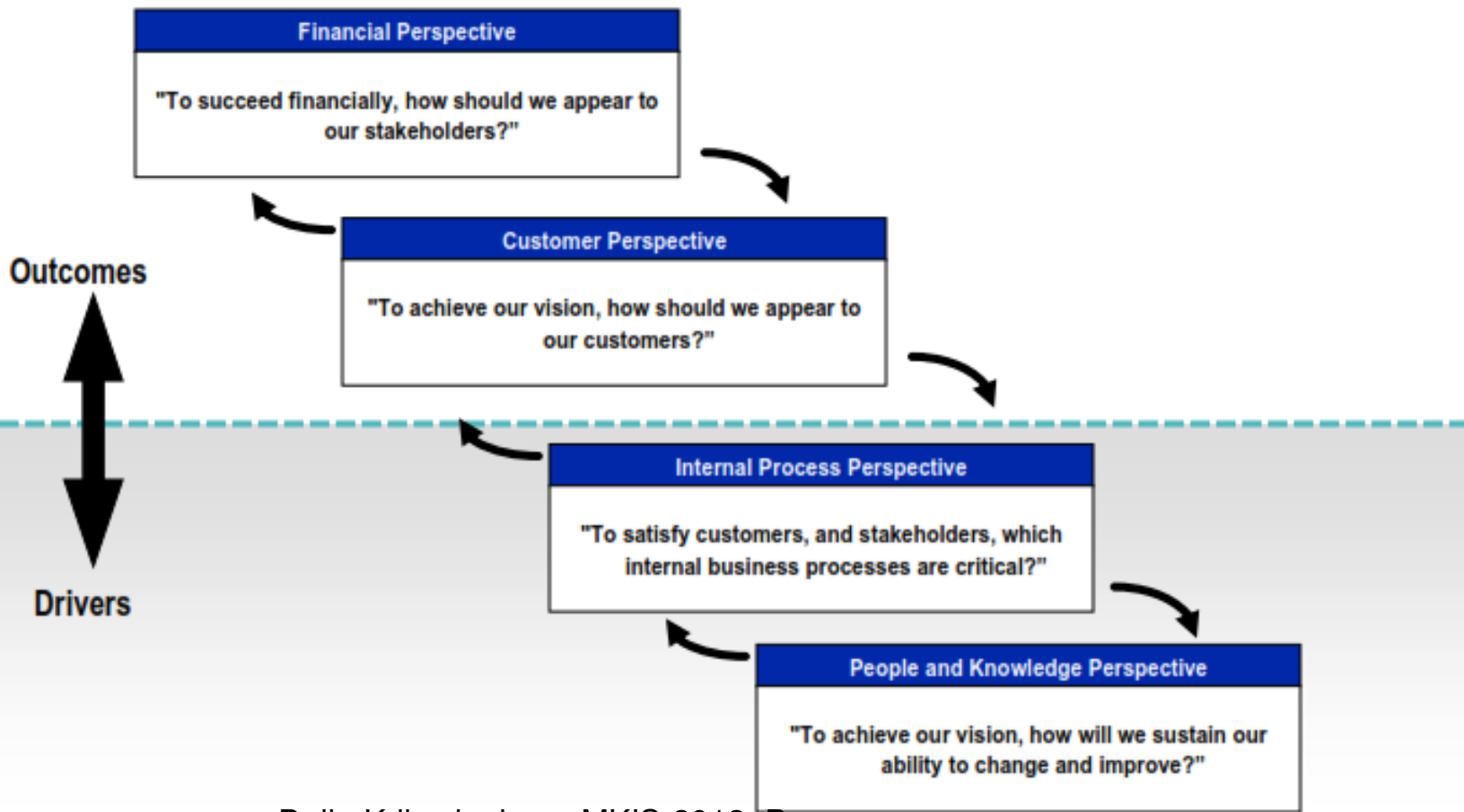
Executive Agenda

85% of executive teams spend less than one hour per month discussing strategy

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The Balanced Scorecard Model: four perspectives, cause – effect principle

The Balanced Scorecard describes strategy by focusing on the its cause and effect relationships.



The Balanced Scorecard Model: four perspectives, cause – effect principle, several views for reporting

- Defining vision, mission, strategy
- Decomposing strategy to strategic themes
- Defining objectives for each theme – building “strategy map”
- Designing measures
- Defining target values - building “balanced scorecard”
- Planning strategic initiatives for improving measures (e.g. by marketing promotion, launching product, implementing IS) or for measuring them (e.g. survey for evaluation of customer satisfaction or customer characteristics (e.g. VALS survey))
- Balancing the scorecard – if it sufficient to achieve strategy
- Cascading balanced scorecard for each department, each

worker

Source: Adapted with permission from Harvard Business School Press. From *The Balanced Scorecard: Translating Strategy into Action*, by Kaplan, R. S. and Norton, D. P., Boston, MA 1996. Copyright ©1996 by the Harvard Business School Publishing Corporation; all rights reserved

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BSC: Application of balanced scorecard for marketing strategic approach

Strategy can be expressed as several parallel and complementary strategic themes.

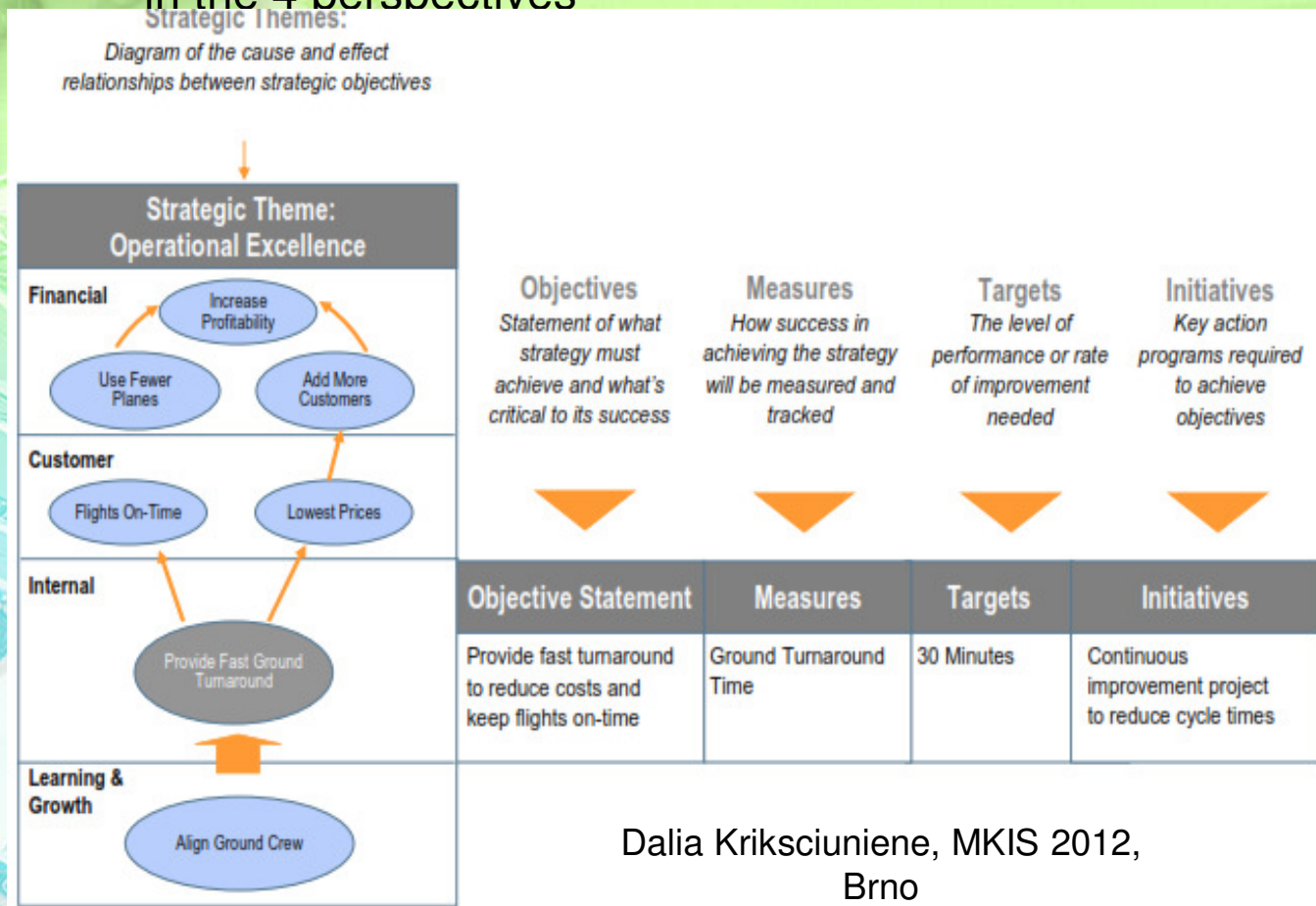


Composing balanced scorecard

The initial view of the balanced scorecard is “**strategy map**”. Its structure- four perspectives, strategic themes with their objectives expressed in “bubbles”, linked by causal relationships.

Each enterprise is advised to have not more than 20 -25 strategic objectives in the 4 perspectives

“**strategy map**” is further transformed into “**balanced scorecard**” by creating **measures** for each **objective**



How to design measures for the objectives

Measure Template

Strategic Objective: Names the objective Measure: Names the measure Measurement Intent: Describes the measure and the reasoning behind its selection as an indicator of progress against this strategic objective.		Frequency of Update: Identifies how often it is calculated Units of Measure: Identifies the units in which the measure will be reported		
Measurement Definition/Formula: Provides a detailed formula for the calculation of a numerical value for the measure				
Notes/Assumptions: <ul style="list-style-type: none"> Clarifies terms in the formula as necessary Highlights key assumptions underlying the formula 		Next Steps:		
Measurement Information Is: ___ Currently Available ___ Available With Minor Changes		Data Elements and Sources: The data elements required to calculate this measure and the source systems, databases, documents, etc. of those data elements		
Source For and Approach to Setting Targets: Identifies the report, document, system or individual from which the information will be obtained				
Target Setting Responsibility: Person	Accountability for Meeting Target: Person	Tracking / Reporting Responsibility: Person	Measure Availability: date Target: date	
Target	1998 Actual	1999 Proj.	2000	2001
Lists numerical targets by year for the various component of the formula where relevant. For 1996 list targets by quarter and year.	1Q 2Q 3Q 4Q Full Year			

Each **objective** can have **several measures**

Each **measure** is derived from variables found in the transaction systems, ERP , composed by formulas or evaluated by surveys.

Distinct feature- each measure has **several targets** for its evaluation:

Current value

Forecasted value

Intolerable value

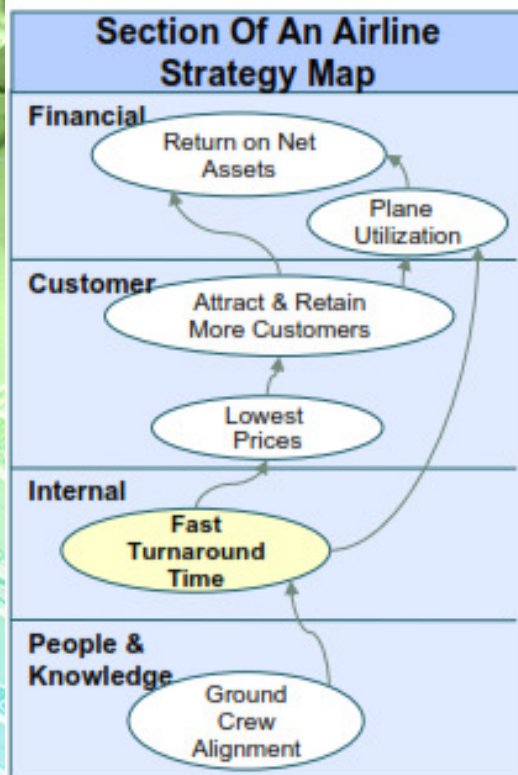
Best value existing in the business branch

Desired ideal value (search for new ideas)

Value presentation methods: numeric, textual, color, graph, etc.

Components: objectives, measures, targets, initiatives

Aligning strategic initiatives ensures that the strategy is translated into action.



Objective: One aspect of what the strategy is trying to achieve

Measure: How performance against the objective is monitored

Target: The level of performance or rate of improvement needed

Initiative: Projects or programs required to reach the target

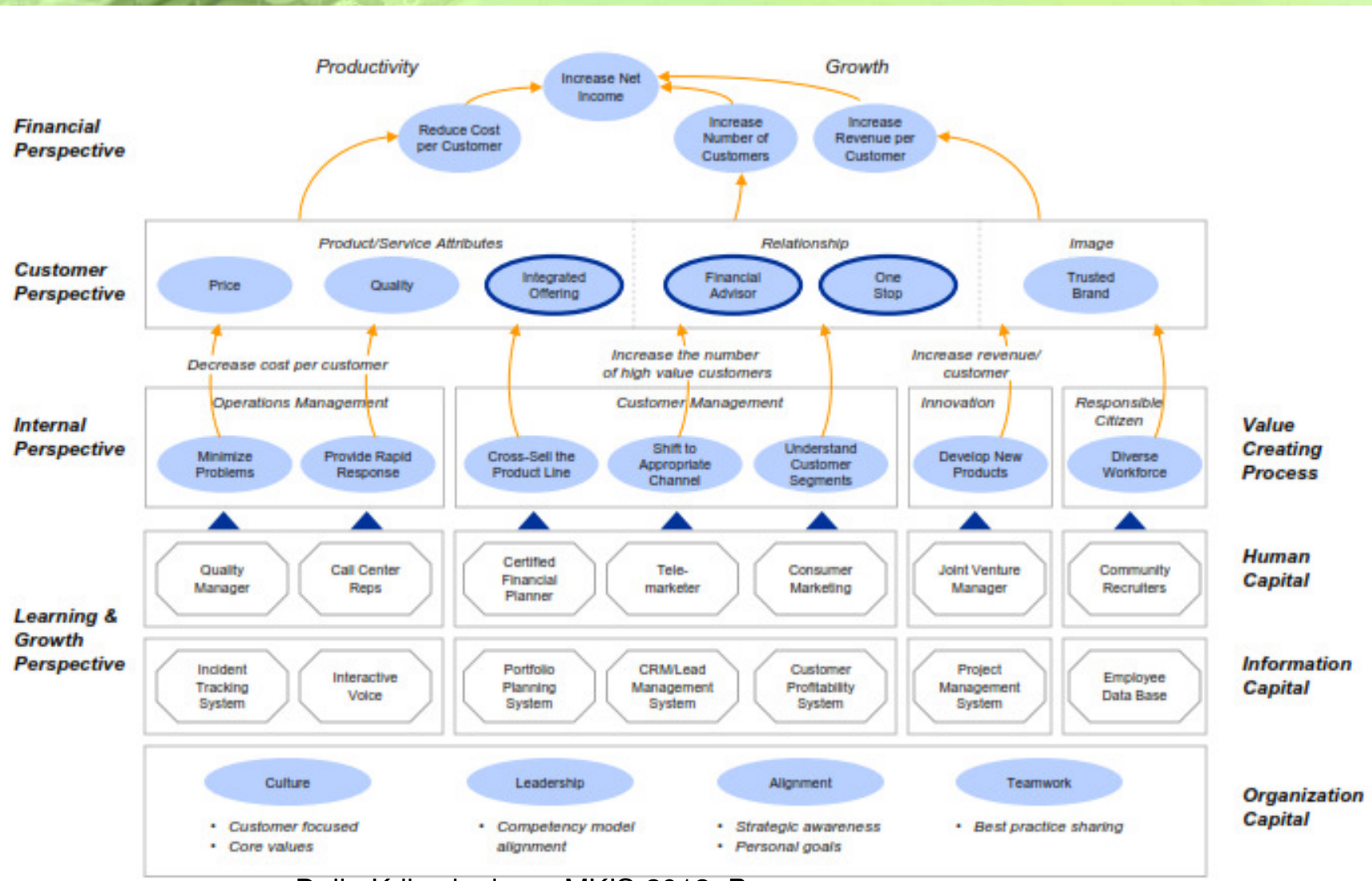
Objectives	Measures	Targets	Initiatives
<ul style="list-style-type: none"> Fast ground turnaround 	<ul style="list-style-type: none"> On Ground Time On-Time Departure 	<ul style="list-style-type: none"> 30 Minutes 90% 	<ul style="list-style-type: none"> Six-Sigma cycle time reduction

Activities	Turnaround time between flights		Lean techniques*
	Current minutes per step	Best practice minutes per step	
Unload passengers	5:14	4:38	A. Stricter controls on carry-on bags, fewer passengers moving back in aisle to find bags B. Cleaning crew in position ahead of time C. Standardized workflow, timing and methods, such as prearranged kits D. Visual signal from cabin crew to agent when plane is ready to board E. Active management of overhead storage bins by flight crew F. Passenger information list delivered by agent following last passenger on board G. Agent ready at aircraft to close door
Wait for cleaning crew to board	0:24	:18	
Clean airplane	10:48	7:40	
Wait for cabin crew to board	4:11	0	
Wait for first passenger to board	4:06	0	
Load passengers	17:32	14:00	
Wait for passenger info list	1:58	:13	
Close aircraft door	:57	:09	
Detach boarding ramp	1:39	:43	
Total on-ground cycle time	48:18	29:11	

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* Source: McKinsey Quarterly

Example of strategy map of consumer bank



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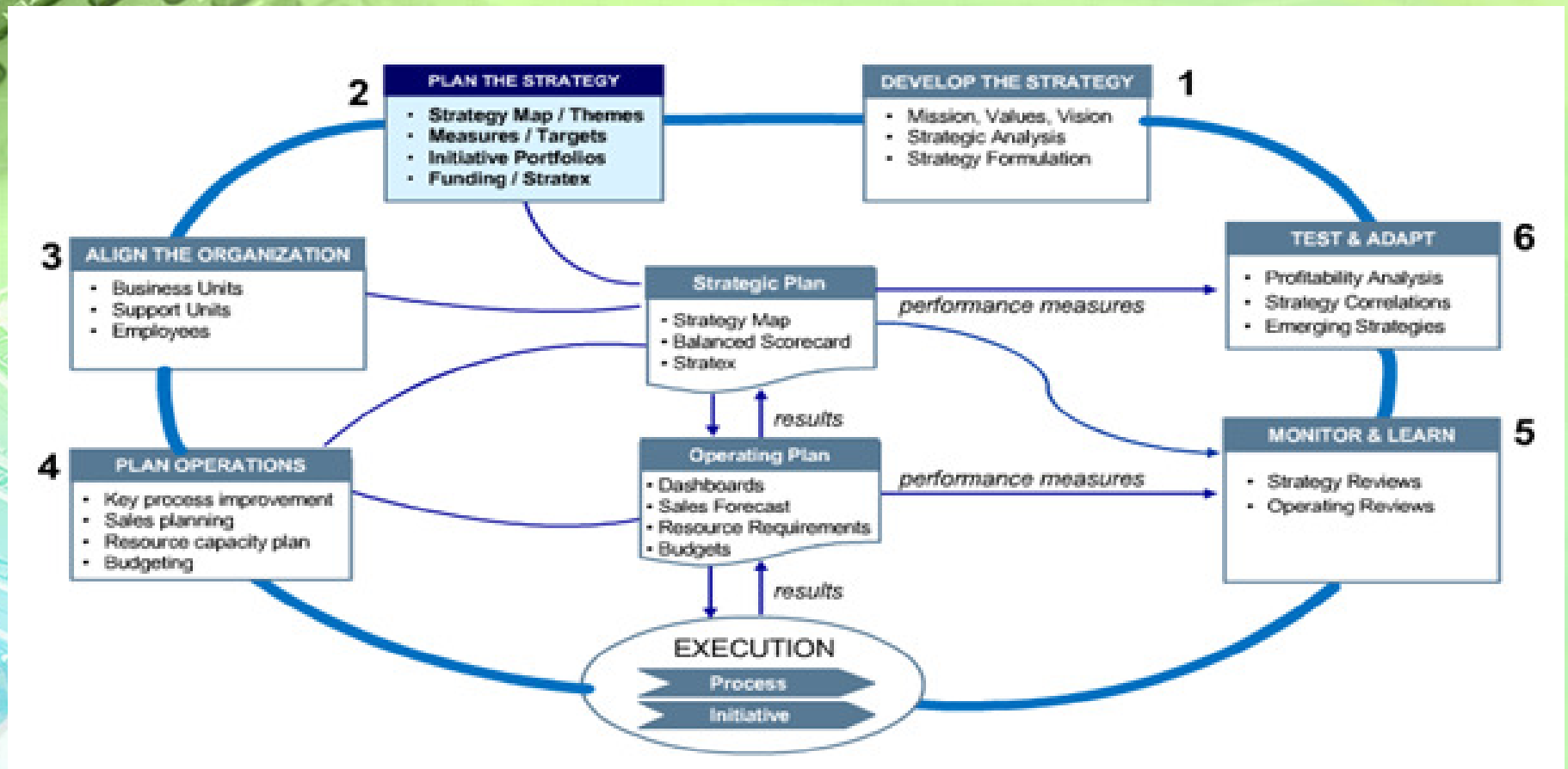
Linking strategy map with balanced scorecard and action plan (initiatives)

Strategy Map	Balanced Scorecard		Action Plan	
<p>Theme: "Shift to Appropriate Channel"</p>	Measure	Target	Initiative	Budget
	<ul style="list-style-type: none"> Net Income Growth (Volume contribution) Revenue Mix (Relationship Customer) 	+\$100M +\$67M 70%	<ul style="list-style-type: none"> Customer Profitability Database 	\$AAA
	<ul style="list-style-type: none"> Customer Satisfaction Share of Wallet 	90% 50%	<ul style="list-style-type: none"> Segmentation Initiative Improved Customer Surveys 	\$BBB \$CCC
	<ul style="list-style-type: none"> Channel Mix Change 	40%	<ul style="list-style-type: none"> Telemarketing Campaign List Purchase Direct Mail Support 	\$DDD \$EEE \$FFF
	<ul style="list-style-type: none"> Strategic Job Readiness 	100%	<ul style="list-style-type: none"> Telemarket Skills Training Program 	\$GGG
	<ul style="list-style-type: none"> Information System Availability 	100%	<ul style="list-style-type: none"> CRM System Rollout 	\$HHH
	<ul style="list-style-type: none"> Customer Focused Culture Leadership Survey Strategic Awareness Best Practice Sharing 	100% 70% 90% 100%	<ul style="list-style-type: none"> Internal Education Leadership Development Program Employee Community Weekly Team Meetings 	\$III \$JJJ \$KKK \$LLL
	Total Budget			\$MMM

Example of balanced scorecard

Perspective		Strategic Objectives	Strategic Measures	Targets
Financial Perspective		F1 Increase earnings per share F2 Add and retain high value customers F3 Increase revenue per customer F4 Reduce cost per customer	<ul style="list-style-type: none"> Net income (vs. plan) Revenue mix (by target segment) Revenue per customer Cost per customer 	+\$100M 30%(A) 70%(B) \$300 \$75
Customer Perspective		C1 Become a trusted financial advisor C2 Provide superior service	<ul style="list-style-type: none"> Customer satisfaction (survey) Share of wallet Target customer retention 	90% 50% 90%
Internal Perspective	Customer Management	I1 Understand customer segments I2 Shift to appropriate channel I3 Cross-sell the product line	<ul style="list-style-type: none"> Share of segment Channel mix change Cross-sell ratio 	30% 40% 2.5
	Product Innovation	I4 Develop new products	<ul style="list-style-type: none"> Revenue from new products (%) 	50%
	Operations Management	I5 Minimize problems I6 Provide rapid response	<ul style="list-style-type: none"> Service error rate Request fulfillment time 	0.% < 24hrs
	Responsible Citizen	I7 Build diversity reflecting community	<ul style="list-style-type: none"> Diversity mix versus community 	1.0
Learning & Growth Perspective	Human Capital	L1 Insure readiness of strategic jobs	<ul style="list-style-type: none"> Strategic job readiness 	100%
	Information Capital	L2 Insure availability of strategic info	<ul style="list-style-type: none"> Information portfolio readiness 	100%
	Organization Capital	L3 Create a customer-focused culture L4 Build cadre of leaders L5 Align the organization L6 Best practice sharing	<ul style="list-style-type: none"> Customer survey 360° Survey (leadership model) Strategic awareness survey Personal goals aligned to BSC (%) KMS utilization/currency 	100% 70% 90% 100% 100%

BSC: Planning strategy



Source: Planning and Budgeting Web Seminar with Dr. Robert Kaplan

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BSC: Balancing the strategic plan

Each strategic theme contributes to meeting the stretch financial target.

Strategic Theme	Add and Retain High Value Customers	Increase Revenue per Customer	Decrease Cost per Customer
Target for Improvement	+ 25%	+33%	-20%
Targeted quantity	125,000 customers	Revenue of \$20/customer per month	Cost of \$4/customer per month

Targeted Profit: $125,000 * (20 - 4) = \$ 2,000,000$ per month

BSC: Strategic initiatives for measurement or improving the indicators

Purpose of Strategic Initiatives

Initiatives Are Short-Term Programs Defined to Help Close the Performance Gap.



BSC: Strategy map

Lanier 15th MTP Strategy Map

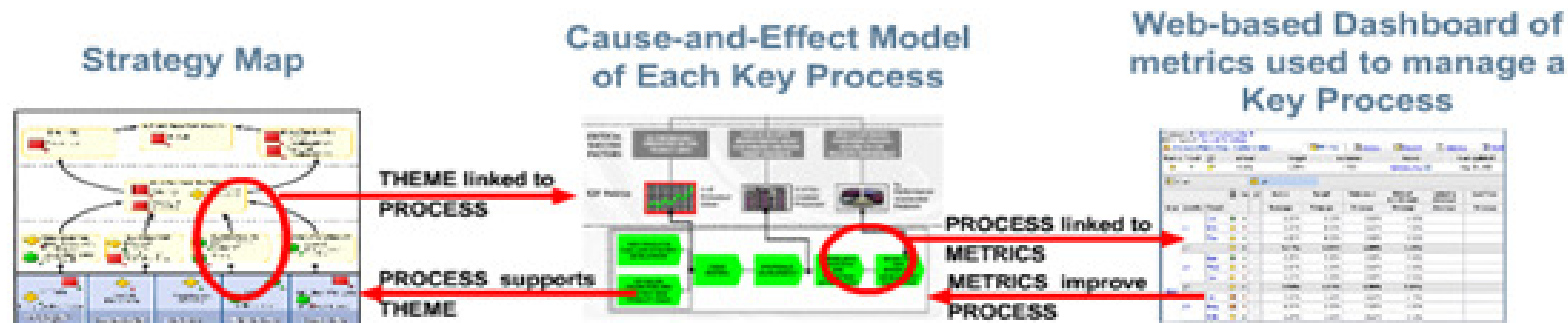


Vision: #1 Document Solutions Company in the US



BSC: measurement process

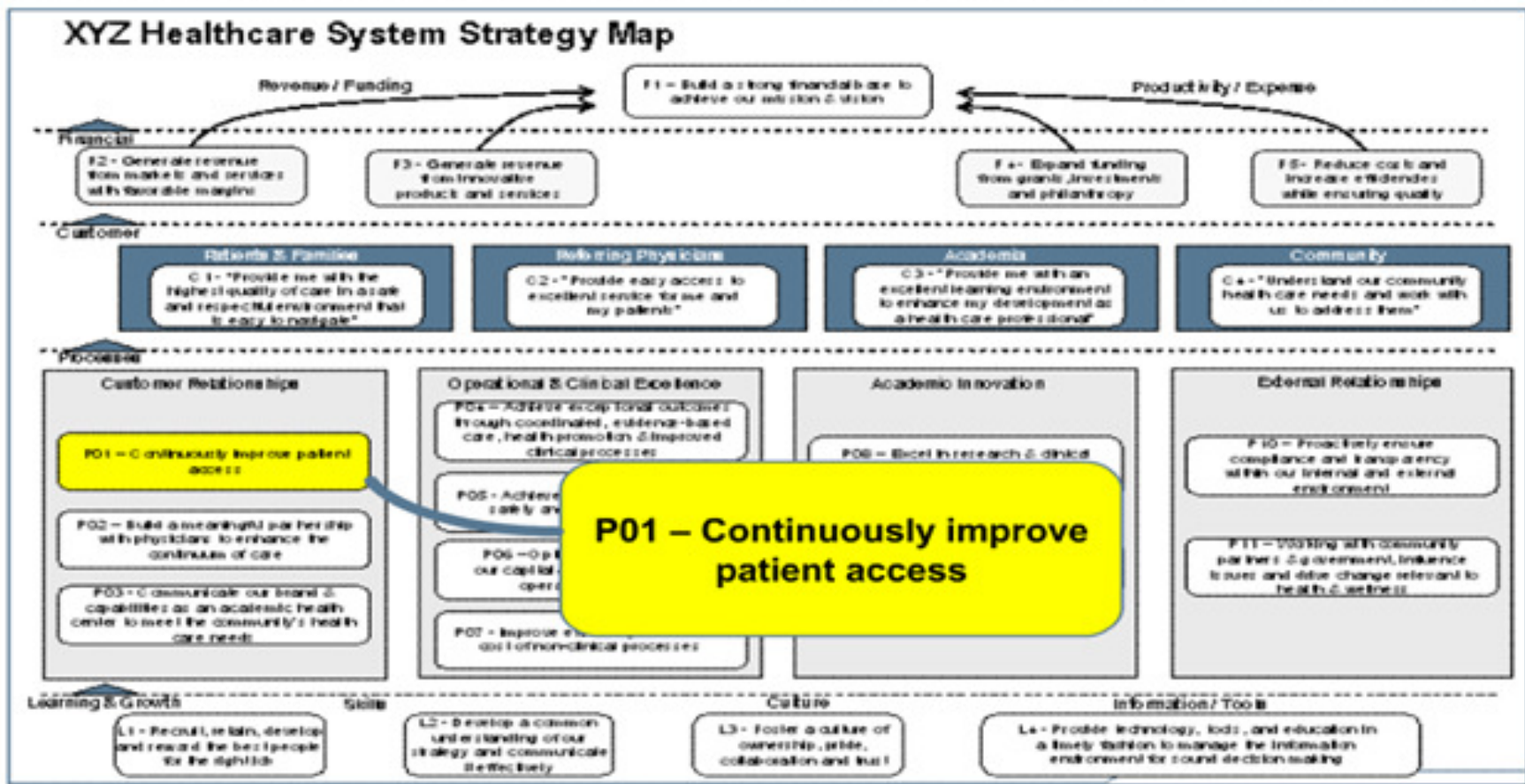
Dashboards articulate the critical link between strategy management and operations management.



- Identify operational processes key to executing strategy and manage those processes using analytical models rather than instincts
- Analytical models identify drivers to the process and display these drivers on a dashboard accessible to managers that can make an impact

BSC: Example of strategy map

A Strategy Map provides the basis for building a Key Risk Indicator dashboard

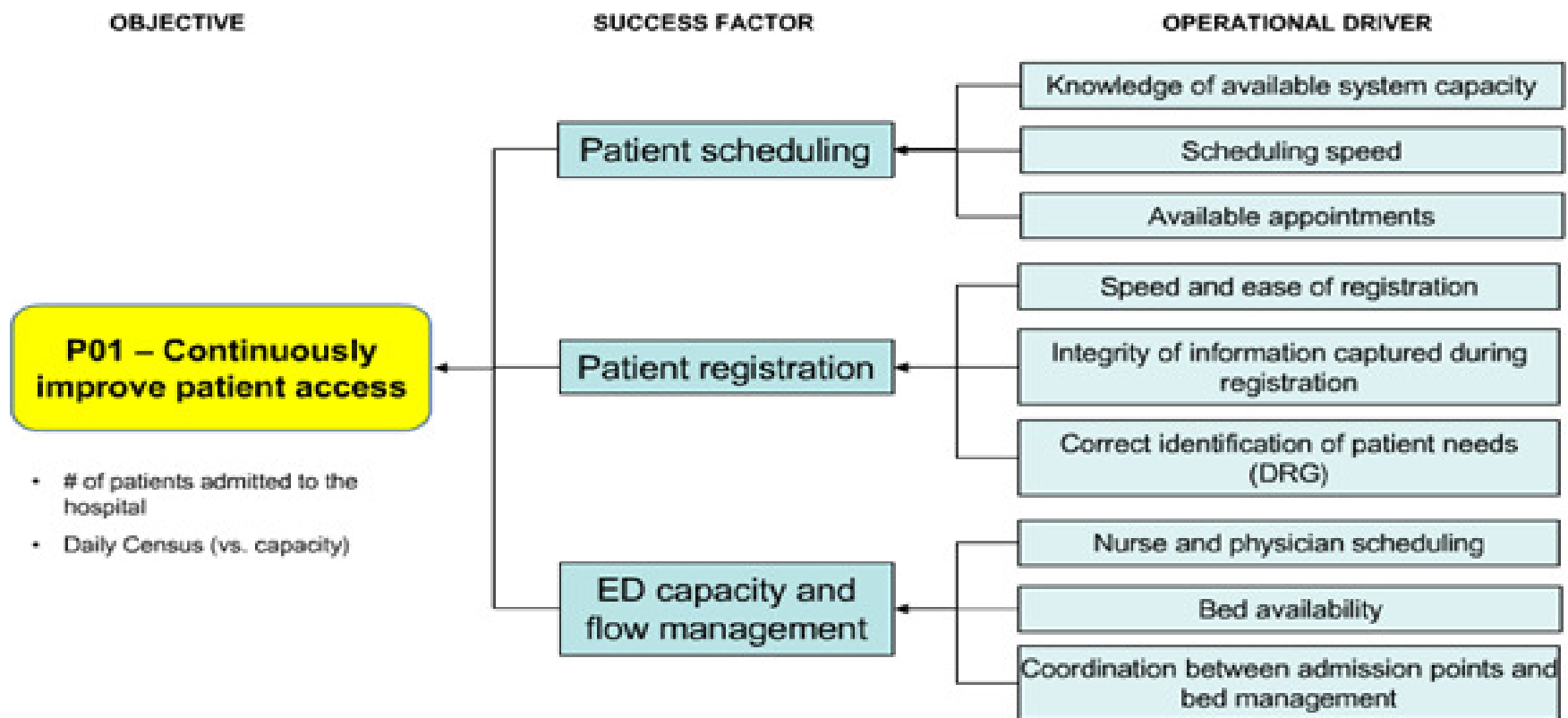


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BSC: Example- linking to measures

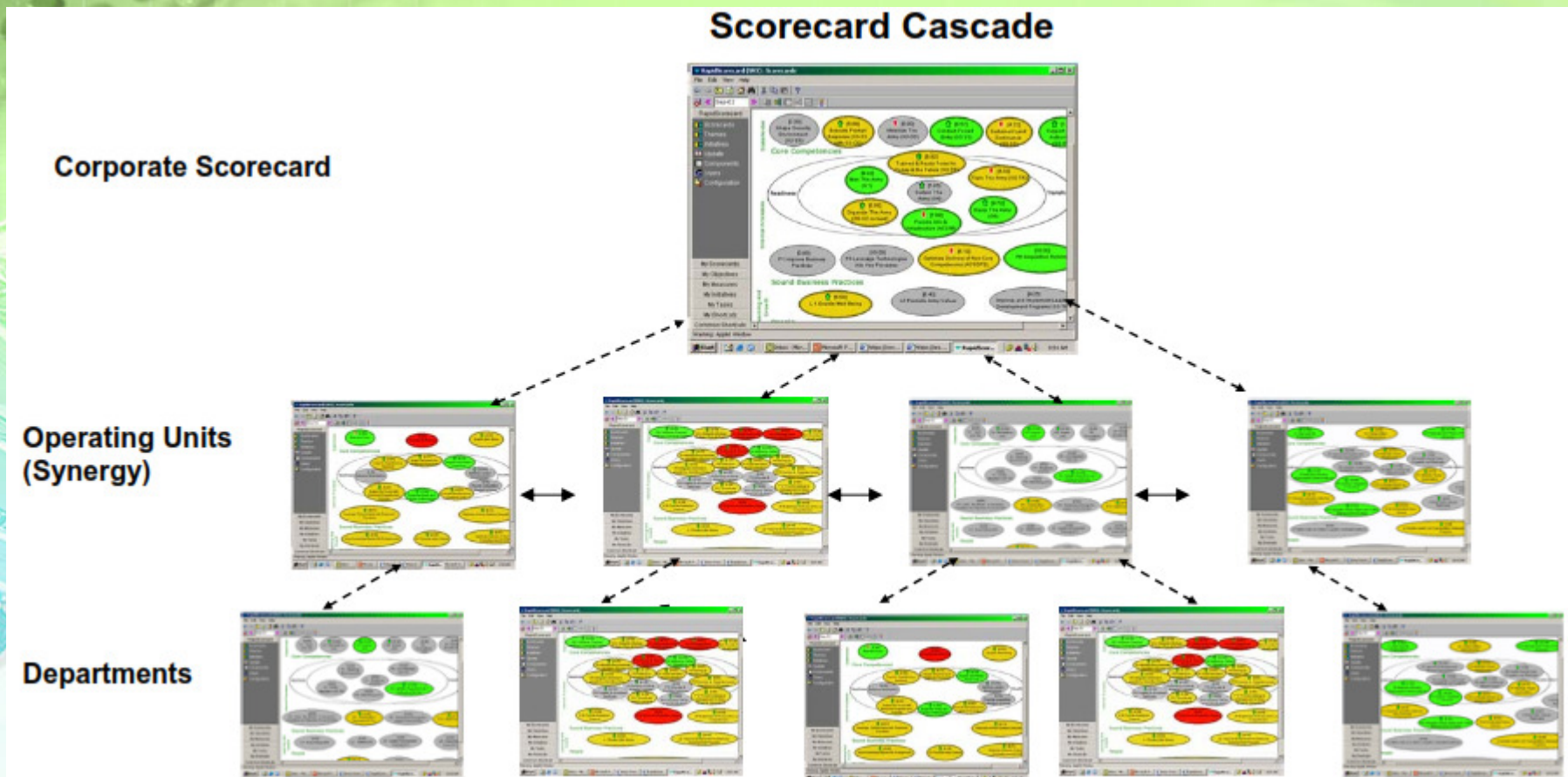
Determine an understanding of the underlying drivers of your strategic objectives.



ED = Emergency Department; DRG = Diagnosis-related group

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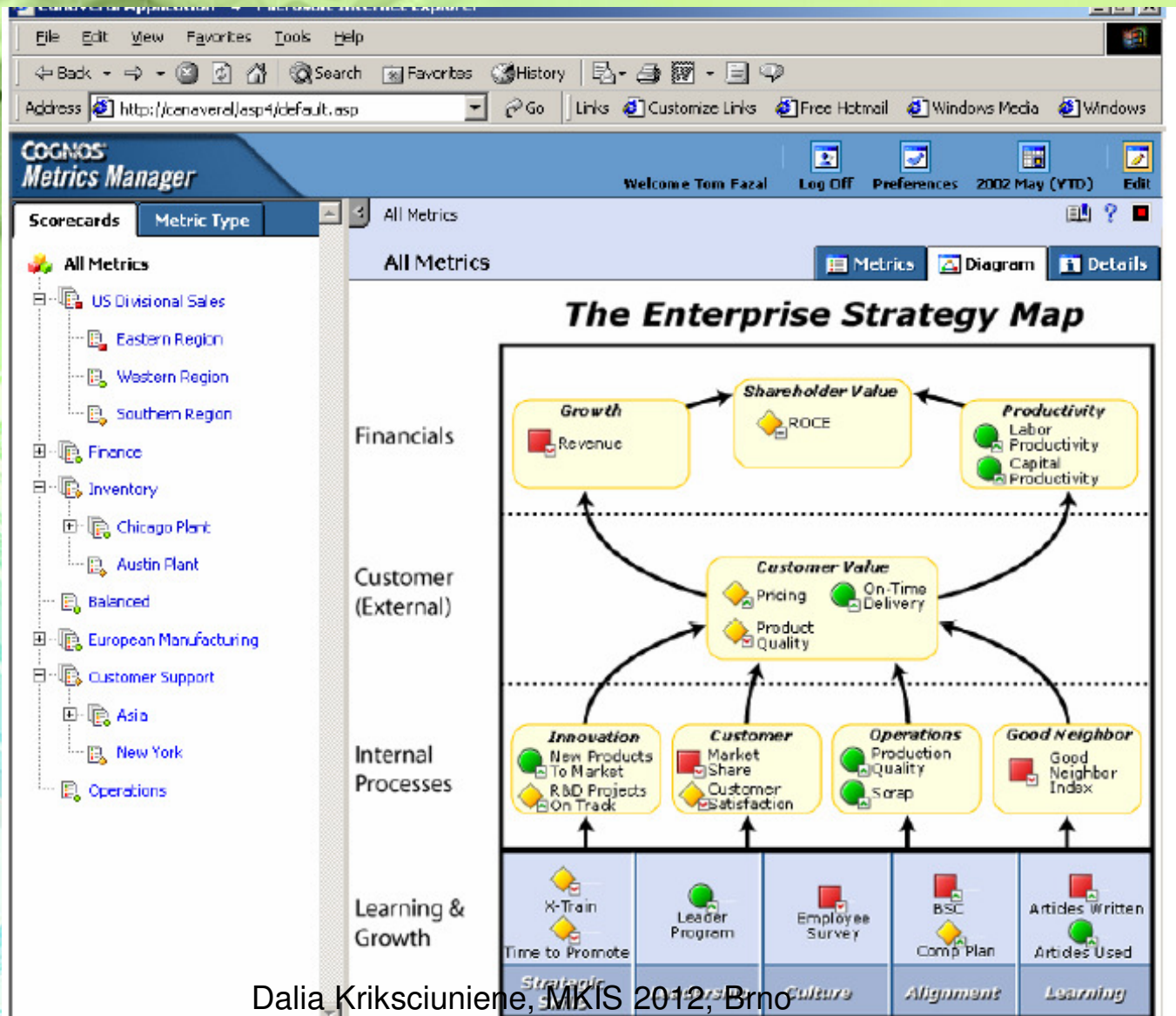
Cascading balanced scorecard: builds common understanding from strategic to operational level persons



Building computerized systems for Balanced Scorecard

- Software solutions are numerous, fully or only partly following the method.
- Part of them are certified by consulting company Palladium group established by creators of method (Kaplan and Norton).
- Requirements and software providers
<http://www.thepalladiumgroup.com/about/softwarecertification/Pages/overview.aspx>
- Among certified are MS Dynamics (Axapta), SAP, Hyperion, Cognos, Peoplesoft

Example: COGNOS software



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Example: QPR software

The screenshot displays the QPR software interface. At the top, there is a navigation bar with the QPR logo and links for Help, QPR UserNet, Settings, and Logout. Below this is a secondary navigation bar with tabs for My Contents, Processes, Scorecards, and Actions, along with a search box. The main content area is titled "Custom View for the City Executive Board" and shows a hierarchy of metrics. The left sidebar contains a "Shared Bookmarks" section with various planning and support materials. The main table lists metrics under four categories: Customers, Personnel, Services, and Finance, each with a value, date, and performance indicator (color and arrow).

QPR Help | QPR UserNet | Settings | Logout

My Contents Processes Scorecards Actions Search

<< Hide Tree << Home What's New My Responsibilities My Alerts My Briefings

[Manage Bookmarks] [<-Back] [Print] [Bookmark] [Add to Basket] [+] [-] [Edit] [Period] [Series] [Views] [Show Designer]

Period: Latest for all Series: Default series

Hierarchy				
Custom View for the City Executive Board				
1. Customers				
Residents' satisfaction	2005	30,83 %	Yellow	Up
2. Personnel				
Man year / All the work in calculatory positions (offices) (Kerava City)	12/04	1 373,50 manyears	White	Down
Total number of personnel (Kerava City)	6/06	15 persons	Red	Up
3. Services				
Completed apartments (Key Ratios for the City)	3/06	116 amt	Green	Up
Increase of population (Key Ratios for the City)	3/06	210 persons	Green	Up
4. Finance				
1 Income from Operations (Kerava City)	4/06	10 754 158 €	Red	Up
2 Costs of operations (Kerava City)	4/06	46 693 906 €	Red	Down
3 Operating margin (Kerava City)	4/06	-35 939 748 €	Red	Down
4 Purchase of movable property (Kerava City)	4/06	225 397 €	Green	Down

QPR - Performance Excellence

Internet

Example: QPR various views of bsc (reporting)

Dentorex Group Scorecard report.07062006.doc - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Heading 3 + Ta Tahoma

QPR Dentorex Group Scorecard

Measure: Market Share (Dentorex Group)
Indicates the market share of Dentorex Group's products the global market place.

Date	Alarm	Target	Forecast
Q3 2003	13.7	18.5	18.3
Q4 2003	13.8	18.7	19.2
Q1 2004	13.8	18.7	20.1
Q2 2004	14.3	19.4	21.2
Q3 2004	14.3	19.4	20.7
Q4 2004	14.5	19.6	20.1
Q1 2005	14.5	19.6	19.8
Q2 2005	15.9	20.5	21.6
Q3 2005	16.2	20.8	19.8
Q4 2005	16.6	21.2	21.3
Q1 2006	16.9	21.5	21.6
Q2 2006	17.4	22	21.6
Q3 2006	17.6	22.2	19.8
Q4 2006	18.4	22.3	21.3
Q1 2007	18.5	22.4	21.6
Q2 2007	19.8	23.3	
Q3 2007	19.9	23.5	
Q4 2007	20.2	23.8	

Sub-Element	Period	Actual
Market Share (Asia Sales Office)	Q2 2006	14.7 %
Market Share (Europe Sales Office)	Q2 2006	21.2 %
Market Share (USA Sales Office)	Q2 2006	22.8 %

Screen Shot - Microsoft Internet Explorer

Address: http://www.visumsolutions.com/qpr.exe?QPRPORTAL&*prb&SES=tE97GK6pggFYK1Y8FMT=c08JA65P1sWh8N1zst)yh70rSprASyPMuY

Scorecard View

Company vision:

- Become a leader within our chosen market segment.
- Provide our partners with superior business opportunities designed to improve customer competitiveness.
- Grow into a worldwide, world-renowned organization.

Perspectives

1. Financial (Actual, Q4 2002)
2. Customer (Actual, Q4 2002)
3. Processes (Actual, Q4 2002)
4. Learning & Improvement (Actual, Q4 2002)

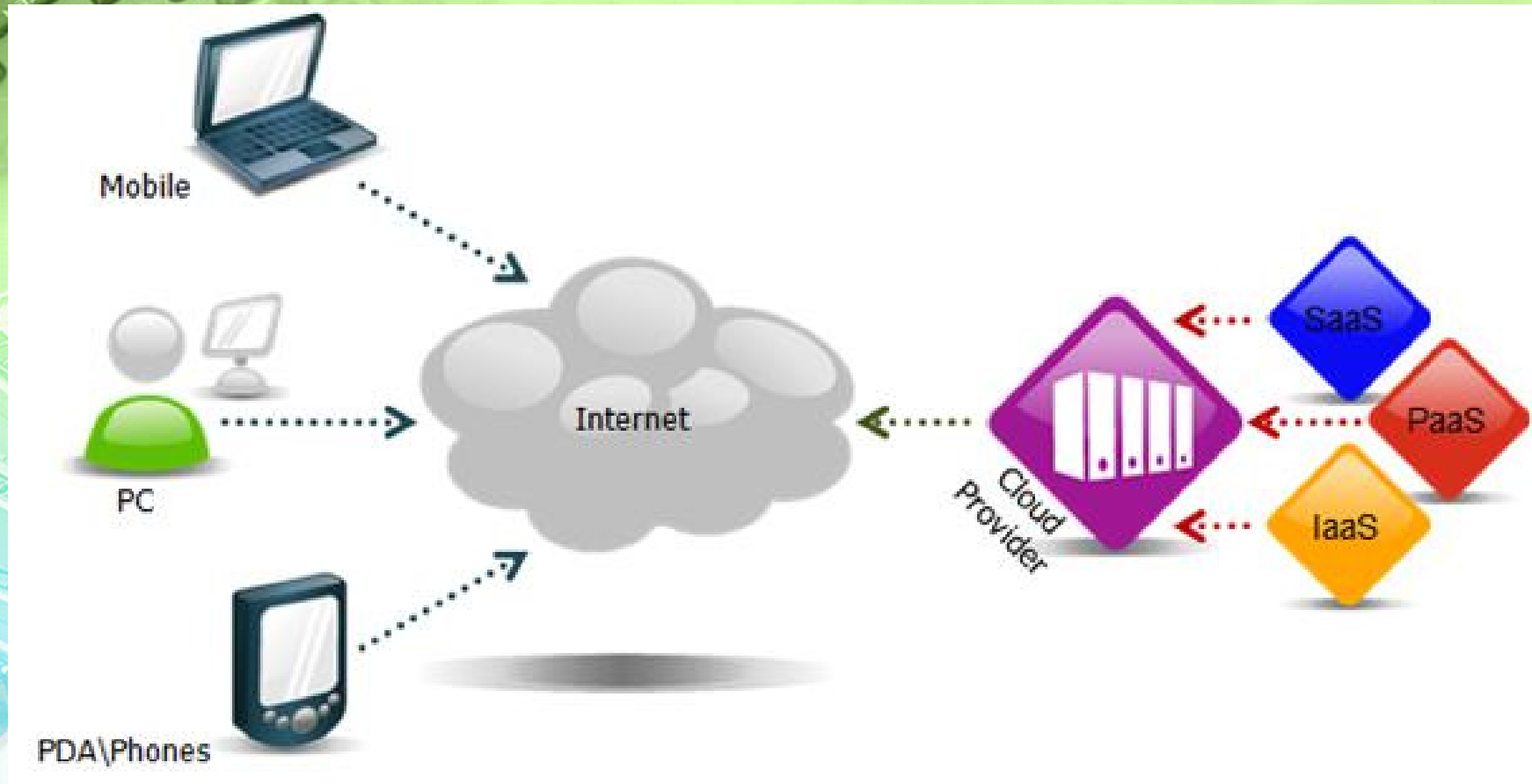
Requirements for computation for implementing BSC

- Defining variables for measurements and key performance indicators, selected by managers
- Collecting data in legacy systems, external systems
- Supplementing necessary data by organizing marketing surveys
- Collecting data from experts, internal communication observations
- Creating new variables derived from the available data
- Processing data for research of root-cause relationships getting analytical insights, forecasting, evaluation, classification, indicating problems and providing alternatives for solutions.

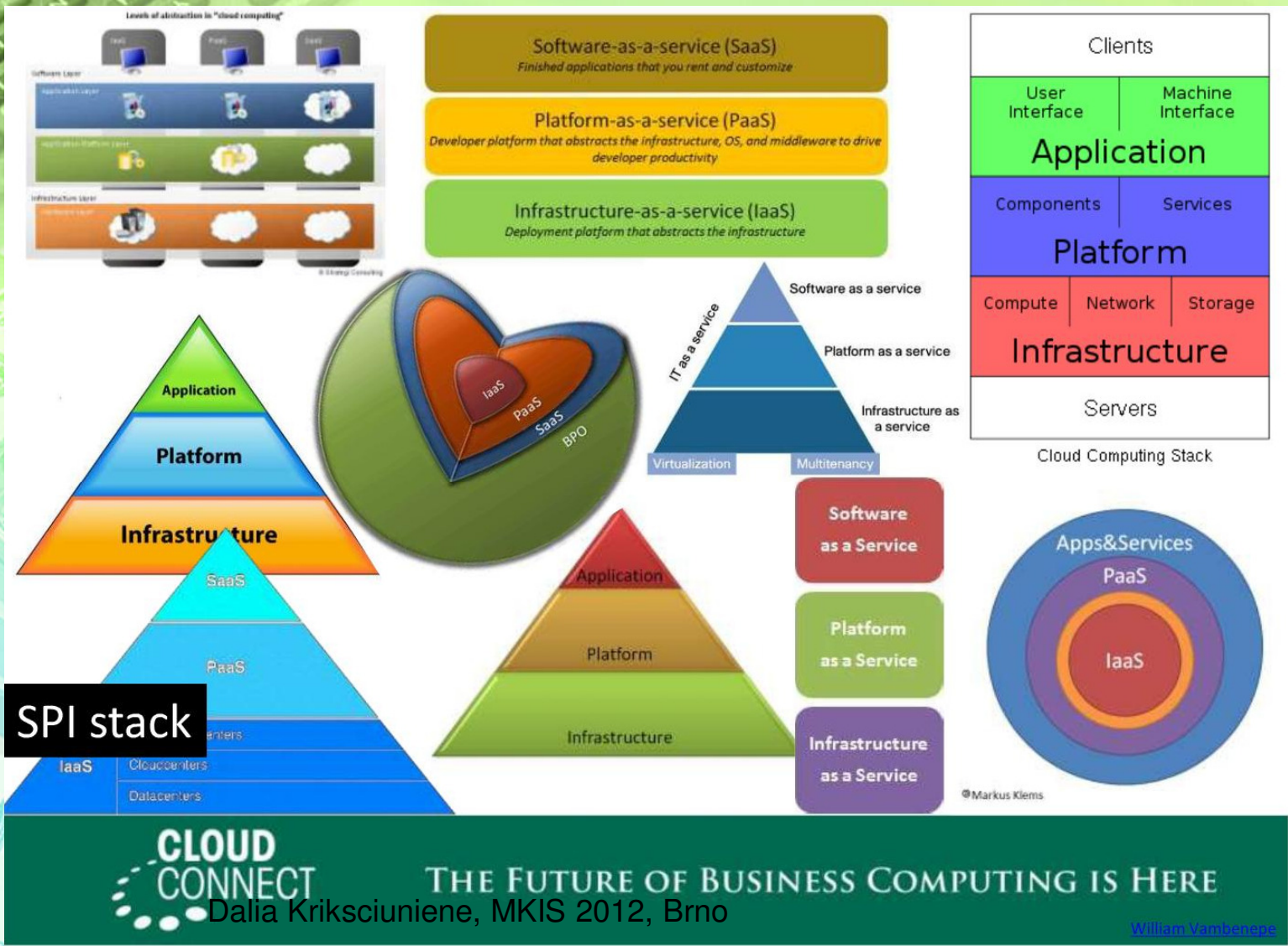
Cloud services

- Software-as-a-Service (SaaS) layer applications are hosted by cloud computing providers and are available to customers over Internet, such as CRM, ERP, project management systems, document management systems, office suite programs etc. These solutions are targeted for business and home users.
- Platform-as-a-Service (PaaS) layer is targeted at software developers' needs, it offers both development environment and tools as a service.
- Infrastructure-as-a-Service (IaaS) layer delivers platform virtualization environment as a service [5]. Target users are system administrators, who analyse the needs for resources and ensure computing power

Cloud allows moving local software to internet: service instead of product



Cloud architecture



Benefits of cloud solutions

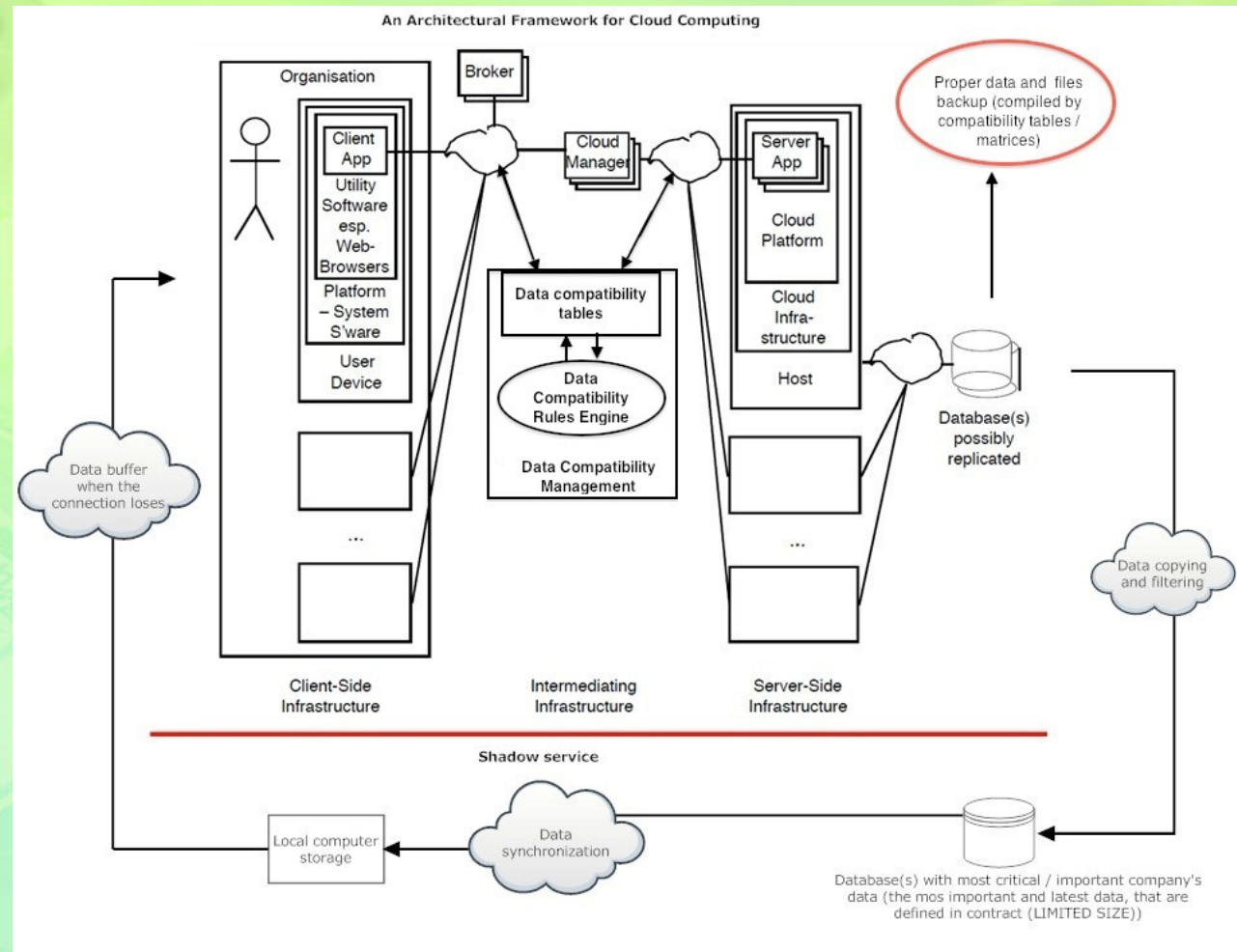
Easy to start, as they do not require specific programming or administration knowledge and could be especially suitable for small and medium enterprises that lack financial and human resources for investing to IT infrastructure: installing and maintaining hardware infrastructure and software applications

By using “pay as you go” subscription model the enterprise can avoid costs of starting capital, and the running costs can be further regulated by subscribing resources and services that company needs at the time.

Other benefits include scalability, reliability, security, ease of deployment, and ease of management for customers

Problem of moving to cloud - Vendor lock-in

- If company subscribes some cloud services, it could be hard or impossible to make backup of all data and ensure that data could be reused or moved to other cloud vendor.



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Threats and risks of cloud

- Major threats of cloud computing can be summarized to the following risk categories :
 - Policy and organizational risks: lock-in, loss of governance, compliance challenges, loss of business reputation, and cloud service termination or failure;
 - Technical risks: unavailability of service, resource exhaustion, intercepting data in transit, data transfer bottlenecks, and distributed denial of service;
 - Legal risks: subpoena and e-discovery, changes of jurisdiction, data privacy, and licensing.

Threats and risks of cloud

- Policy and organizational risks can lead to difficulty of extracting data from the cloud service, and this is important reason why some companies refuse start using it . It is recommended that cloud computing customers should have an alternative location for services, and the cloud provider would give proper data backup to ensure continuity even if the cloud computing provider went broke or acquired and swallowed up by a larger company

Scopes of risk: many users, their specific needs

- Salesforce.com can serve as a case study of managing company data in cloud. In 2010 it had over 87 200 customers (a world leading CRM provider indicated) by Gartner. It provides export possibility of all company data once a week only for subscribers of highest priced versions - Enterprise and Unlimited Editions, paid for other versions. The provided backup is flat file format without any object relations.
- SugarCRM:<http://www.sugarcrm.com/company-overview>
company is headquartered in Cupertino, California with European headquarters in Munich, Germany and Asia Pacific headquarters in Sydney, Australia

* **News from partner In Czech:**

Akce: Integrate a inovace s SugarCRM

Datum: 20.11.2012 / 9:00-14:00

Místo: **HUB Praha (Drtinova 10, Praha 5)**

<http://www.corenet.cz/registrace>

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Customers	Risk of updating system: data loss risk due to administrative changes		Risk of updating system: data recovery and preserving cost (hours)		File storage	Resource usage		Integration with other apps
	Number of fiels in new modules	Number of records in new modules	Average time for updating customized files (hrs)	Average time for updating DB (hrs)		Size of files stored (MB)	Size of DB (MB)	
1 Wholesale	329	37771	40.5	2.5	5000	53	26033	5
2 Fin	178	48107	42.5	3.5	200	112	105275	5
3 Advertise	72	117392	35	1	500	50	61283	3
4 Retail	96	279692	56	1	250	684	918216	6
5 Retail	144	363599	44.5	0.5	900	167	204016	7
6 Wholesale	39	4380	12.5	0.5	500	15	1802	0
7 Advertise	52	32760	57.5	0.5	100	27	7746	0
8 Advertise	120	782	13.5	0.5	50	28	12252	5
9 Service	56	4320	21	0	20	15	8634	0
10 Retail	26	420	2.5	0	220	9	1890	3
11 Wholesale	0	0	1	0	5	5	567	0
12 Service	20	28	0	0	70	7	989	0
13 Service	8	150	5	0	200	8	290	0
14 Service	68	8480	32.5	3	3000	32	16046	0
15 Wholesale	26	690	0	0	200	5	419	0

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Example of Sugar CRM usage

Workload estimation for updating customized customer files due to development of vendor's cloud environment (Empirical data from 15 SME companies in LT)

Customer data collections become “big data”

- Facebook revealed some stats on its **big data**: <http://techcrunch.com/2012/08/22/how-big-is-facebooks-data-2-5-billion-pieces-of-content-and-500-terabytes-ingested-every-day/>

Big Data

- 2.5B - content items shared
- 2.7B - ‘Likes’
- 300M - photos uploaded
- 100+PB - disk space in a single HDFS cluster
- 105TB - data scanned via Hive (30min)
- 70,000 - queries executed
- 500+TB - new data ingested

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If you want to insert one more field into Facebook customer record it would take 3 months (told at hosting service providers’ seminar 2012)



Assignment 2

Tools & software: Sugar CRM, MS Excel pivot module, Statistica advanced models, Viscosity SoMine

2nd team assignment and lab work training:

- *Operational CRM (Sugar CRM)*
- *Analytical CRM (CRM performance analysis by applying computational intelligence methods: neural networks, fuzzy rules, Kohonen self organizing networks)*

Assignment 2

*Tools & software: Sugar CRM,
lab work training:*

Operational CRM (Sugar CRM)

[https://demo.sugaropencloud.eu/optimus/
Masaryk](https://demo.sugaropencloud.eu/optimus/Masaryk)

Username : sugarcrm0

Password: mkis0

**(0-your number of enrolment in PV250
MKIS)**

Lab work

1. Access the system
2. Register new customer and his data
3. Register new task, related to the customer. Services (reminder, topic categories)
4. Plan the meeting, fulfill it
5. Assign the task to your colleague
6. Create sales operation for the customer.
7. Find the sales transaction in the analytical area.
8. Define the time period of analysis
9. Create project. Define tasks for the project
10. Get acquainted to the environment, find 5 other functions and make them.

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