

IS Development: Business Value of Information Systems and Management knowledge

Eri Prasetyo W

<http://staffsite.gunadarma.ac.id>

Sources :

Information Systems For Managres, Tralvex (Rex) Yeap, 19 mei 2003

Achieving Competitive Advantage with Information Systems, Printece Hall, 2007

IS Development: Business Value of IS

- The **worth of systems** from a financial perspective essentially revolves around the question of **return on invested capital**.
- **Cost** of IS includes (1) **Hardware** (2) **Telecommunications** (3) **Software** (4) **Services** (5) **Manpower**.
- **Tangible Benefits** of IS in terms of cost saving includes (1) **Increased productivity** (2) **Lower operational costs** (3) **Reduced work force** (4) **Reduced rate of growth in expenses**, etc.
- **Intangible Benefits** of IS includes (1) **Improved asset utilization** (2) **Improved resource control** (3) **Improved organizational planning** (4) **Improved decision making** (4) **Improved operations**, etc.

Capital Budgeting

- **Capital budgeting** is the process of **analyzing** and **selecting** various **proposals** for capital expenditures.
- **Six** commonly used capital budgeting models
 - (1) The **payback method** (PB)
How long will it take to **pay back** the investment? $PB = \text{Years } (R \Rightarrow I)$
 - (2) The accounting rate of **return on investment** (ROI)
Does return **during useful life** of an item **exceed** the
cost to borrow money. $ROI = R > C?$
 - (3) The **cost-benefit ratio** (CBR)
Does the **ratio of benefit versus cost** exceed 1? $CBP = B/C?$

Capital Budgeting

(4) The **net present value** (NPV)

Accounting for cost, earnings & time value of money what is the investment worth?

$$PV = FV / (1+r)^n$$

(5) The **profitability index** (PI)

What is the ratio of present value of cash inflow to initial investment?

$$PI = C_{pv} / I$$

(6) The **internal rate of return** (IRR)

Accounting for the time value of money, what is the return rate of an investment?

Cost & Benefits of a Legal Information System

Estimated Costs and Benefits 2001-2006											
Year :				0	1	2	3	4	5		
				2001	2002	2003	2004	2005	2006		
Costs Hardware											
	Servers		3@ 20000	60,000	10,000	10,000	10,000	10,000	10,000		
	PCs		300@3000	900,000	10,000	10,000	10,000	10,000	10,000		
	Network cards		300@100	30,000	0	0	0	0	0		
	Scanners		6@100	600	500	500	500	500	500		
Telecommunications											
	Routers		10@500	5,000	1,000	1,000	1,000	1,000	1,000		
	Cabling		150,000	150,000	0	0	0	0	0		
	Telephone connect costs		50,000	50,000	50,000	50,000	50,000	50,000	50,000		
Software											
	Database		15,000	15,000	15,000	15,000	15,000	15,000	15,000		
	Network		10,000	10,000	2,000	2,000	2,000	2,000	2,000		
	Groupware		300@500	150,000	3,000	3,000	3,000	3,000	3,000		
Services											
	Lexis		50,000	50,000	50,000	50,000	50,000	50,000	50,000		
	Training		300hrs@75/hr	22,500	10,000	10,000	10,000	10,000	10,000		
	Director of Systems		100,000	100,000	100,000	100,000	100,000	100,000	100,000		
	Systems Personnel		2@70000	140,000	140,000	140,000	140,000	140,000	140,000		
	Trainer		1@50000	50,000	0	0	0	0	0		
26	Total Costs			1,733,100	391,500	391,500	391,500	391,500	391,500	3,690,600	
Benefits											
	1. Billing enhancements			300,000	500,000	600,000	600,000	600,000	500,000		
	2. Reduced paralegals			50,000	100,000	150,000	150,000	150,000	150,000		
	3. Reduced clerical			50,000	100,000	100,000	100,000	100,000	100,000		
	4. Reduced messenger			15,000	30,000	30,000	30,000	30,000	30,000		
	5. Reduced telecommunications			5,000	10,000	10,000	10,000	10,000	10,000		
	6. Lawyer efficiencies			120,000	240,000	360,000	360,000	360,000	360,000		
35	Total Benefits			540,000	980,000	1,250,000	1,250,000	1,250,000	1,150,000	6,420,000	

Financial Models

Estimated Costs and Benefits 2001-2006												
	A	B	C	D	E	F	G	H	I	J	K	L
1	Year :			0	1	2	3	4	5			
2	Net Cash Flow (not including orig. investment)			540,000	588,500	858,500	858,500	858,500	758,500			
3	Net Cash Flow (including orig. investment)			-1,193,100	588,500	858,500	858,500	858,500	758,500			
4												
5	(1) Payback Period =	2.5 years										
6	Initial investment =	1,733,100										
7				Year 0	540,000	540,000						
8				Year 1	588,500	1,128,500						
9				Year 2	858,500	1,987,000						
10				Year 3	858,500	2,845,500						
11				Year 4	858,500	3,704,000						
12				Year 5	758,500	4,462,500						
13	(2) Accounting rate of return											
14												
15	(Total benefits-Total Costs-Depreciation)/Useful life				Total Benefits	6,420,000						
16	-----				Total Costs	3,690,600						
17	Total initial investment				Depreciation	1,733,100						
18					Tot. benefits-tot. costs-depreciation	996,300						
19					Life	6 years						
20												
21					Initial investment	1,733,100						
22	ROI =	(996,300/6)	9.58%									
23		1,733,100										
24												
25	(3) Cost-Benefit Ratio		Total Benefits	6,420,000	1.74							
26			Total Costs	3,690,600								
27												
28	(4) Net Present Value											
29	= NPV (0.05,D2:I2)-1,733,100				2,001,529							
30												
31	(5) Profitability Index											
32	PV/Investment		3,734,629/1,733,100		2.15							
33												
34	(6) Internal Rate of Return											
35												
36	= IRR(D3:I3)				55%							

Other non-financial methods

- **Portfolio Analysis**

- Analysis of portfolio of **potential applications** within a firm
- Determines **risks** and **benefits**
- Selects among **alternatives** for information systems

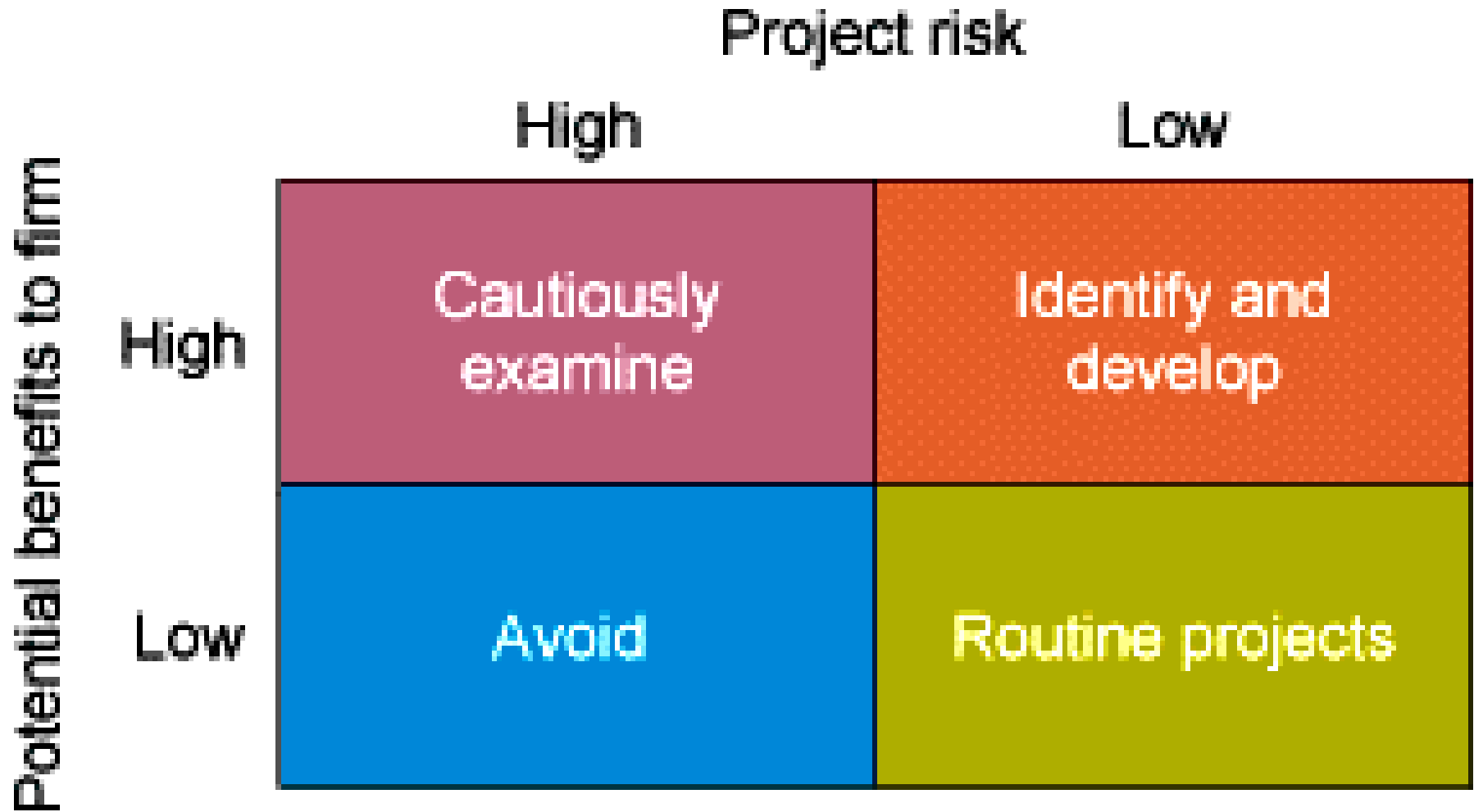
- **Scoring Models**

- Method for deciding among alternative systems based on a **system of ratings**

- **Real Options Pricing Models**

- Models for evaluating information technology investments with **uncertain returns**

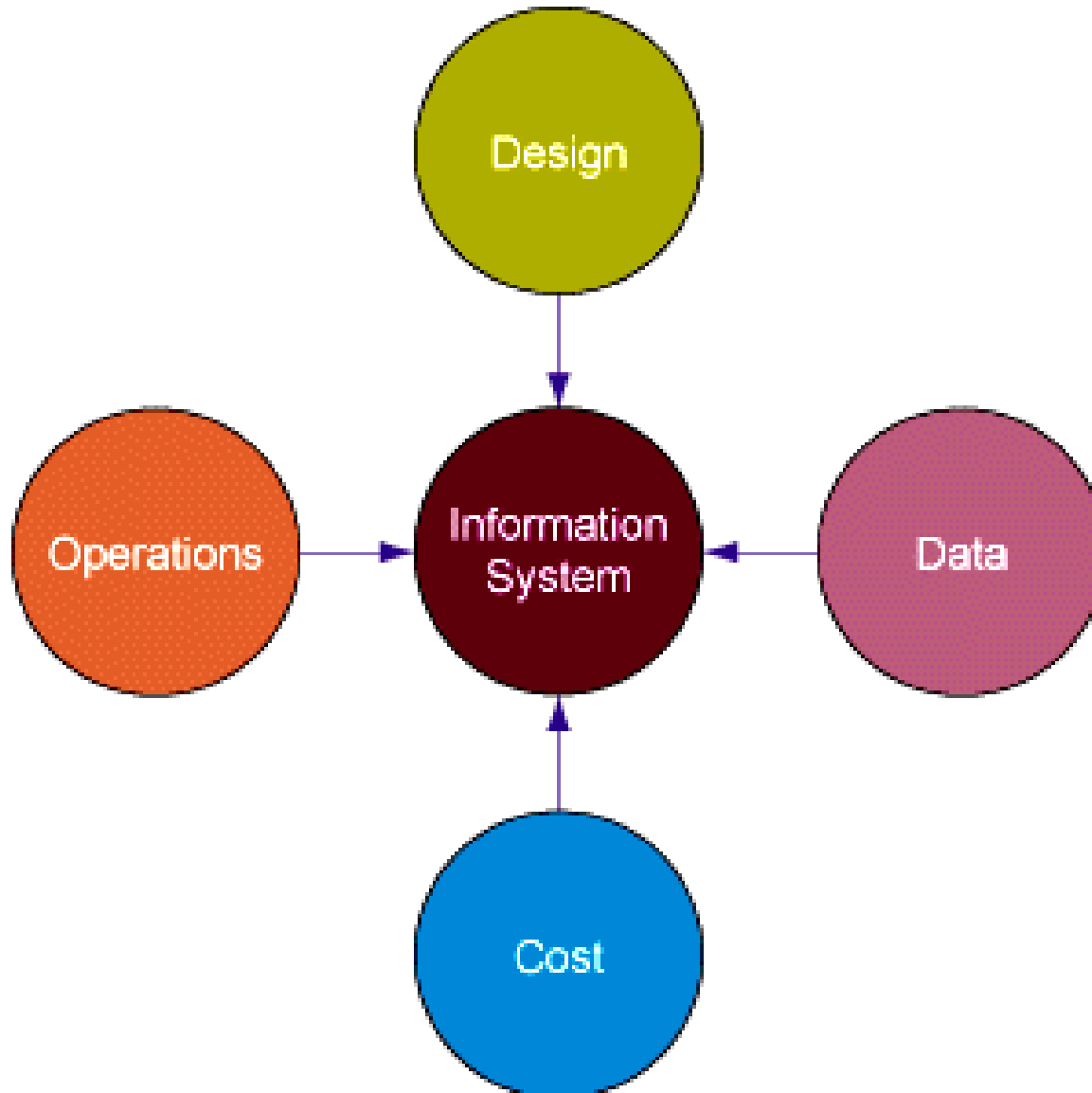
System Portfolio



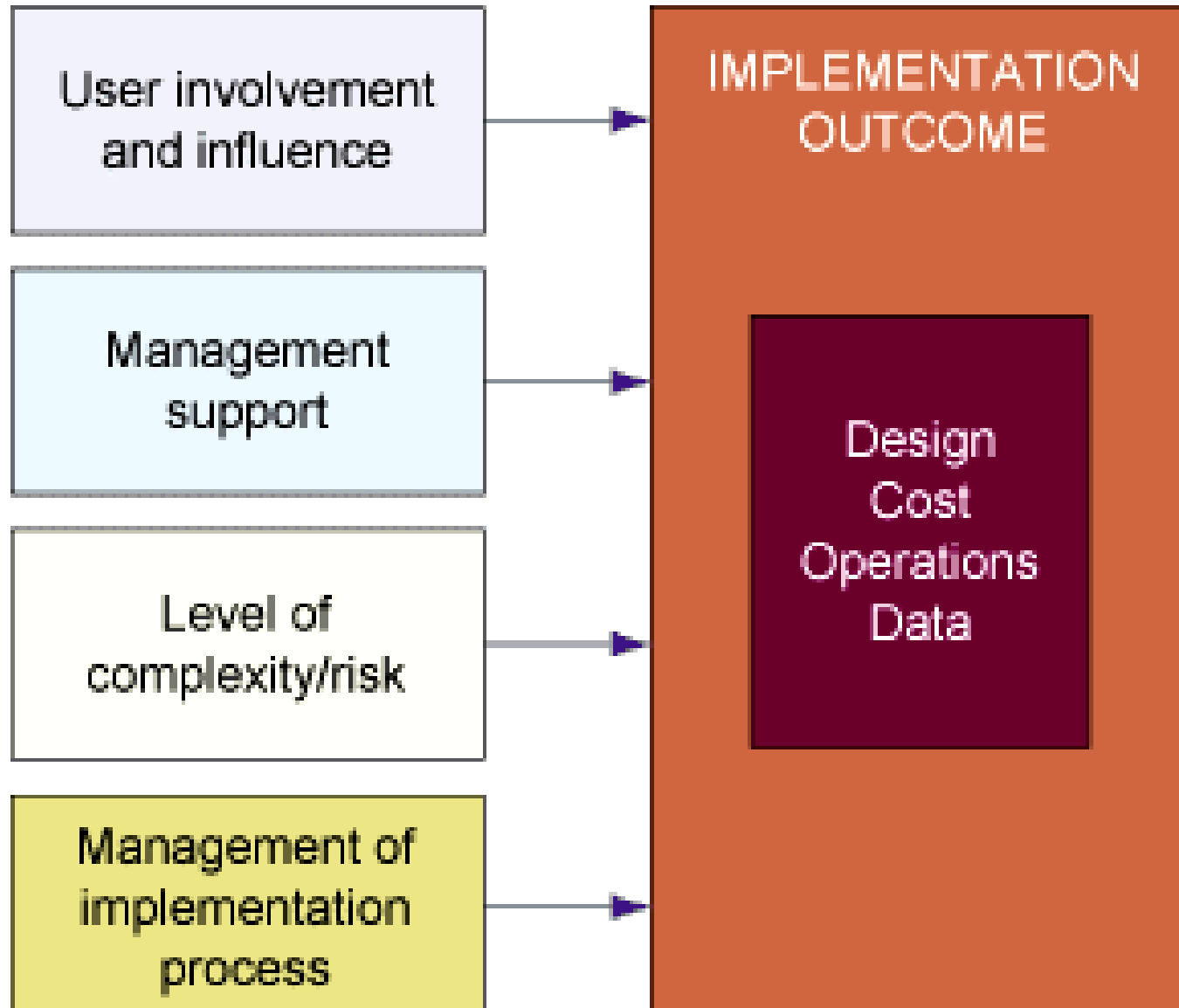
Information System Problem Areas

- **System failure**
 - Information system **does not perform as expected, is not operational** at a specified time
 - **Poor** design, **inaccurate** data, **excessive** expenditure, **breakdown** in operations

Information System Problem Areas (cont)



Factors in Information System Success or Failure



Actions & Indicators for Successful System Implementation

- Support by local funds
- New organizational arrangements
- Stable supply & maintenance
- New personnel classifications
- Changes in organizational authority
- Internalization of training program
- Continual updating of the system
- Promotion of key personnel
- Survival of system after turnover
- Attainment of widespread use

Organizational Learning and Knowledge Management

- **Organizational learning**
 - Creation of **new** standard operating procedures and **business processes** reflecting experience
- **Knowledge management**
 - Set of **processes**
 - **Creates, gathers, stores, maintains, and disseminates** knowledge

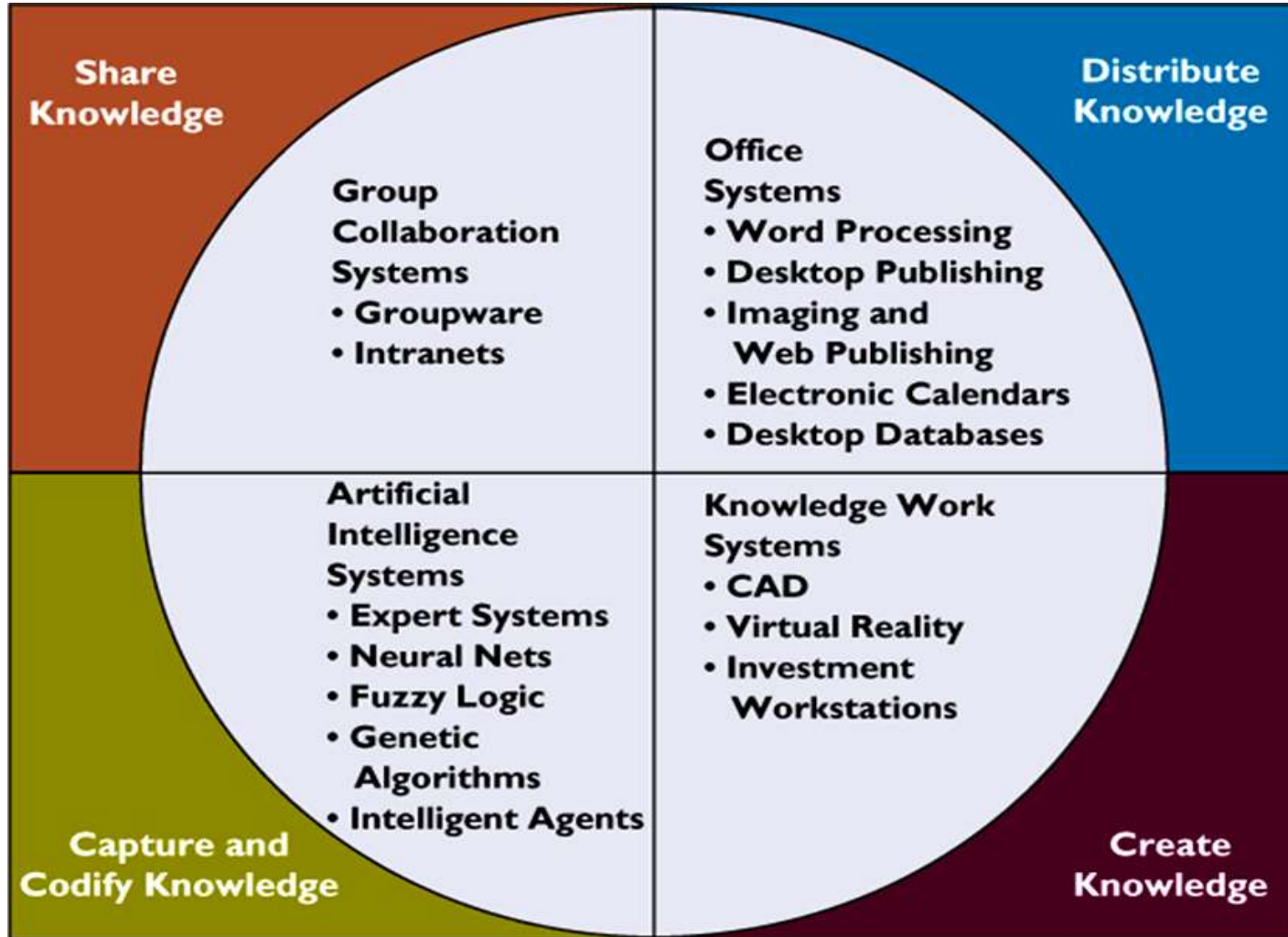
Organizational Learning and Knowledge Management

- **Knowledge Assets**
 - **Organizational knowledge** enabling the business to create value
- **Chief Knowledge Officer (CKO)**
 - Senior executive in charge of organization's knowledge management program

IT Infrastructure for Knowledge Management

- **Tacit Knowledge**
 - Expertise and experience not formally documented
- **Best Practices**
 - Successful solutions or problem-solving methods developed by specific organization or industry
- **Organizational Memory**
 - Stored learning from organization's history
 - Used for decision making and other purposes

IT Infrastructure for Knowledge Management

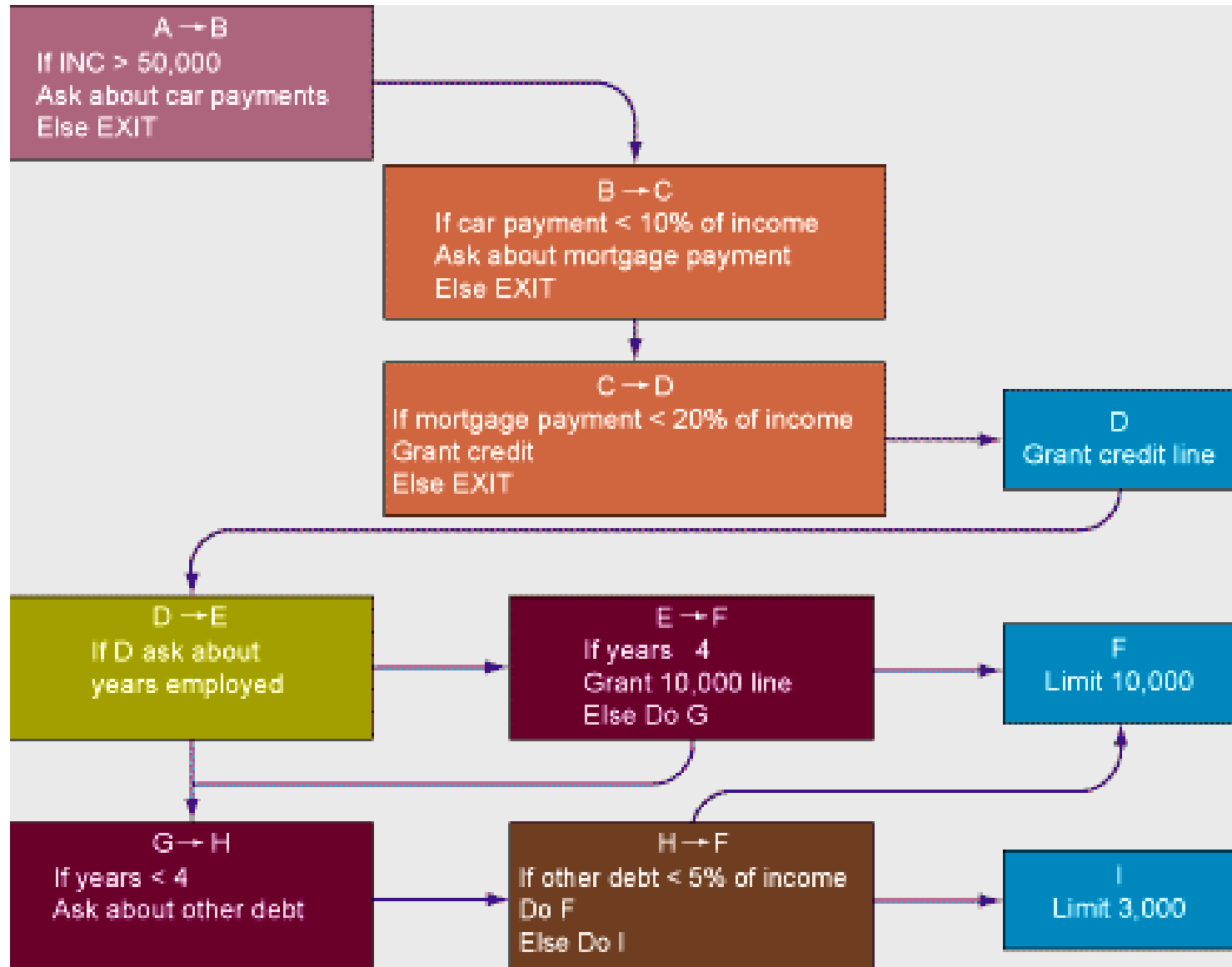


Artificial Intelligence

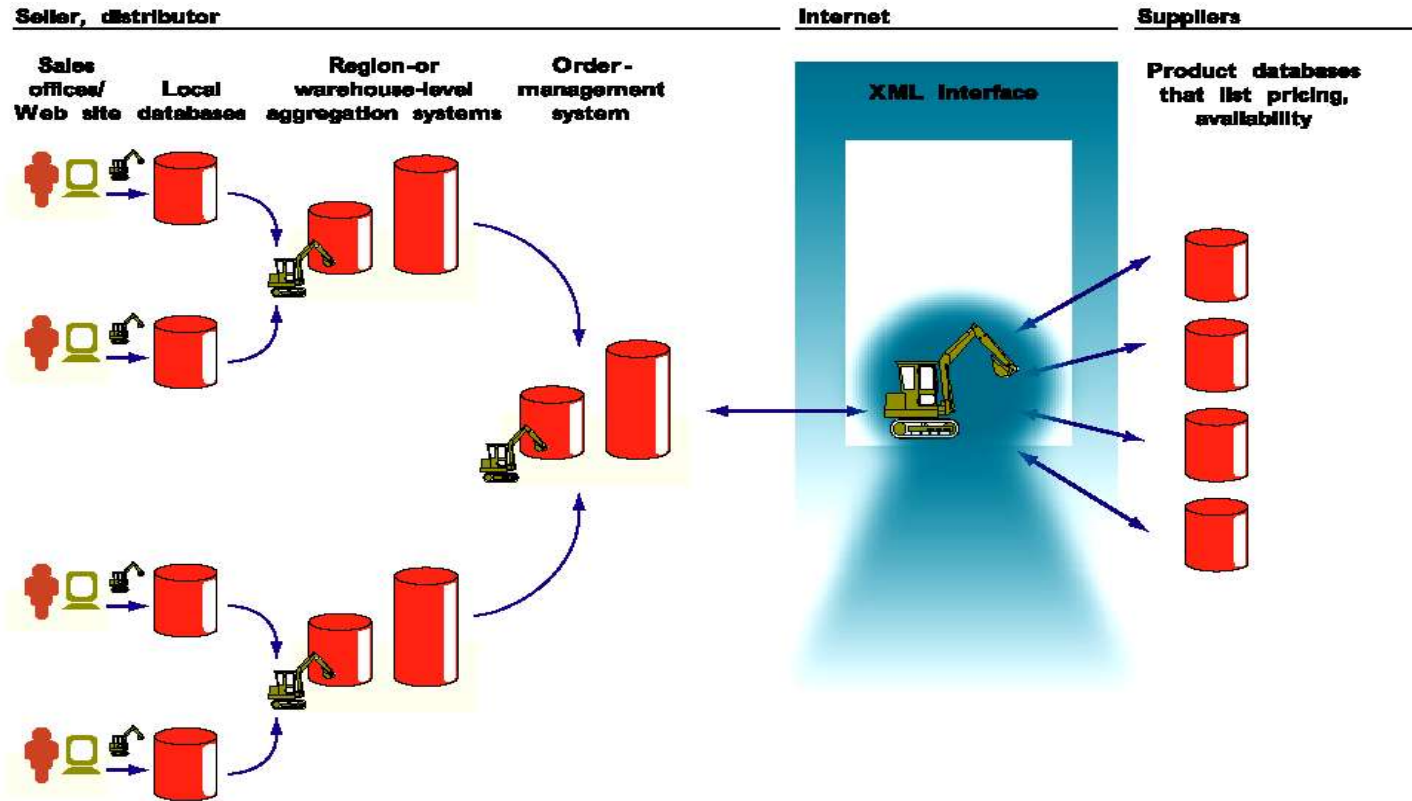
- AI systems is also known as **intelligent systems**.
- Related AI movies to includes “The Thirteenth Floor”, “Matrix”, “Dark City”, “eXistenZ”, “Blade Runner”
- **Sub-fields** within AI includes:
 - Intelligent agents
 - Natural language processing
 - Robotics
 - Machine Vision
 - Expert Systems
 - Neural Networks
 - Genetic Algorithms
 - Simulated Annealing
 - Fuzzy Logic
 - Case-based Reasoning
 - Planning
 - Philosophy



Rules in an AI System



Intelligent Agents



Autonomous agents such as daemons use rule-based modules to match customers' orders with suppliers' components.

Monitor point-of-sale transactions to track inventory levels

Continuously track inventory data at store, region, warehouse, and enterprise levels

Create supply order list for standardized products

Compare suppliers' listings to facilitate optimal order volumes and timing

Group Collaboration Systems and Enterprise Knowledge Environments

- Groupware
- Intranets and Enterprise Knowledge Environments
- Enterprise information portals
- Teamware

Enterprise Information Portal

E-mail

Chat and conferencing

Groupware

Search tools and directories

Web pages

Document management and work flow

Databases and data warehouse

Enterprise applications

Best practices

Projects

Research and reference

News feeds

Management Challenges

- Building information systems that can actually **fulfill executive information requirements.**
- Create meaningful **reporting** and **management decision-making processes.**

Management IS Needs

- Computer system at the **management level** of an organization.
- Combines **data, analytical tools, and models.**
- Supports **semi-structured** and **unstructured decision-making.**

M11. Enhancing Management Decision Making

MIS & DSS

- **MIS**

- Provides **reports** based on routine flow of data
- Assists in **general control** of the organization

- **DSS**

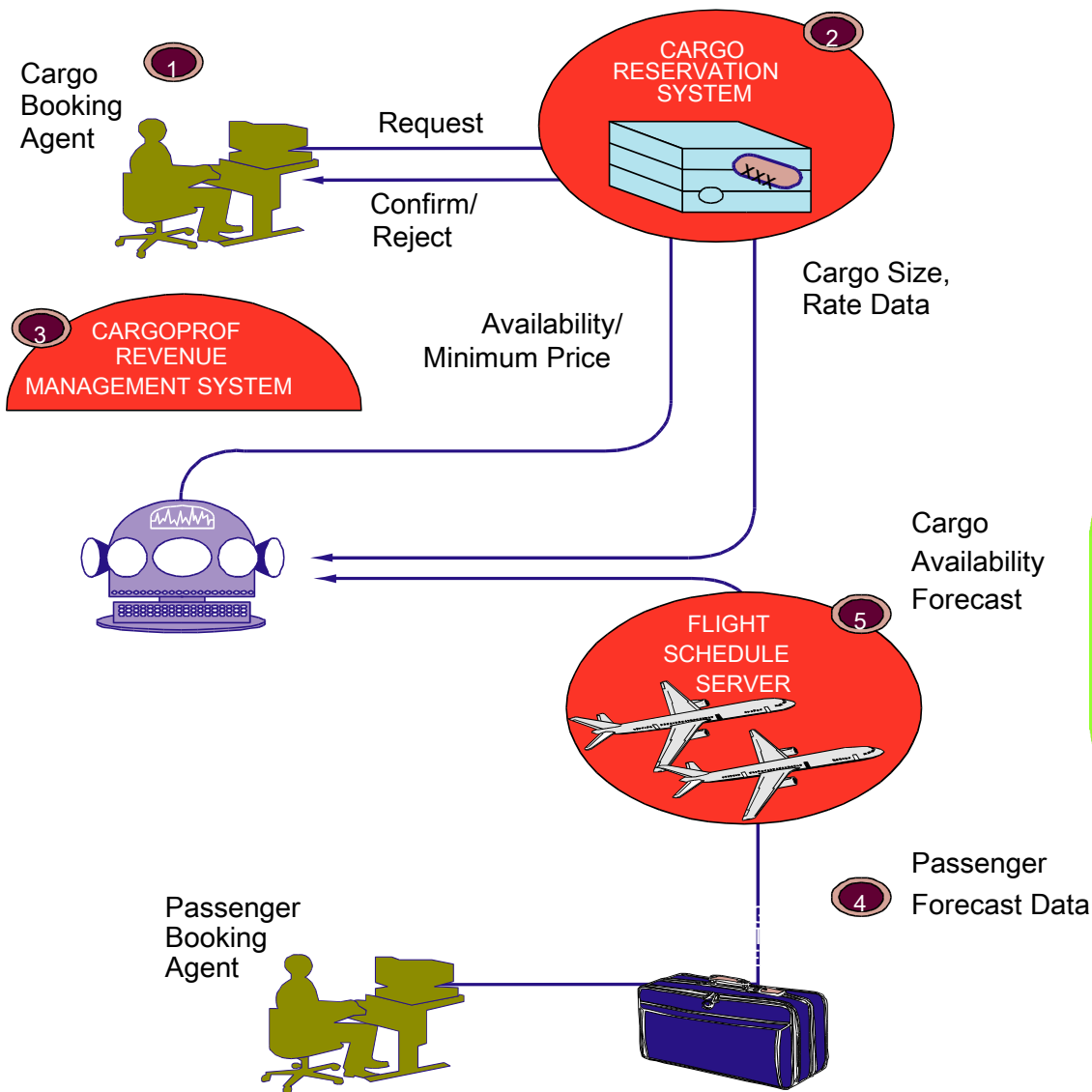
- Emphasizes **change, flexibility, rapid response, models, assumptions, ad hoc queries**, and display **graphics**

M11. Enhancing Management Decision Making Model & Data-driven DSS

- **Model-driven DSS**
 - Primarily **stand-alone**
 - Uses model to perform “**what-if**” and other kinds of analysis.
- **Data-driven DSS**
 - Allows users to **extract** and **analyze** useful information from **large databases**.
- **Datamining**
 - Finds **hidden patterns** and **relationships** in large databases to **infer rules**.
 - **Knowledge discovery**.

M11. Enhancing Management Decision Making

DSS: Airline Industry

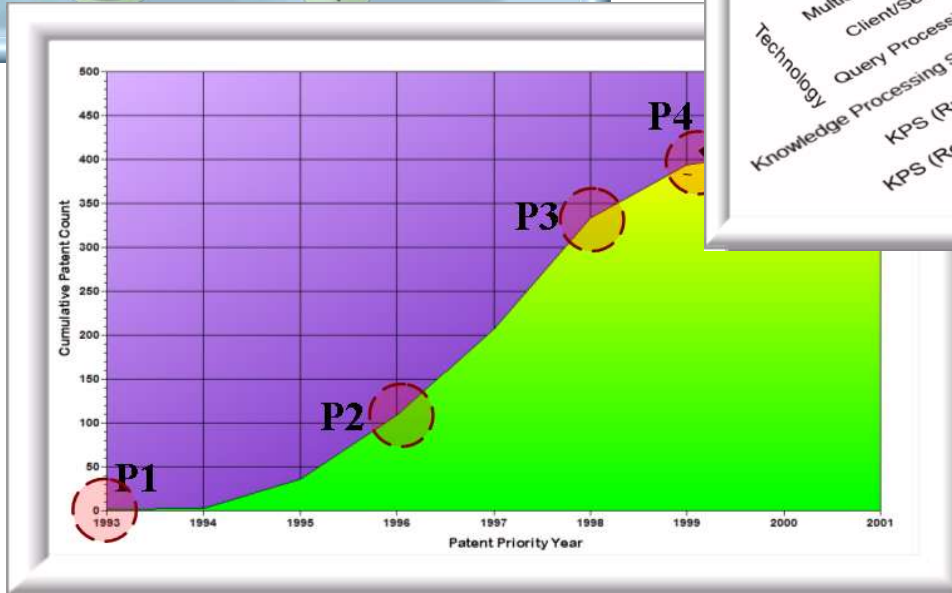
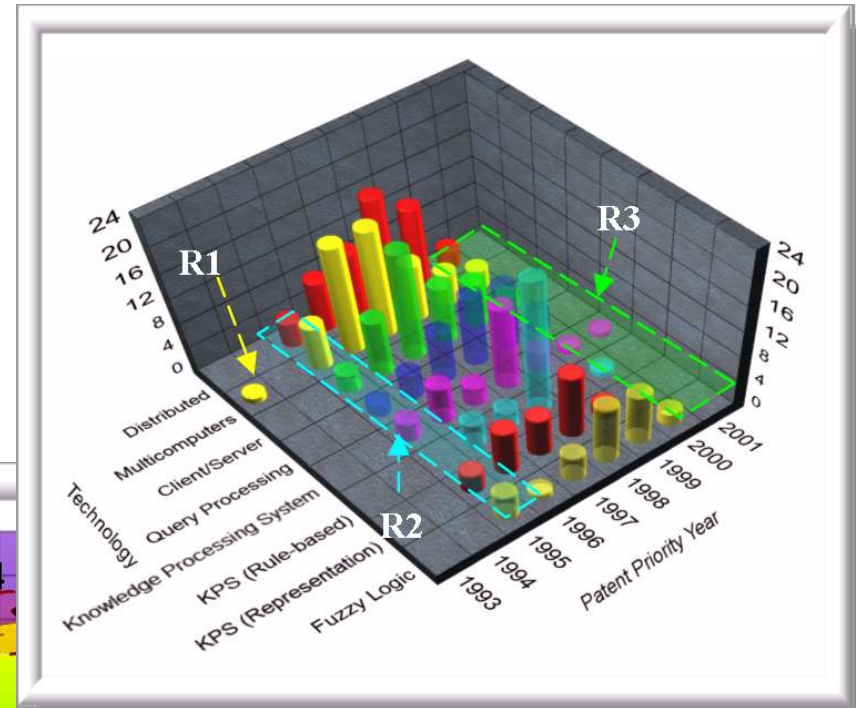
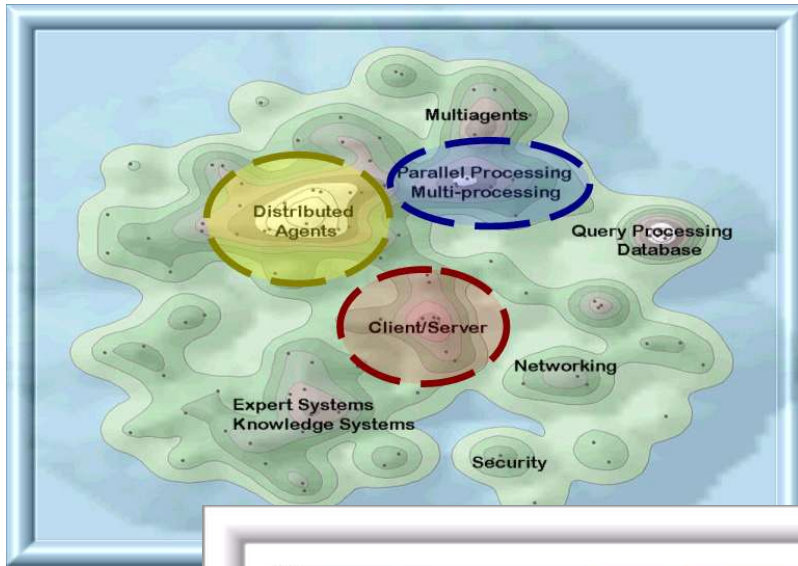


AFX European Focus, April 30, 2003
Wednesday, Singapore Airlines asks
6,600 cabin crew to take unpaid
leave... measures arising from the
impact of the SARS situation on
travel...

AFX European Focus, April 30, 2003
Wednesday, SIA brings total capacity
cuts to 28.9 pct due to SARS...

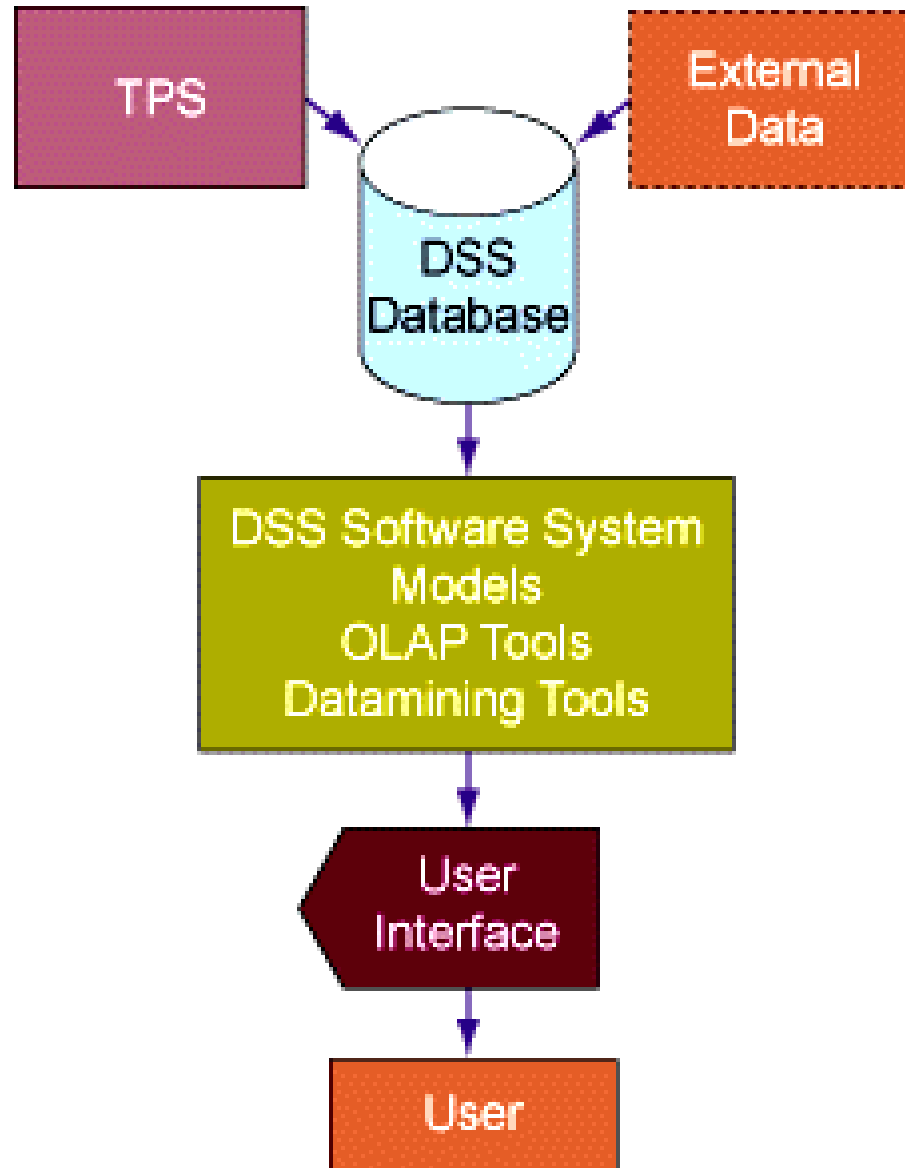
M11. Enhancing Management Decision Making

DSS/ESS: Patent Mapping System (Technology Industry)



M11. Enhancing Management Decision Making

DSS High-level Architecture



M11. Enhancing Management Decision Making

DSS High-level Architecture

- **DSS database:** collection of current or historical data
- **DSS software system:** collection of software tools/mathematical and analytical models
- **User interface:** easy interaction
- **Model:** Abstract representation illustrating components or relationships
- **Sensitivity analysis:** Asks “what-if” questions repeatedly to determine the impact of change

M11. Enhancing Management Decision Making

Group DSS

- Interactive computer-based system
- Facilitates solution to unstructured problems
- Set of decision makers working together as a group
- Characteristics:
 - **Hardware:** Conference facility, electronic hardware
 - **Software tools:** Tools for organizing ideas, gathering information, and ranking and seeking priorities
 - **People:** Participants, trained facilitator, staff supporting hardware and software

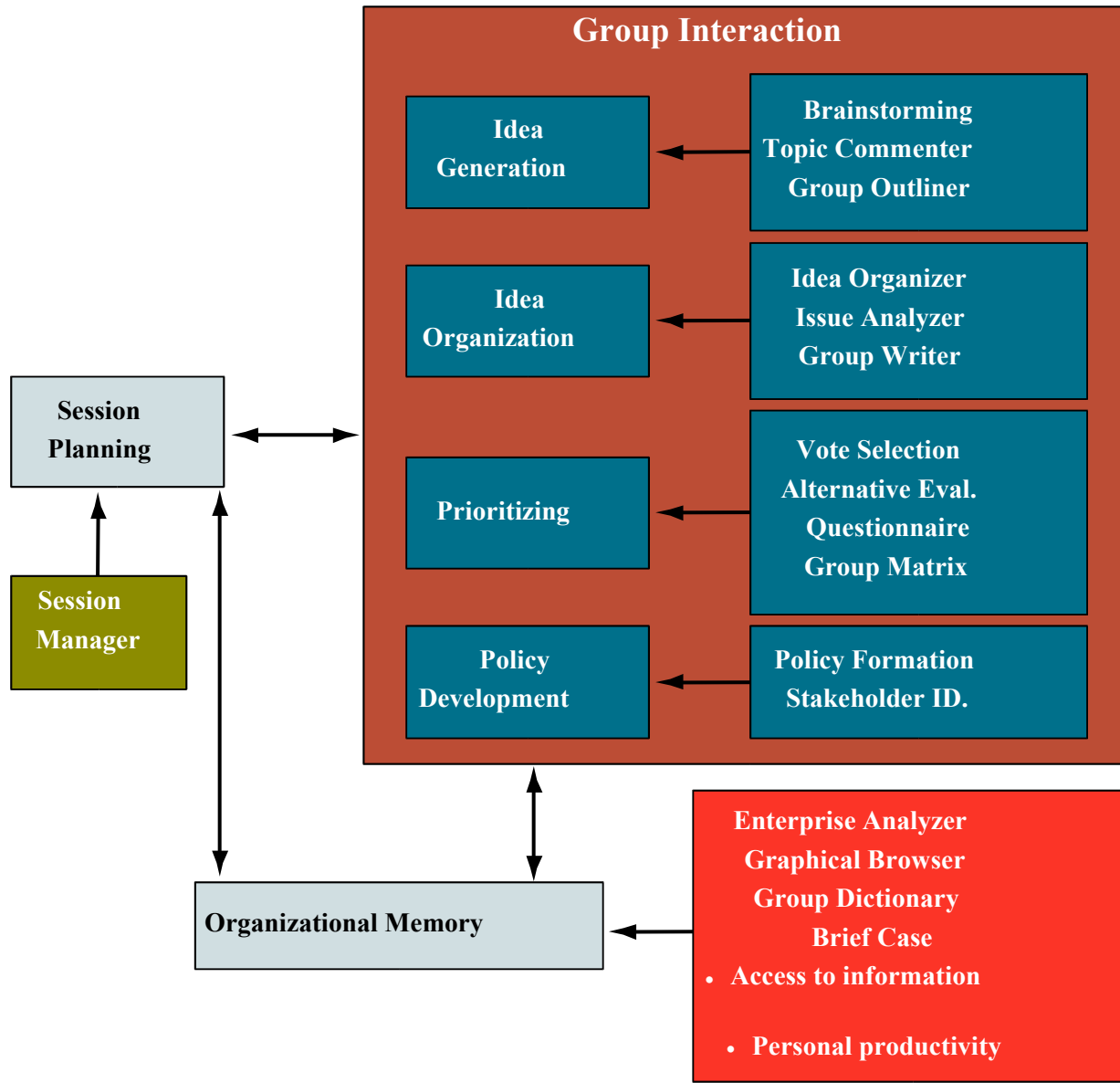
M11. Enhancing Management Decision Making

Group DSS - Tools

- Electronic questionnaires
- Electronic brainstorming tools
- Idea organizers
- Questionnaire tools

M11. Enhancing Management Decision Making

Group DSS In Operation



M11. Enhancing Management Decision Making

How GDSS can Enhance Group Decision-Making

- Improved **pre-planning**
- Increased **participation**
- **Open, collaborative** meeting atmosphere
- Criticism-free **idea generation**
- Evaluation **objectivity**

- Expenditures = pembelanjaan
- Tangible = terukur
- Exceed = melebihi
- Uncertain = tidak pasti
- Expeted = mengharapkan
- Tacid = diam
- Fulfill = memenuhi
- Improved = meningkatkan
- Determine = menentukan
- Assist = membantu
- Infer = menyimpulkan
- Worth = berharga
- Avoid = menghindari
- Emphasizes = menekankan