"A System Dynamics Model as Part of a Continuous Online Management Training Application"

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Agenda

1. System Dynamics as a Business Tool
2. Management Training Application
3. Model Development
4. Application Development
5. Application Deployment
6. Summary

Business are adopting SD modeling more and more

Usage can be classified as

- One time decision support
  - One time investment decision analysis; Acquisition decision support
- Continuous planning
  - Analyze business decisions on an ongoing basis; strategic planning tool
- Management training
  - Strategic decision making; break the silos;
- Change management
  - Communicate corporate strategy to employees

Stretching SD Principles

- Rather focusing on building a model based on one specific issue

Businesses build SD models that capture the entire business system

- When modeling for a specific problem
  - the problem definition guides the model boundary
    - becomes the scale for what is important to include and exclude in the model
- Without a problem statement
  - what will guide the business world in avoiding scope creep

How a Fortune 1000 Company Developed Their Model

- A leading semi-conductor equipment manufacturing company
- Objective: To train Sr. managers and directors
  - How to make strategic and tactical decision in a cyclical industry
  - Understand how other departments/functions are affected by ones decisions
  - How decisions at all levels translate into financial performance
  - What strategies work for different market conditions
  - How to continue to grow and be profitable in a highly competitive market

How the Model Boundary was Decided

- Based on the high level project objectives a detailed list of learning objectives were developed
- The learning objectives then were grouped by major functions in the company

These detailed learning objectives grouped by functions helped to identify the relevant dynamics to be included in each sector

More Details

- SD model development
- Application development
  - How other technologies were combined with SD model to develop a management training application
- Training session delivery
  - How the application was delivered simultaneously to 350 managers

Model Development

- Dynamics of major sectors were mapped with the help of executives

Research & Development	Manufacturing
Customer Service	Facilities
Human Resources	Finance

- Market dynamics
  - Customer behavior was derived from prior historical trend and combined with
  - Assumptions of changes in the trend (scenarios)
- Competitor behavior
  - Assumptions were made with the help of executives

User Decision and Report Variables

- Based on learning objectives for each sector
  - User decision and report variables were identified and built in the model

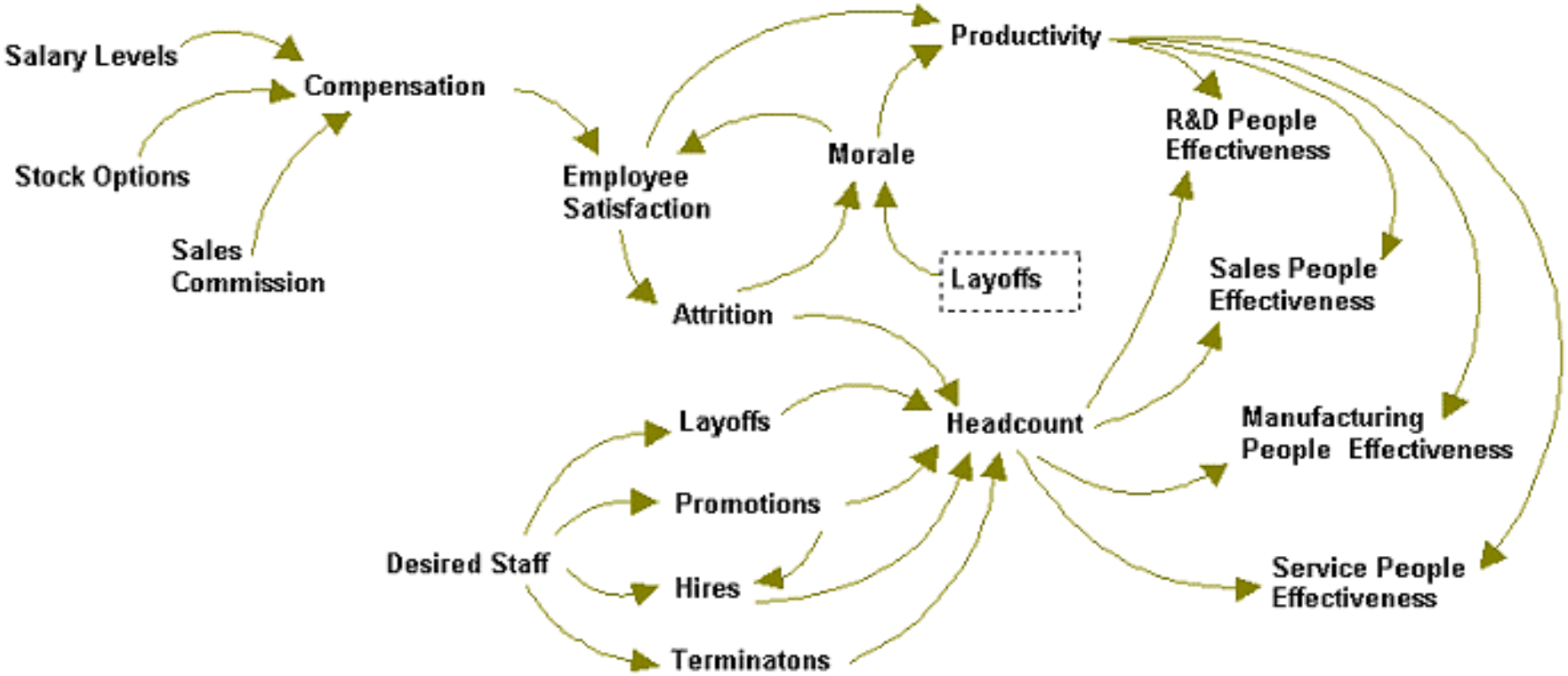
- For each round of the simulation users were asked to make a set of strategic and tactical decisions

- A set of detailed report including financial statements, sales, customer satisfaction, employee satisfaction etc.

External Events

- Unexpected external event were thrown in to the system to meet the learning objectives
  - Users were asked to react to these events without disturbing much of the financial and other organizational objectives

A Sample Causal Map: Human Resource



Application Development

- Technologies combined with SD model
  - ExTrain®: web-based training platform
    - Customized to host simulation models for training

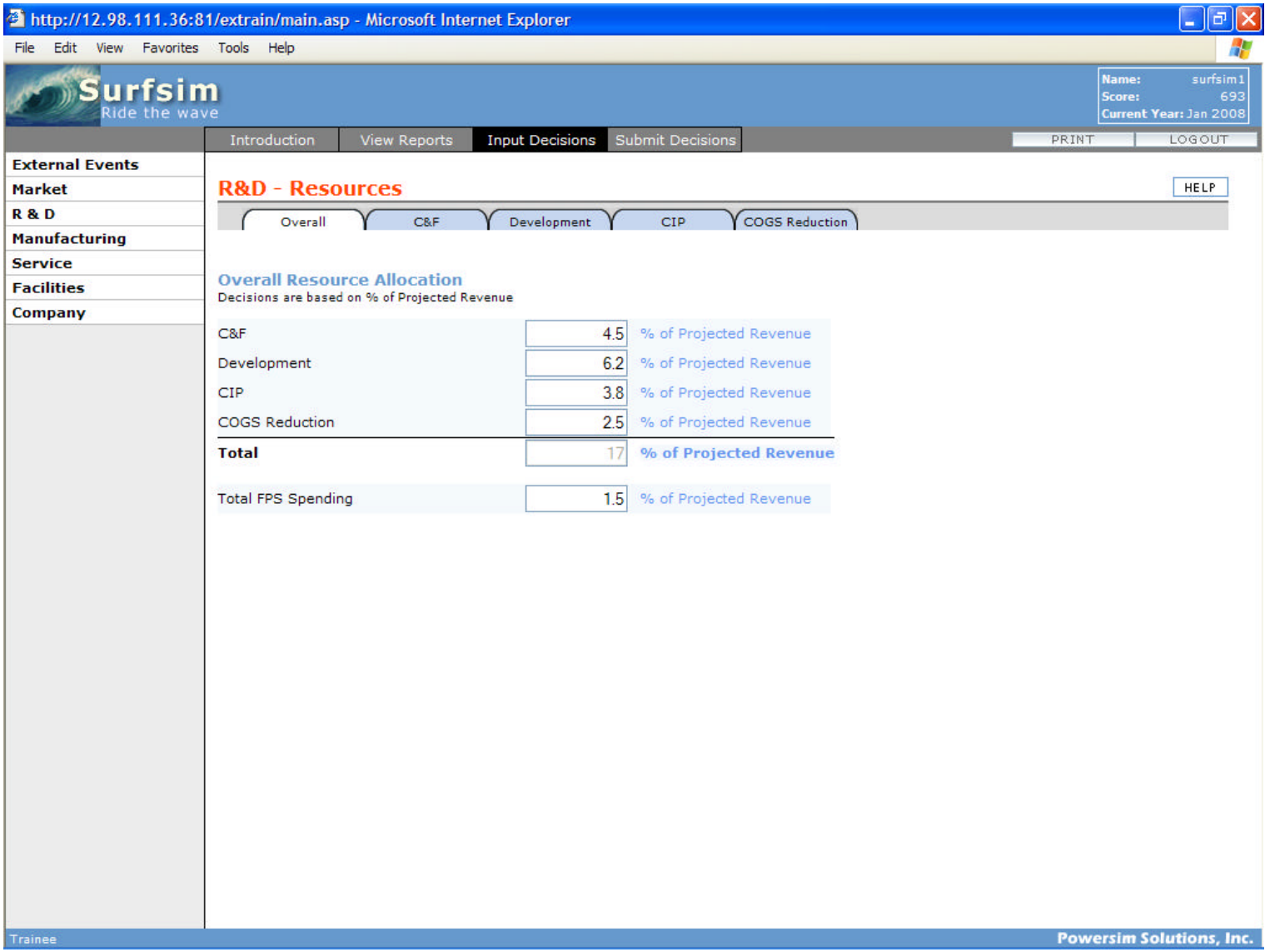
- ExTrain: various user privileges
  - Trainee:
    - Read objectives and background information - View reports - Enter decisions - Submit
  - Facilitator:
    - Monitor user activates – Advance simulation
  - Administrator:
    - Add/delete user/simulation – Assign trainees
  - Modeler:
    - Update and manage model

Underlying Technologies

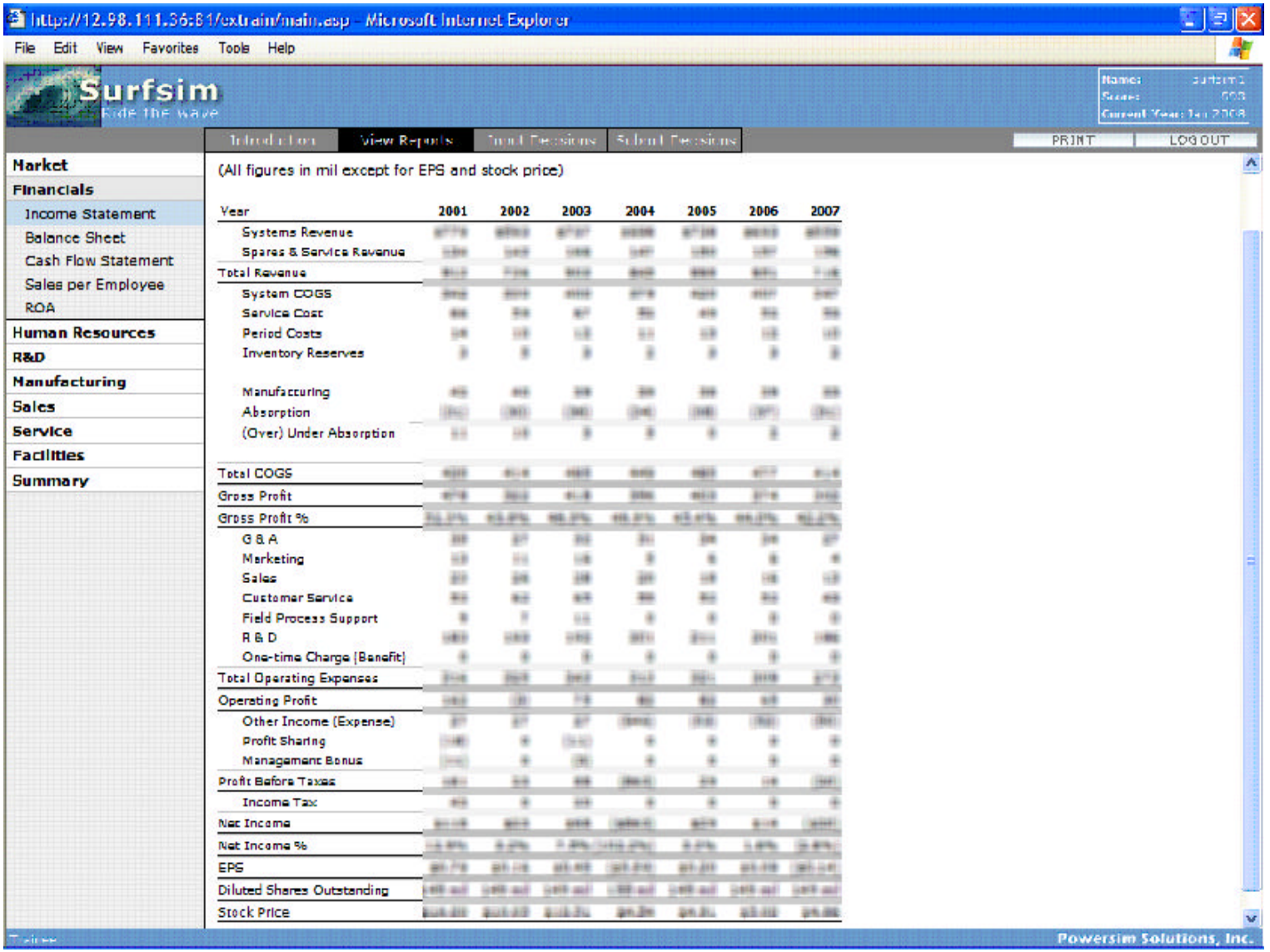
- Underlying technologies
  - HTML (presentation)
  - JavaScript (interactive pages)
  - ASP (dynamic content)
  - SQL (central database)
  - Third party controls (Graphics Server)

- Ease of navigation
  - Each user window will specify username, score and simulation time
  - Introduction, decision and Report areas were organized in tabs and menu structure

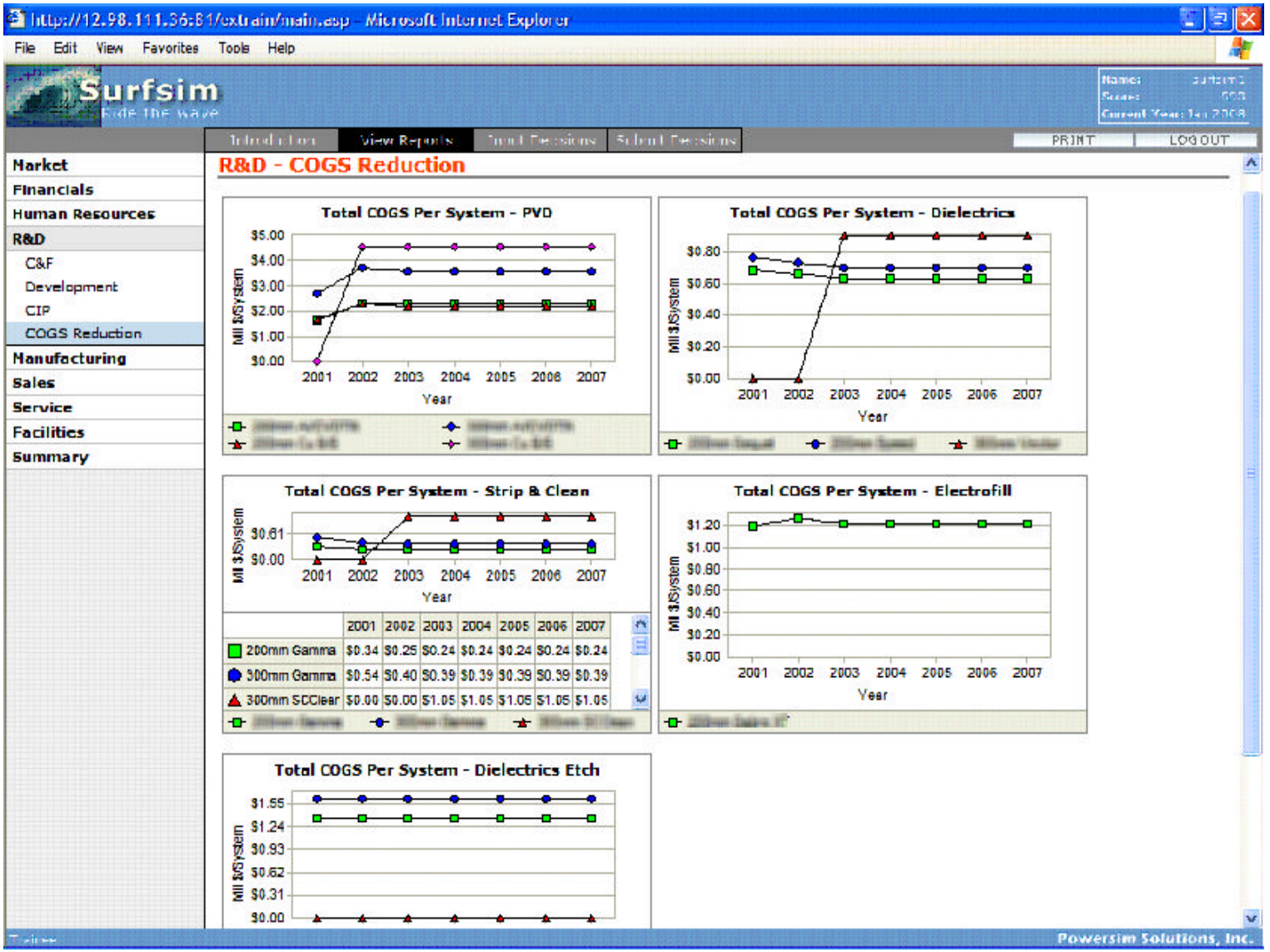
Screen Shot of Application - 1



Screen Shot of Application - 2



Screen Shot of Application - 3



4. Application Deployment

Workshop organization

- Total of 300 participants
- 2 days of 10 hour sessions
  - 1 to 3 hours decision time per round of simulation
- Team composition
  - Groups of 7-8 managers
  - Cross functional teams to foster knowledge sharing

Networked Computers

- Each team logged in to the online simulation using a networked computer
- Using a browser and a unique username and password

4. Application Deployment

- Facilitator involvement
  - Facilitator also logs into the online application
  - Can view the status and performance of each team
  - Move the simulation forward after teams submit their decisions

- Scoring/Ranking
  - Weighted score over time
    - Revenue, profitability stock price, ROA
  - Prizes to first three teams (motivation aspect)

Value of Simulation Based Training- as the client sees it

Learning - feedback from participants

Business Dynamics :

- Cross-functional understanding of business (R&D, manufacturing, service, HR, facilities, finance)
- How to achieve consistency among different strategies to achieve business objectives
- Gain skills to address short- and long-term issues
- Focus on industry and company issues rather than theory
- Interactive hands-on training more enjoyable
- Immediate feedback from simulation means quicker learning
- Executive feedback on team strategies improves understanding

Human Dynamics :

- Great tool for team building
- Role playing within teams facilitates learning
- Year-after-year exercise reinforces learning
- More responsive and engaging than conventional training

5. Summary

- Successful implementation of a training application
  - Model development
    - Focus on learning objectives
    - Avoid irrelevant details where possible
    - Model verification and validation vital
  - Interface development
    - Depend on proven technologies
    - Familiar presentation to promote interpretation
    - Ease of navigation important
    - Test application under maximum server loads
  - Application deployment
    - Provide abundant background on simulation
    - Discussion an integral part of training
    - Plan for logistics crucial

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