



Shell Global Solutions

**Supporting Supply Chain Planning & Scheduling Decisions
In the Oil and Chemical Industry.**



Nort Thijssen & Winston Lasschuit

FOCAPO Conference

January 2003

Outline

- Shell Global Solutions
- Supply Chain Management
- From History to Future
- Strategic and Global Planning



Shell Global Solutions

- Part of Royal Dutch/Shell
- An integrated research, technical services and consultancy group
- International skill pool of 2,700 + distributed teams
- Advising over 140 industrial sites in more than 30 countries through Technical Service Agreements & another 550 customers on consultancy work
- Operating out of 7 locations



Shell Global Solutions – centres of excellence



Our team

- From all over the world ...
 - Many nationalities
 - 85% has hands-on operational experience
- Covering a broad range of expertise ...
 - Ranging from chemical technology via all facets of hydrocarbon logistics management to business economics, distribution and marketing
 - Covering information and web-based technology



Outline

- Shell Global Solutions
- ***Supply Chain Management***
- From History to Future
- Strategic and Global Planning



The world becomes greener, but it rains more often.



- Operational environment - *decision support essential to survive*
 - lower margins; over capacity, commoditization, reduced loyalty
 - globalisation; consolidation, multiple assets, overlap
- Planning environment - *business and technology have changed*
 - world is now: always on, mobile, volatility at speed.
 - the \$\$ are increasingly in managing the variability
- Business imperatives - *what keeps VPs awake at night?*
 - fine-tuning the investment portfolio
 - decisions must be based on integrated margin rather than just cost
 - improve ability to execute

Challenges in current Supply Chain

The enemy is variability!

The solution:

- shorter review cycle
- more frequent planning
- real-time decision support

*Would it help
in your case?*

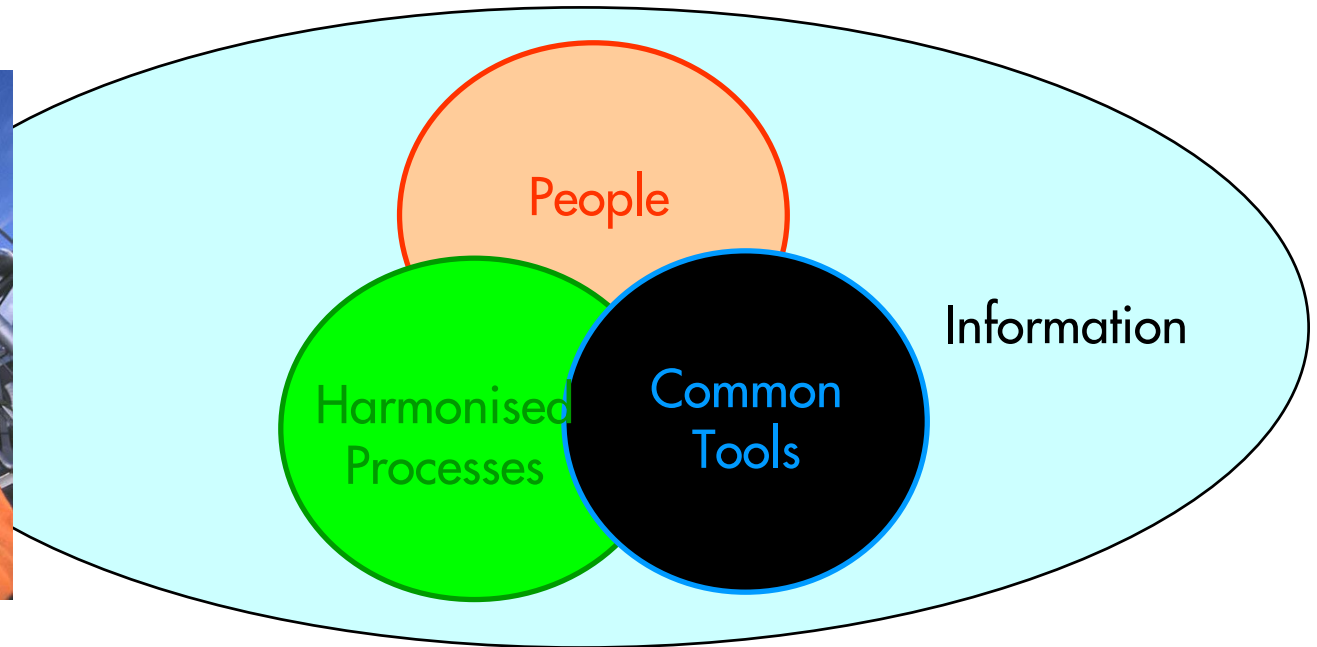
Multiple hand offs
No Overall view of the Supply Chain
Disjointed information flows
No Overall planning framework

Economies of scale not realised
High Inventories
Multiple systems/interfaces
Operational inefficiency
Poor Product/Margin decision making

Systems management
Reactive Planning/Operations
Transaction Processing
Stock Administration/Management
Infrastructure and network support
Product and feedstock movement
costs and services
Terminal OPEX



Transformation means information, people, processes and tools coming together



People

- getting the resources, skills and organisation right

Processes

- harmonisation around best practices

Tools

- a world-class APS based on a high quality data management environment.

Information

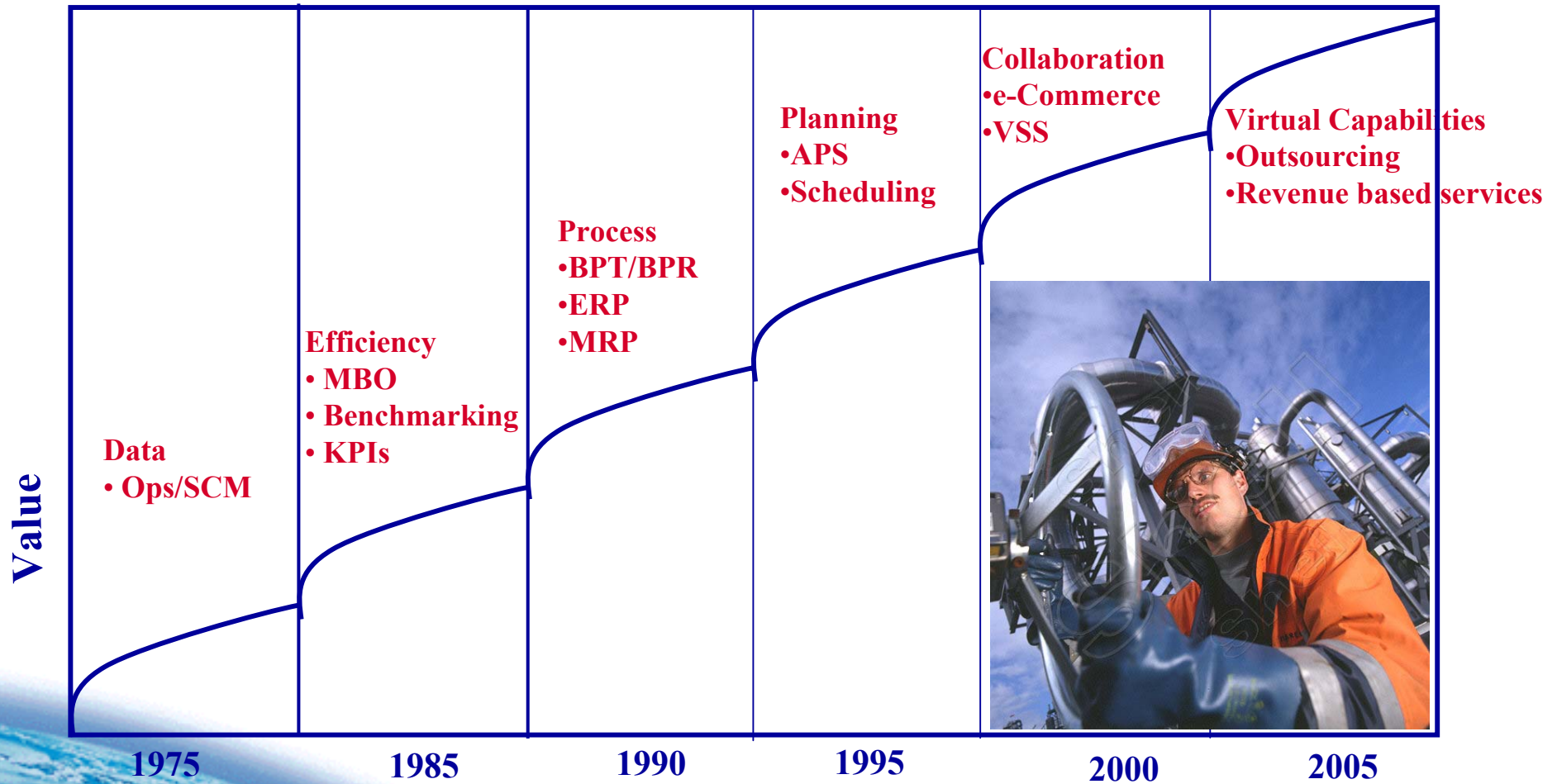
- accurate, reliable, consistent, transparent information

Outline

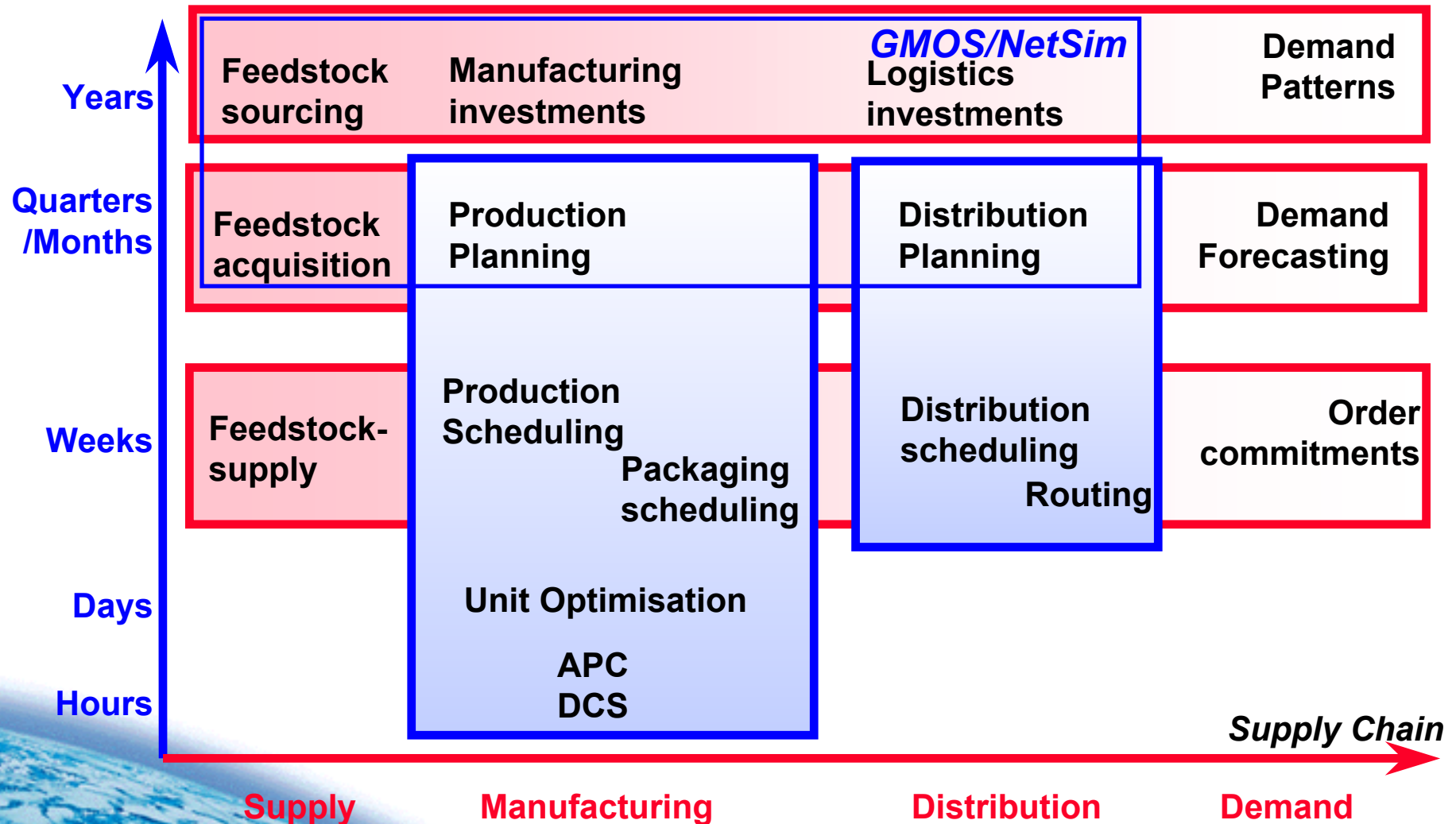
- Shell Global Solutions
- Supply Chain Management
- ***From History to Future***
- Strategic and Global Planning



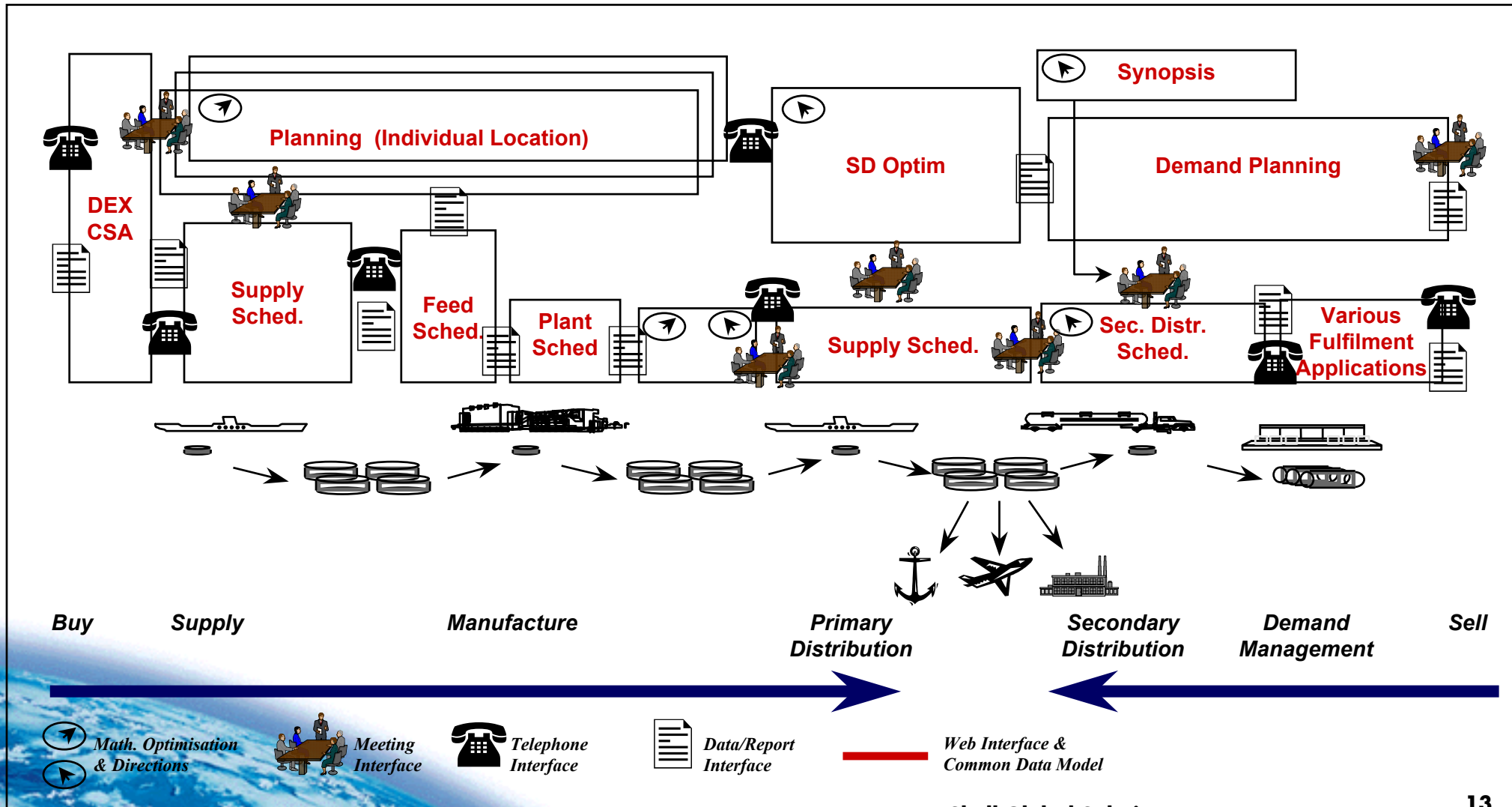
Evolutionary Stages in Supply Chain Management



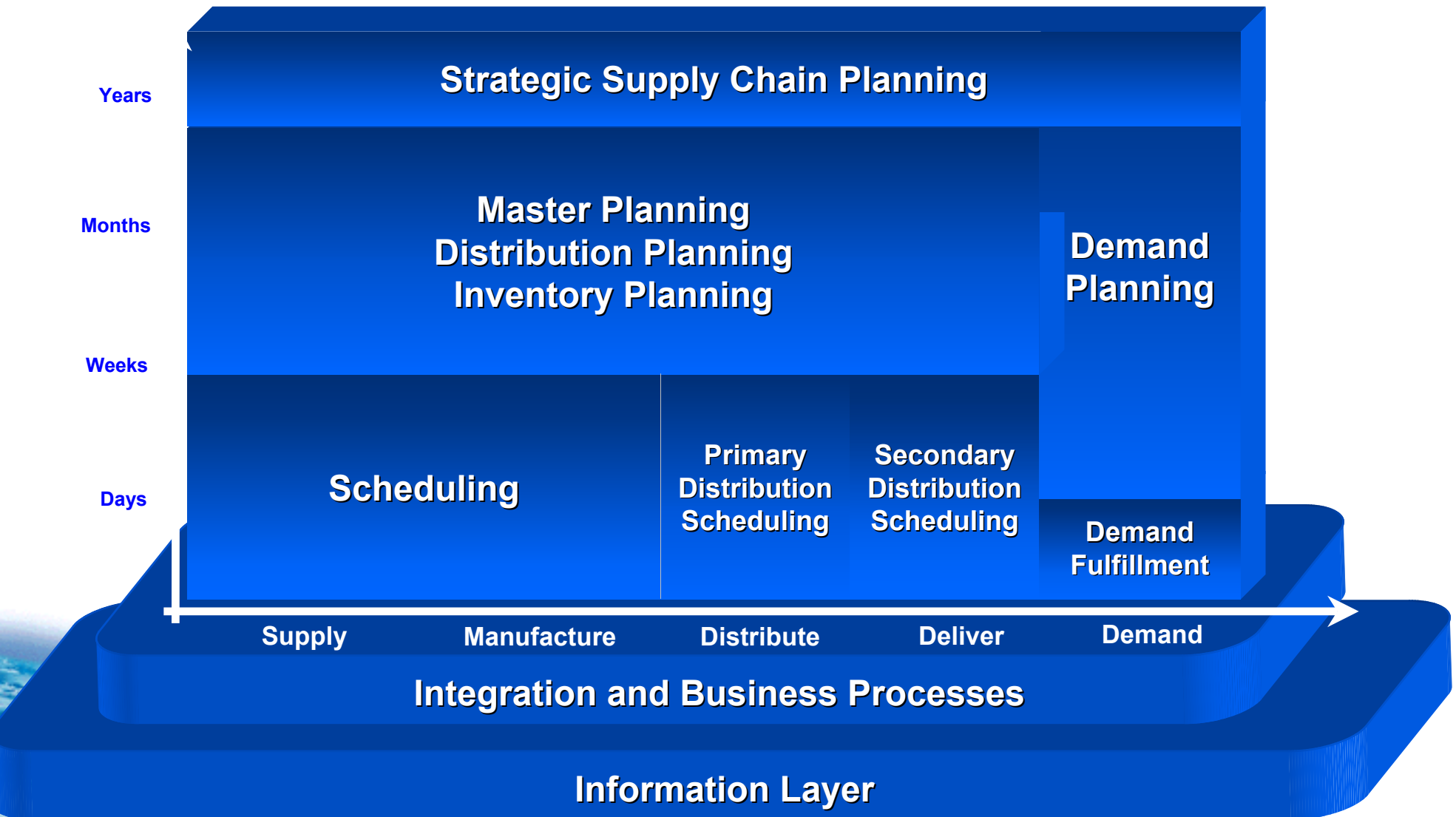
From history, ...



From history, ...



..... to the Future



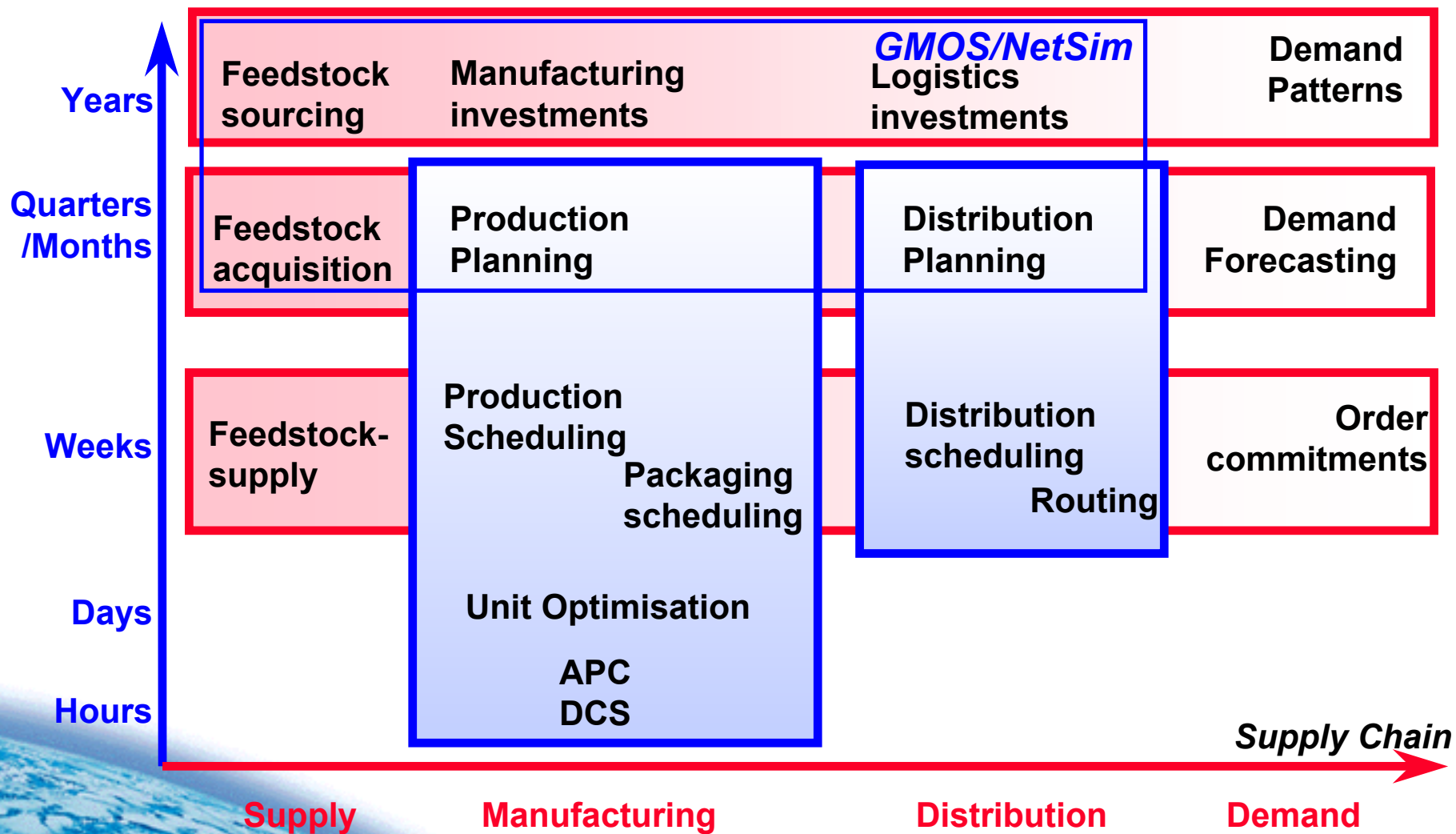
Core Requirements

- Complete horizontal Supply Chain Integration
- Convergence of strategy, planning and scheduling
- Modularity
- Scalability
- Interactive
- User-interfacing
- Real-time optimization speed
- Direct links

Outline

- Shell Global Solutions
- Supply Chain Management
- From History to Future
- ***Strategic and Global Planning***



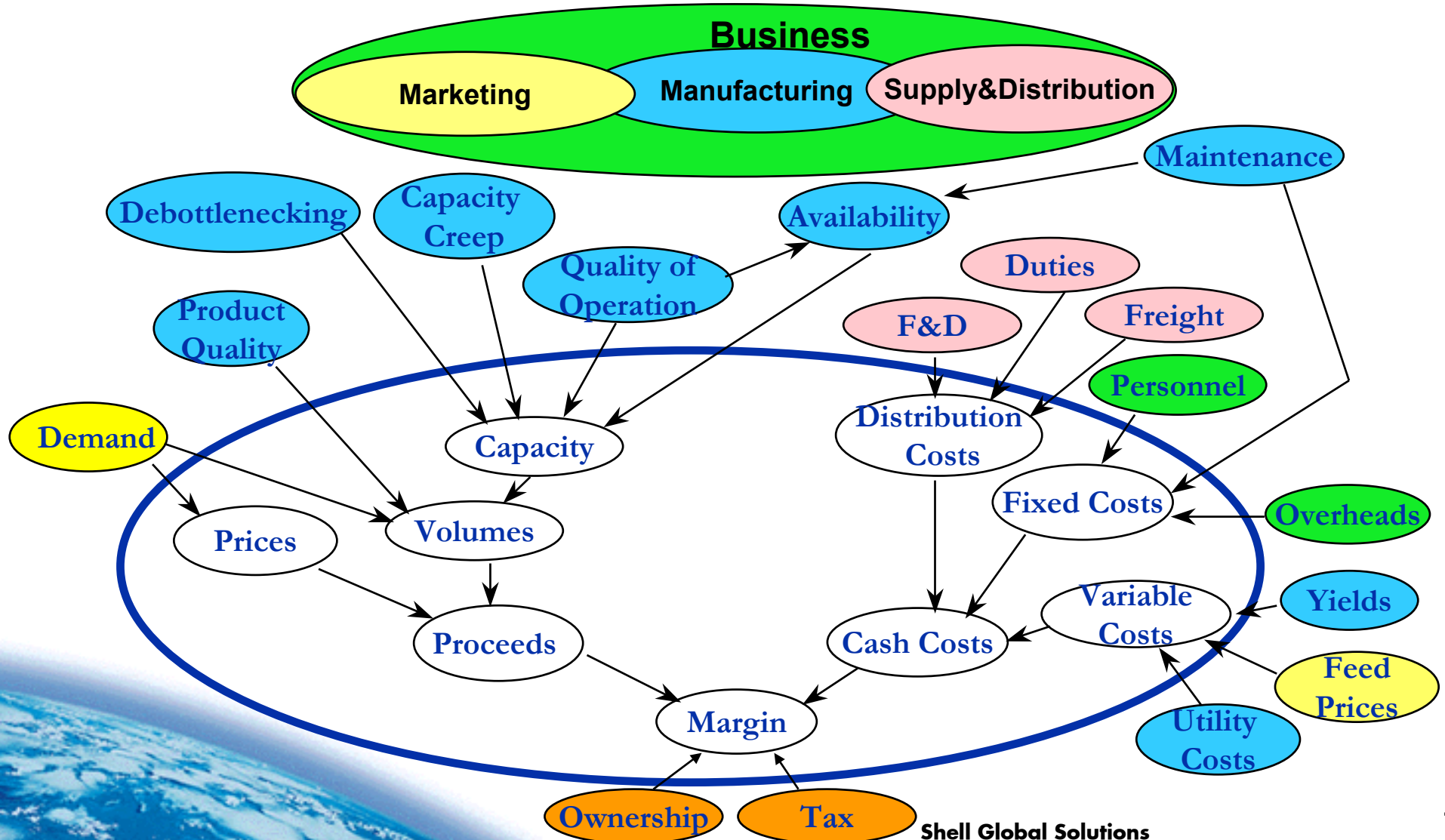


Strategic/Tactical/Planning tool : GMOS/NetSim

(**G**lobal **M**anufacturing & logistics **O**ptimisation **S**ystem;
Network Analysis and **S**upply Chain **O**ptimisation System)

- Overview GMOS/NetSim Functionality
- Application Areas

Value Tree - Global



Structure

Model:

- Manufacturing Capabilities
- Logistics Network
- Interchangabilities
- Cash Cost / revenue Structure
- *Environmental (Planet) data*

Input

- Feed availabilities
- Product demand
- Prices
- Profit - *Planet* obj.

Output

- Manufacturing Plan
- Logistics Plan
- Supply cost curves
- P&L statements
- *Planet impact*

Structure

Model:

- Manufacturing Capabilities
- Logistics Network
- Interchangabilities
- Cash Cost / revenue Structure
- *Environmental (Planet) data*

Input

- Feed availabilities
- Product demand
- Prices
- Profit - *Planet* obj.

Output

- Manufacturing Plan
- Logistics Plan
- Supply cost curves
- P&L statements
- *Planet impact*

Options

- Capacities (production, Modes of Transport)
- Flexibility (grades, modes of operation)
- Exchange/Swap Deals
- *Planet improvement possibilities*

Exchange Functionalities

- Can model on a “per contract” basis
- Can model on a “per grade/product” basis
- Can handle fix charges
- Can handle “settlements” – locational differences, handling charges
- Can handle exchanges of different products (e.g. grade1 with grade2)
- Can handle exchanges at different volume “mark-ups”
(1m3 for 1.1 m3)

Asset Rationalization/Investment analysis

- Fixed Costs can be modeled at different levels
 - Site Level, Process Unit Level, Filling/Dispatching Level
 - Allow for fixed cost / charges when site, process unit, FD line not used
- Examples
 - Site rationalization
 - Product rationalization
 - Manufacturing line rationalization
 - Debottlenecking
 - Evaluation of new options

Logistics Modeling

- Modes of Transport
 - \$ per quantity
- Ship Scheduling
 - Pre-defined voyages
 - Load / Discharge parcel sizes
 - Travel time per voyage
 - Port / Ship restrictions
 - Costs per trip
- 'Exclusive Supplier' constraints

Handling of Duties

- Export Duty
- Import Duty
- Calculations can be based on cost, selling price, transfer price
- Duties can be excluded in e.g same economic zone (CCA, Europe)
- Duties can be product specific, country of origin specific

Demand Modeling

- Fixed Demand
- Min/Max Demand
- Fixed or Variable pricing
- Tranched/Tiered Pricing
- Mk Margin

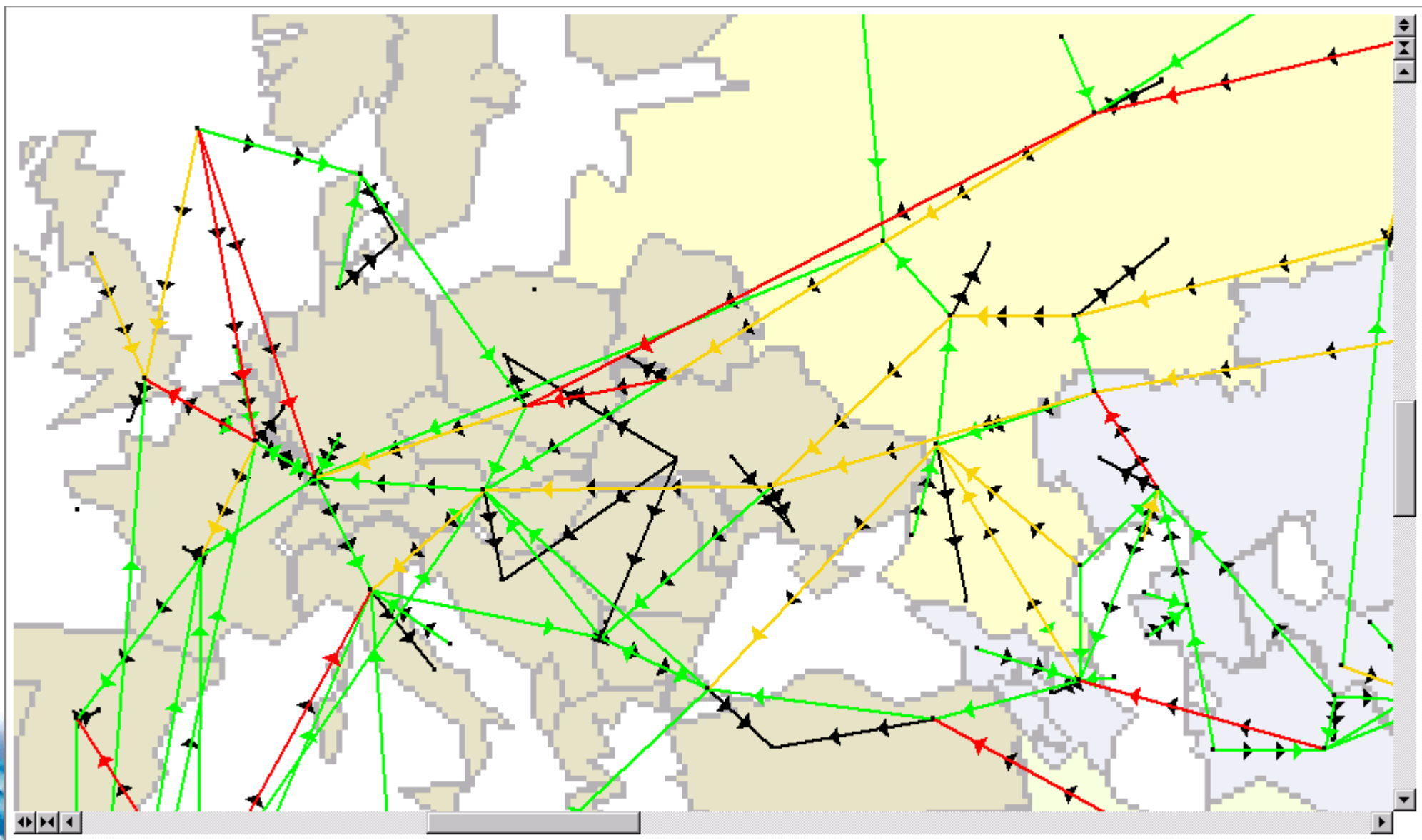
Other Functionality Features

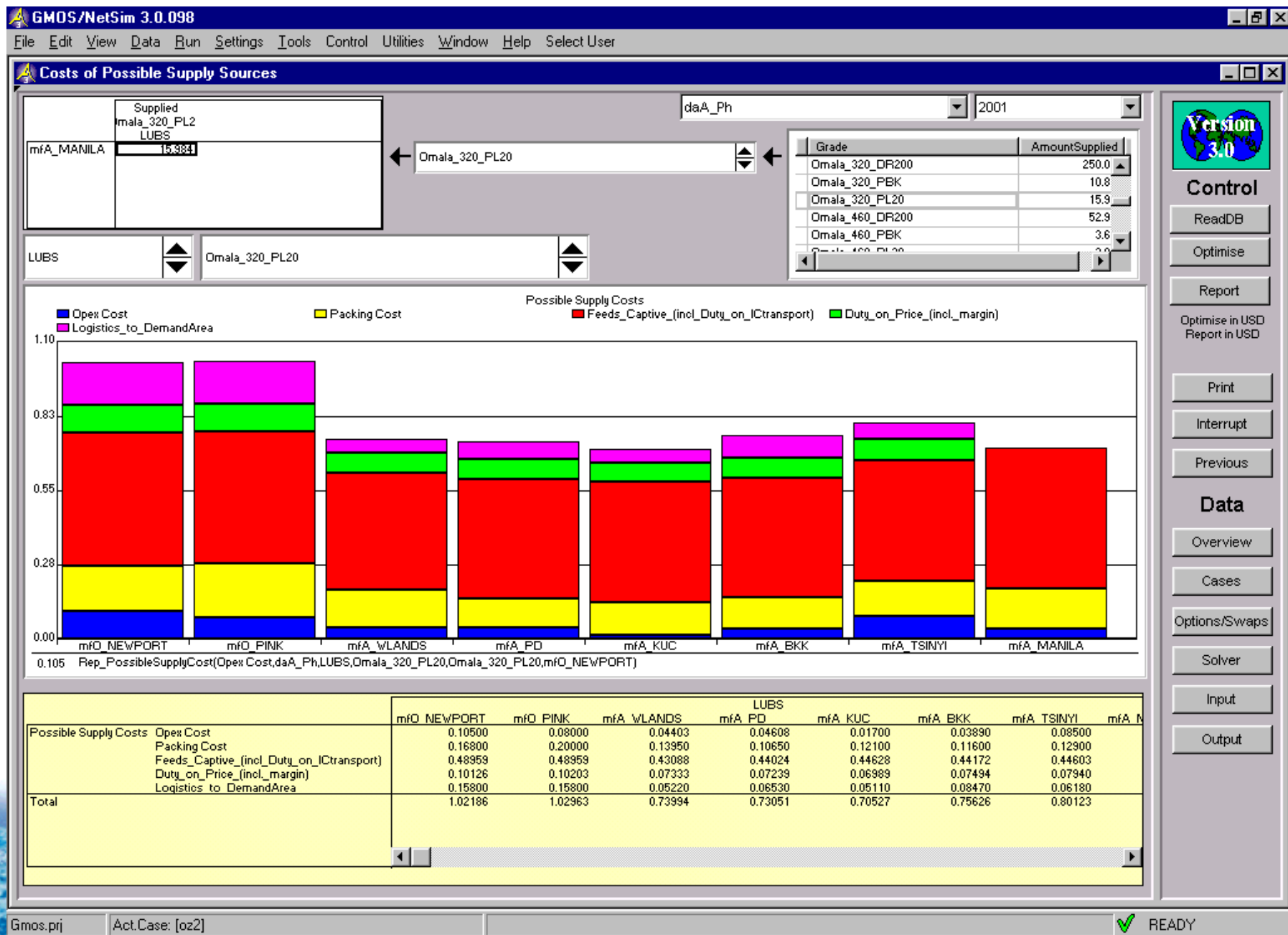
- Full Spec blending capabilities
- Multi-period – Mixed Integer Non Linear
- Data can be entered in currency of the country/region
- Full Profit & Loss overview
- Graphics
- Drill – down possibility
- Extensive Data consistency checking
- Constraint Analyzer / Infeasibility Analyzer
- Built-in documentation
- Maintenance & Support (help-) desk
- Annual User Group Meeting
- R&D program – “Rapid Model Builder”

Main system features

- PC based: AIMMS – EXCEL / MS-Access front end / reporting
- 100% data driven
- Data intensive
- Enables transparent decision taking:
 - Data consistency
 - Robustness analysis (series of sensitivity analysis)
 - What-if's using case management









Control

ReadDB

Optimise

Report

Optimise in USD
Report in USD

Print

Interrupt

Previous

Data

Overview

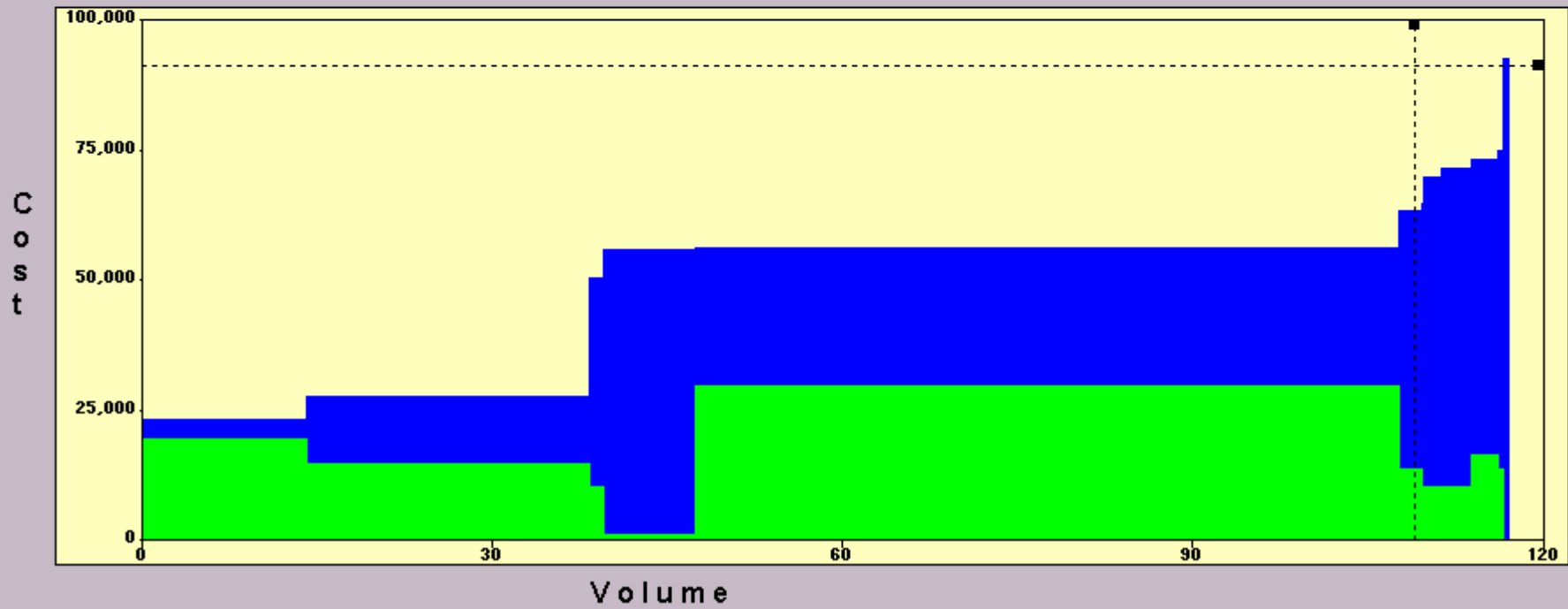
Cases

Options/Swaps

Solver

Input

Output



Application Areas

Production Planning

- Feedstock selection, production & demand allocation
- Evaluation alternative feedstock suppliers
- Cost of product non-interchangability

Benchmarking

- Assess (competitive) position per demand area
- Identify key performance drivers (sensitivity analysis)

Investment Planning

- Asset re-structuring / Debottlenecking
- Feasibility alternative manufacturing technologies
- Master Plan Studies
- Valuation of potential acquisitions
- Sustainable Development studies

Thank you for your attention

