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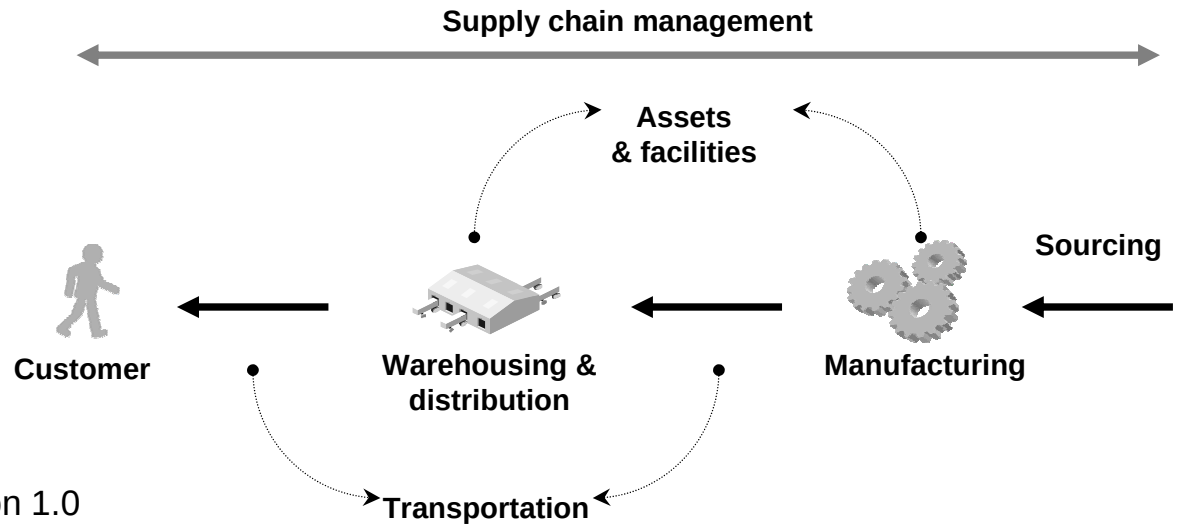
Decision support system for the definition of the optimal warehouse concept

•Ware 2 Store•
logistic engineering tool



Agenda

- **Why** •Ware 2 Store• logistic engineering tool **?**
- Model structure
- Project approach
- Results

Why Ware 2 Store?

Questions:
Which warehouse concept is the optimal combination of storage system and material handling equipment?
Should all products be handled in the same warehouse concept or should one differentiate?

Strong tool to help to answer these questions quickly:

•Ware 2 Store•
logistic engineering tool

For a quick and consistent warehouse concepts evaluation

Consequence:
The lead-time of feasibility studies are shortened and the studies are even more complete !

Why Ware 2 Store?

A wide range of warehouse concepts are included

Pallet-like concepts:

- Wide aisles
- Narrow aisles
- Automatic cranes
- Block stack
- Pallet flow, manual picking
- Pallet flow, pick to bin
- Drive-inn racking

Shelve-like concepts:

- Shelves, manual picking
- Shelves, pick to tote
- Case flow, manual picking
- Case flow, pick to tote
- Miniload

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Why Ware 2 Store?

Sensitivity analysis

Ware 2 Store makes it possible to quickly run what-if scenarios such as:

- What if the order profile changes?
  - *Is the chosen concept still optimal and does it meet the required capacity?*
- What if the future growth is bigger than expected?
  - *Is the chosen concept flexible enough to capture this growth?*
- What if a different picking strategy is used?
  - *What is the optimal solution in that case?*

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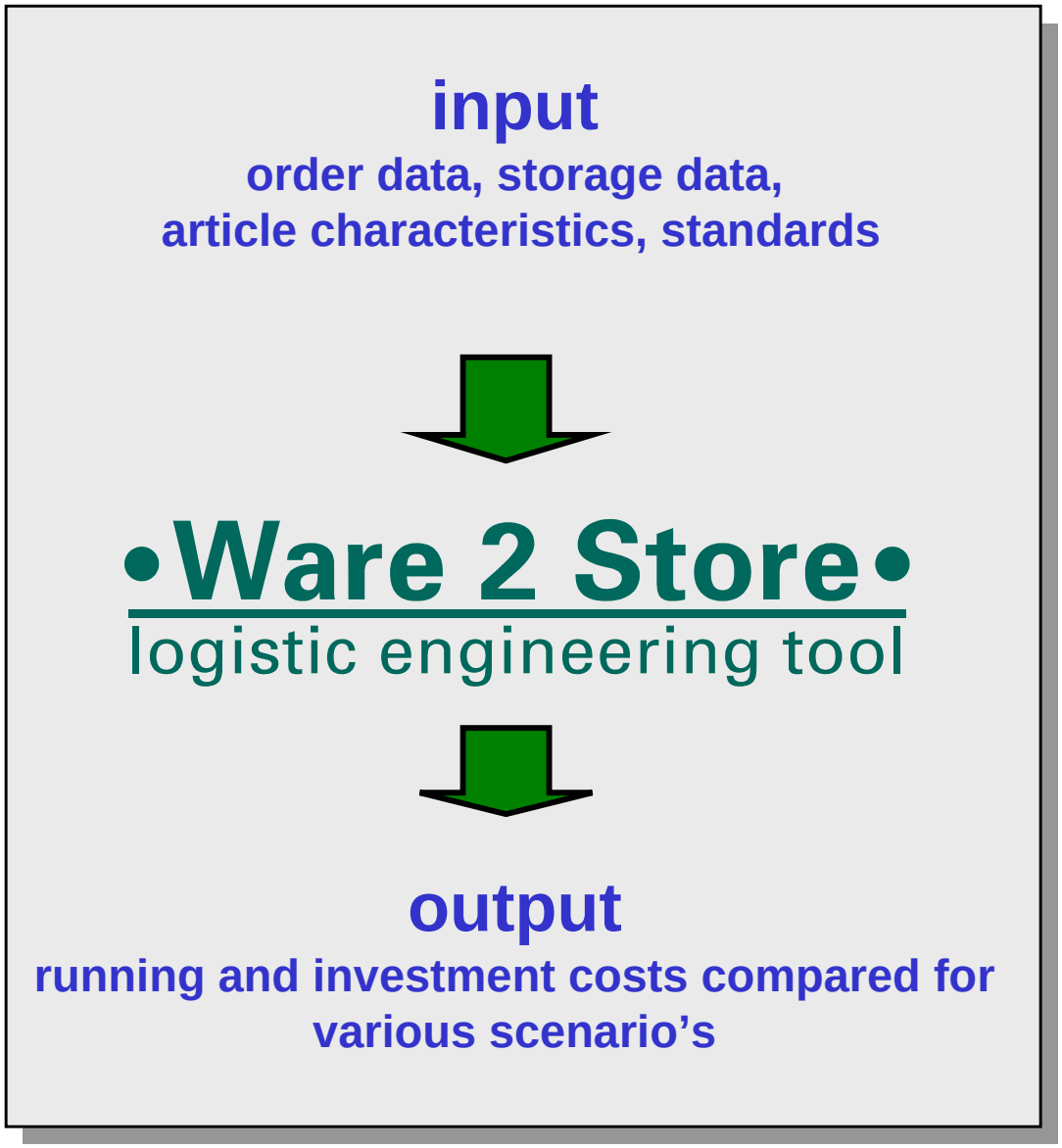
Model structure



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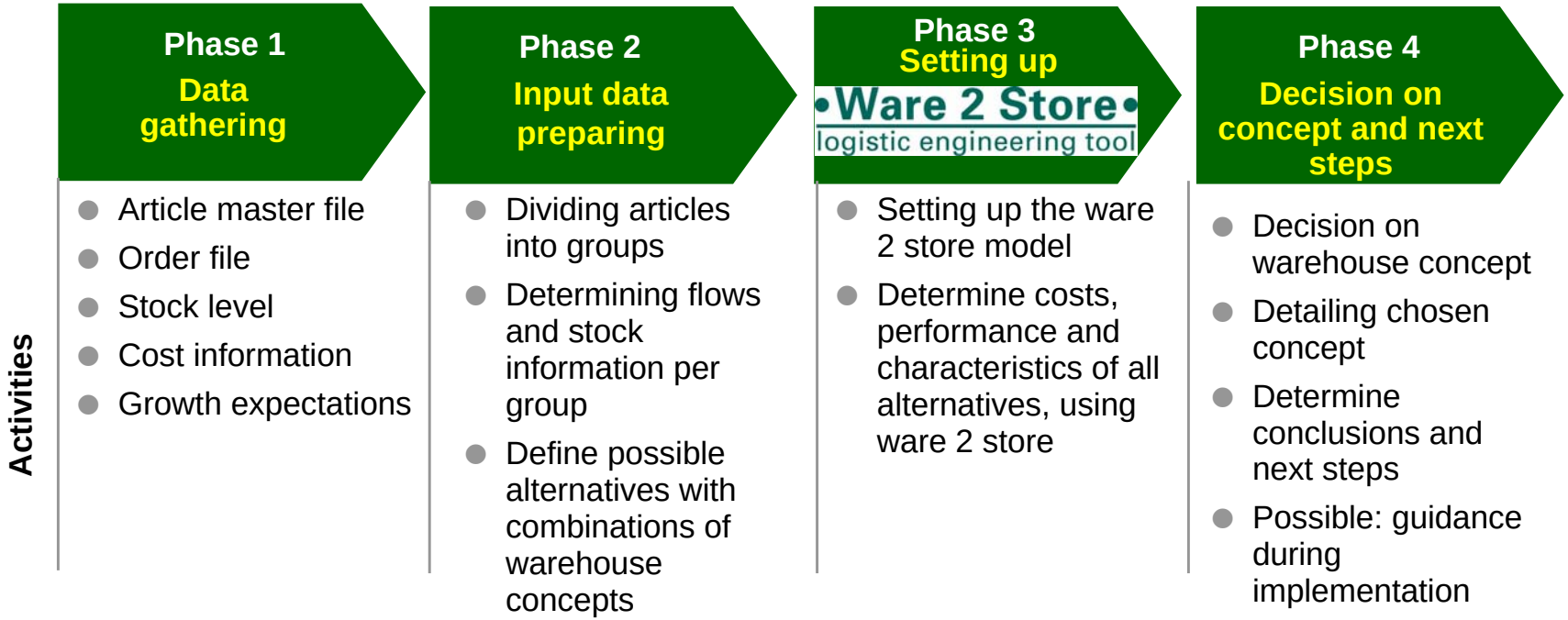
- **Project approach**
- Results

Project approach



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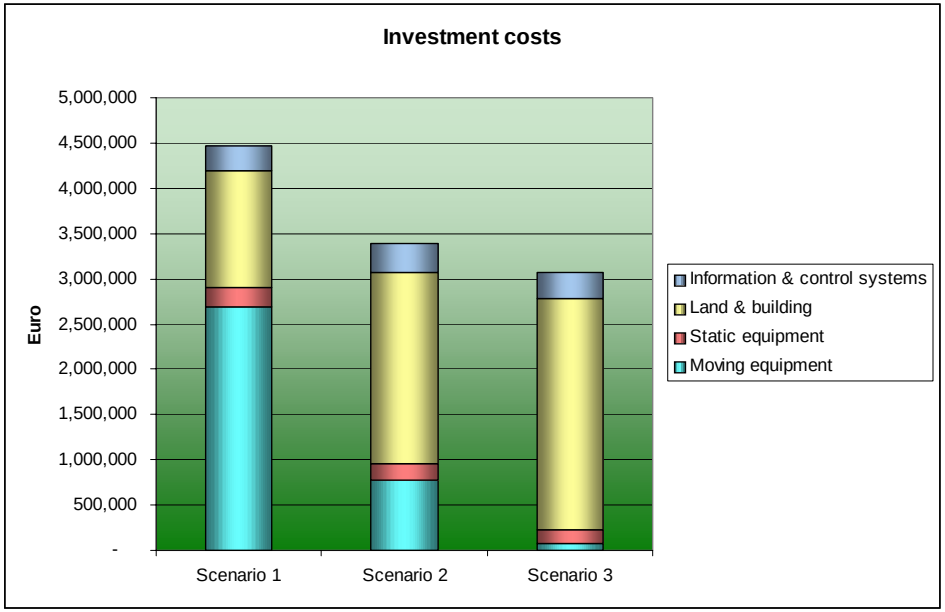
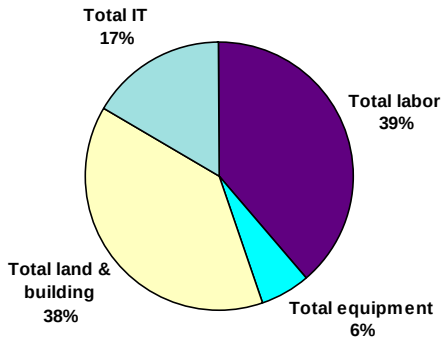
Results

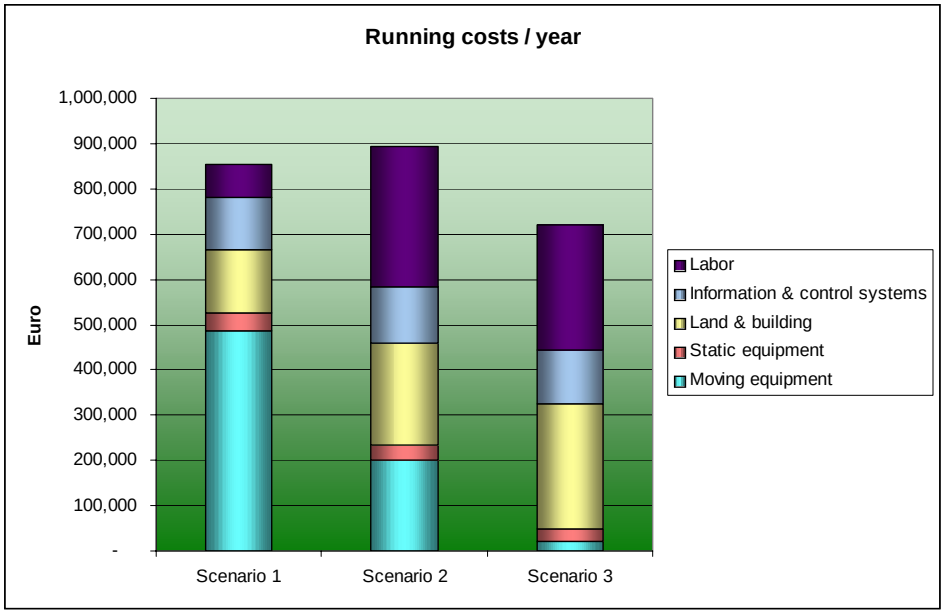
A good and fast comparison can be made based on the output of the model

Characteristics	Scenario 1	Scenario 2	Scenario 3
# direct FTE	2	8	7
# indirect FTE	1	1	1
m2	2,013	3,262	3,960



Build up of running costs / year for scenario 1





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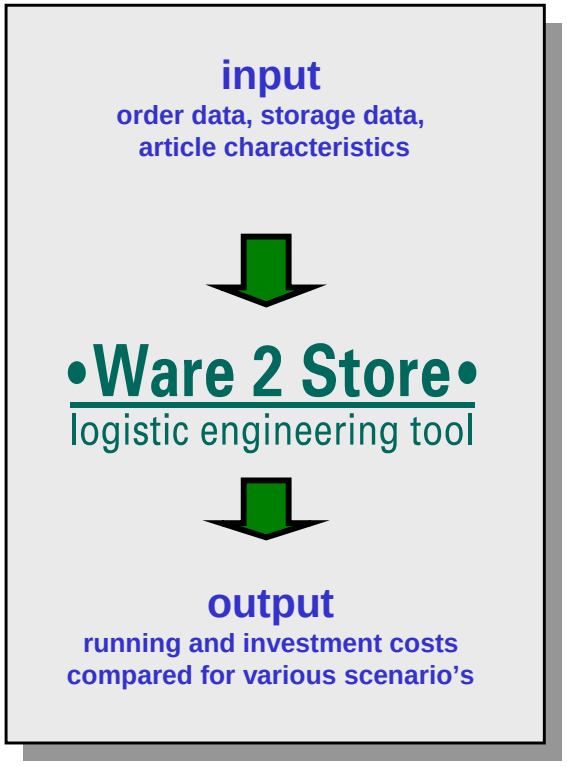
Model structure more details

Ware 2 Store is a simulation tool determining the running and investment costs for a combination of warehouse systems using parameters such as:



Operation specific parameters:

- Order data:
  - flows in (# pallets, # mixed pallets, # totes)
  - flows out (# full pallets, # orders, # lines / order)
- Storage data:
  - # pallets / # totes on stock
  - ABC characteristics
- Article characteristics:
  - # pallets / # totes on stock
  - pallet / tote dimensions
  - article size, easy or difficult to pick

Warehouse system specific parameters:

- Financial data (costs for land/m^2, building/m^2, equipment, IT, labor)
- General data resources (velocity trucks, picking times, labor working times)

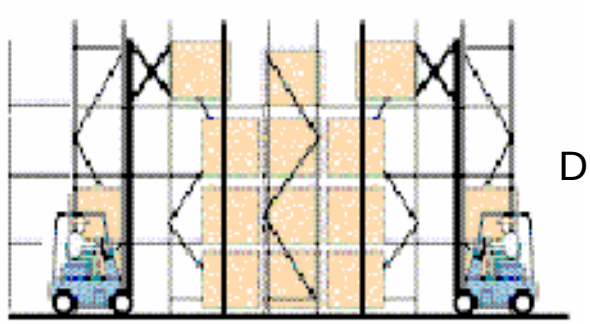
Pictures pallet-like concepts

Wide aisles

Narrow aisles

Block stack

Automatic cranes



Drive inn racking

Pallet flow with pick to belt

Pictures shelve-like concepts

Shelves, manual picking

Caseflows, manual picking

Miniload