FOM ild Institut für Logistik- & Dienstleistungsmanagement an der FOM University of Applied Sciences

Sustainability and Innovation in Logistics – Friends or Foes?

MESD 2009, ICN Nancy, 06.11.2009

Prof. Dr. M. Klumpp, FOM ild
Dipl.-Kfm. (FH) S. Bioly, FOM ild
Prof. Dr. S. Zelewski, UDE PIM

UNIVERSITÄT DUISBURG ESSEN

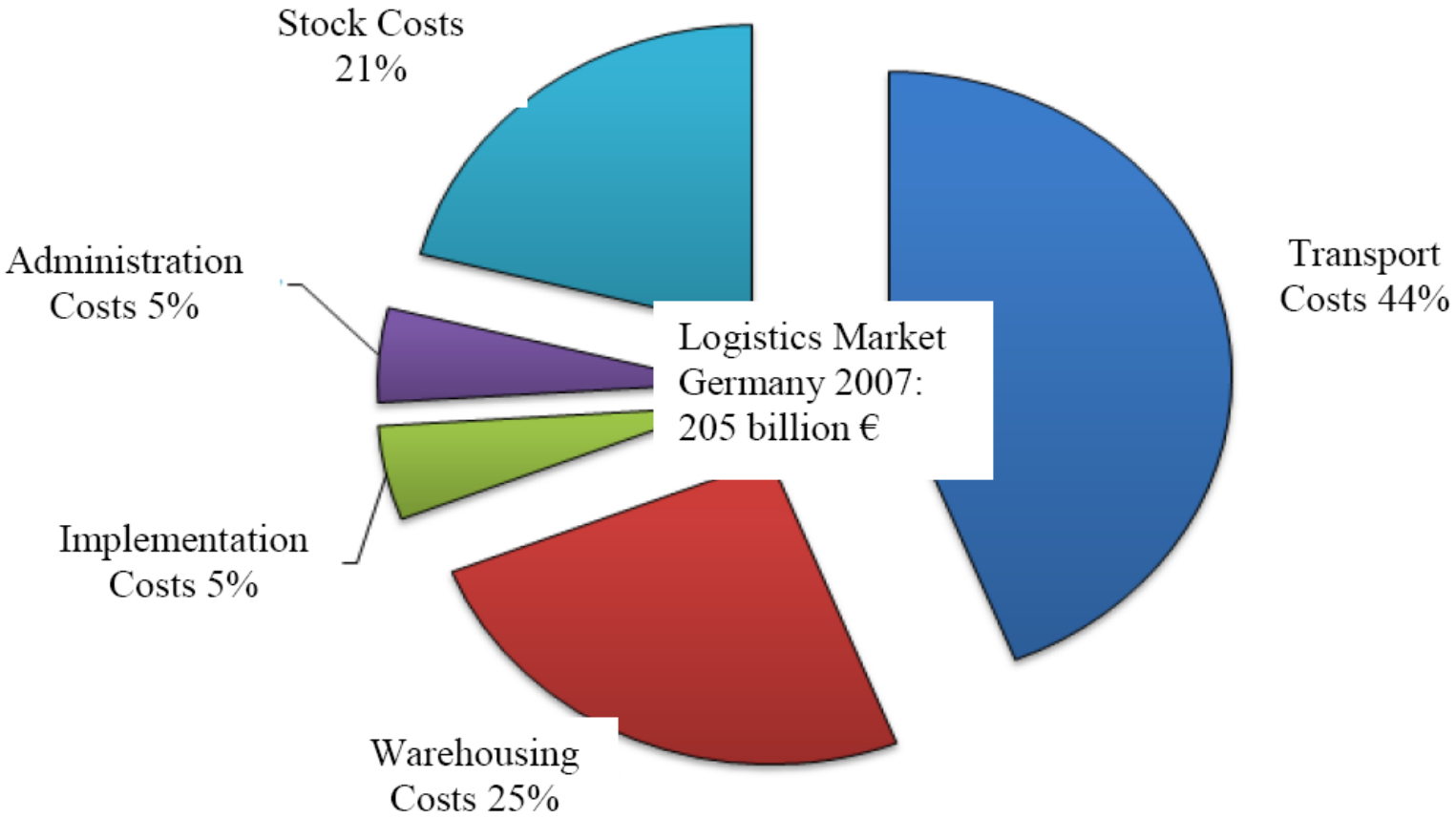
PIM

Agenda

1. Introduction
2. Economic Logistics Perspective
3. Sustainable Logistics Perspective
4. Integrated Innovation Concept
5. Conclusions

1. Introduction

(A) **Logistics** is a huge sector with non-neglectable **ecological impact** as in transport and warehousing.



1. Introduction

(B) In **Logistics** several **major trends** are driving forces of change, **sustainability** and **innovation** among them.

Globalisation

→ Complex & Volatile SC

Security

→ Physical & Information

Trends in Logistics

Innovation

→ Technology / Integration

?

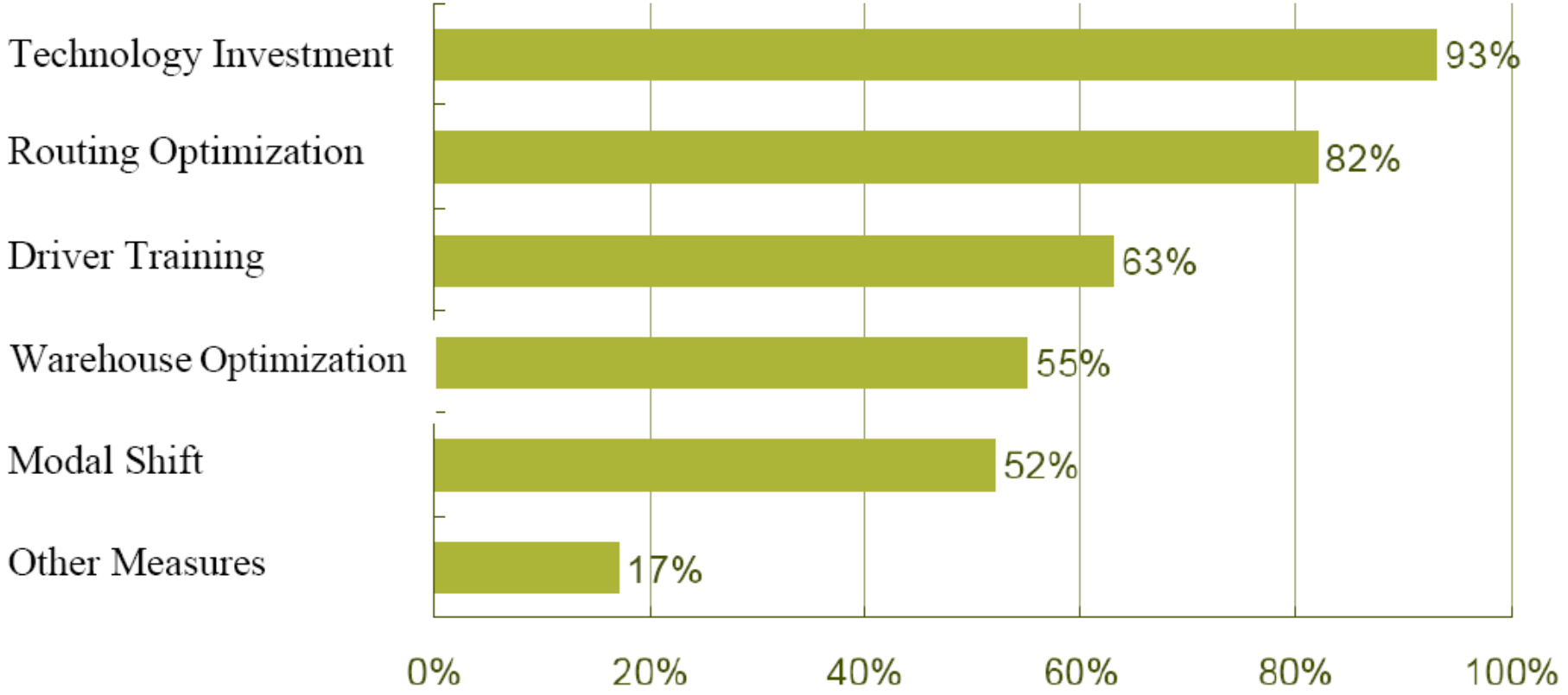
Sustainability

→ Energy & Pollution

Source: Straube, F., Pfohl, H. (2008), Bundesvereinigung Logistik (BVL) Berlin.

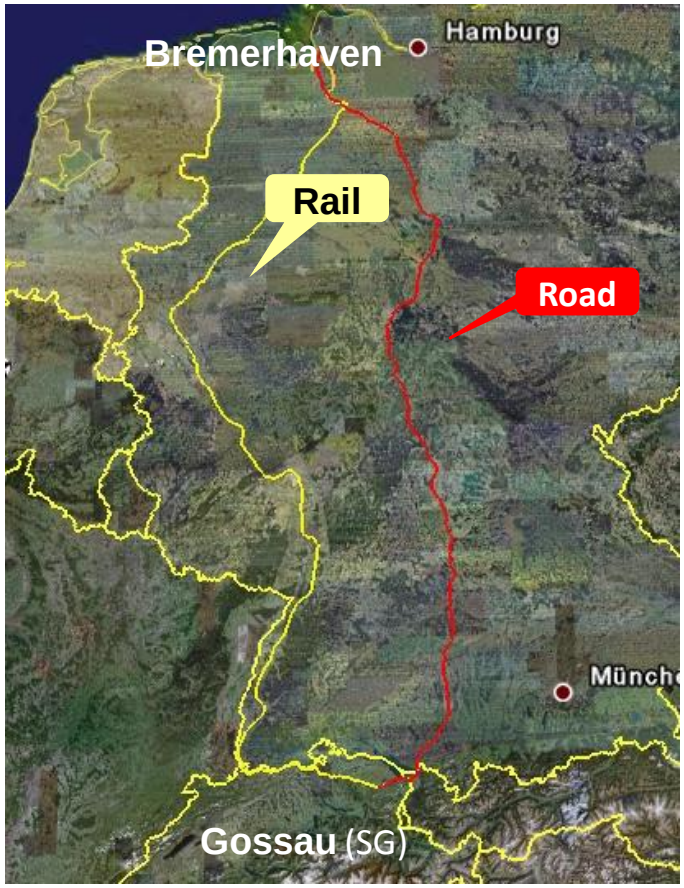
1. Introduction

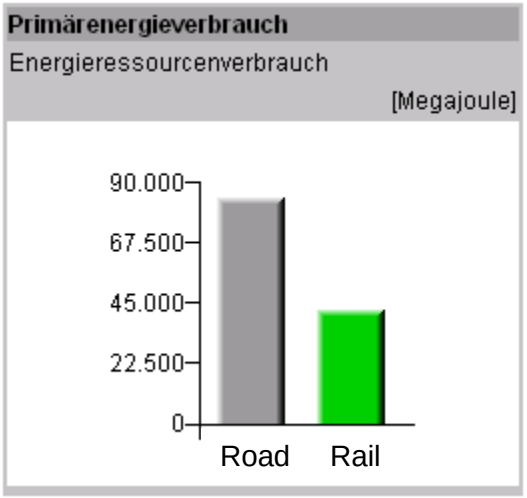
(C) Companies answer the challenges with **technology investments** – research is neglecting this connection.

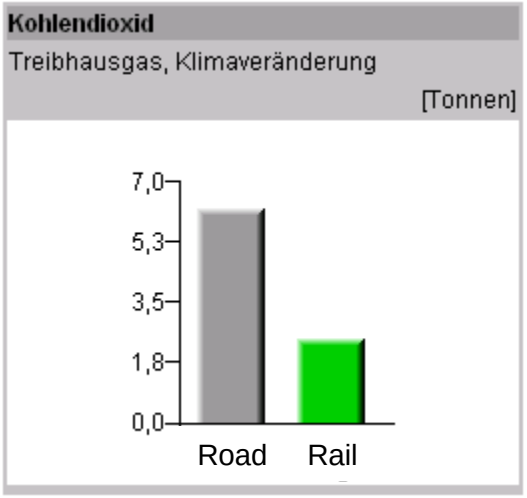


1. Introduction

(D) Logistics research is usually comparing **ceteris paribus alternatives** – not searching for win-win-concepts.

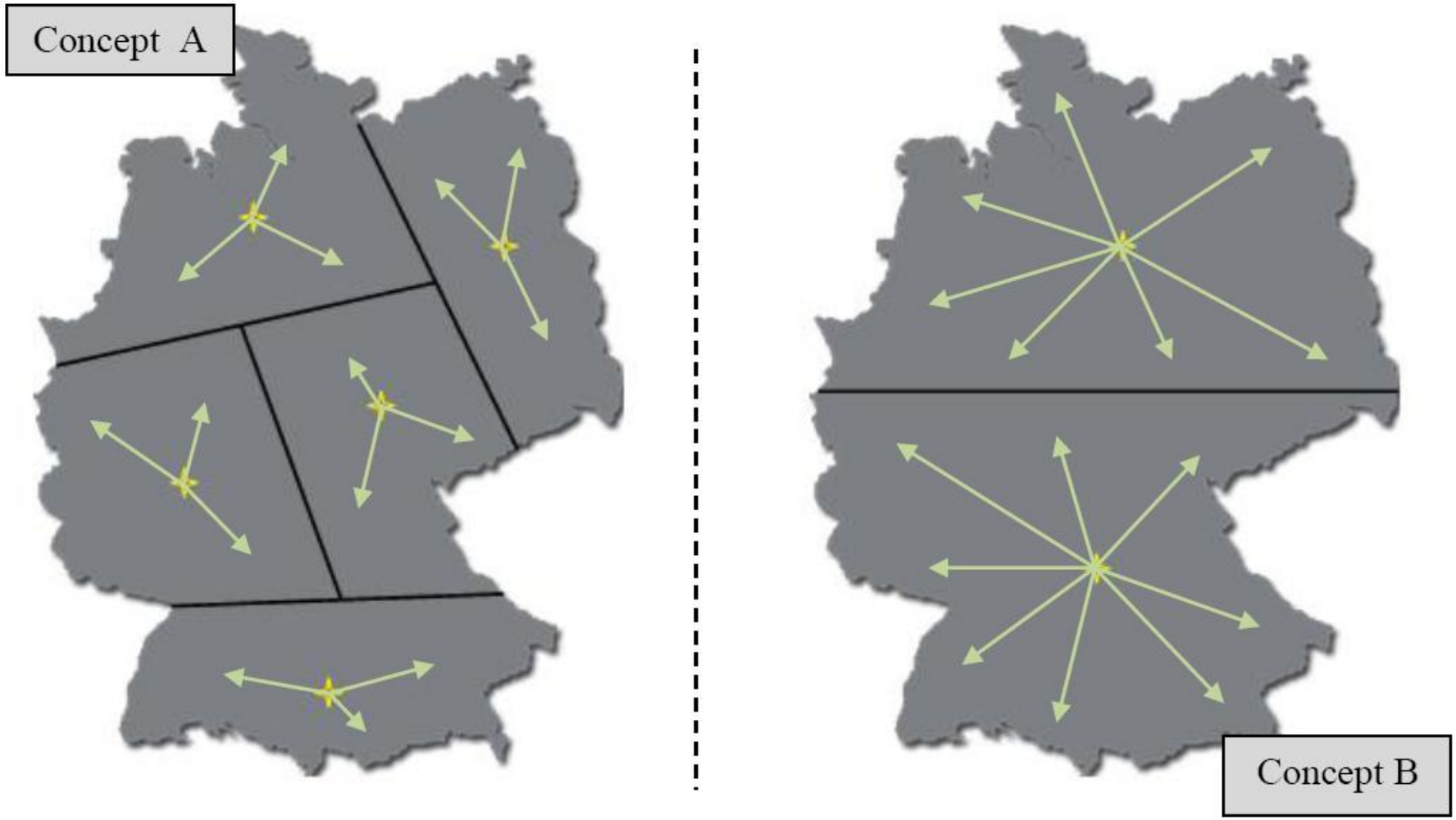






- 50% less energy consumption for rail transport
  60% less CO_2 emission compared to road
- With increasing road pricing and also increasing congestion rail cargo may be the strategic alternative

2. Econ. Logistics Perspective



(A) Logistics concepts try to improve **transportation costs**.

2. Econ. Logistics Perspective

Decentral Warehousing (Status quo)

(I) (More) Central Warehousing

→ Cost Reduction
→ Increasing Pollution

(II) Decentral Warehousing with RFID

→ Cost Reduction by reduced security stock level
→ No increased Poll.

(B) Logistics concepts shall optimize for **several** objectives.

2. Econ. Logistics Perspective

Stock costs rise with the number of warehouses.*)

- This is because the **average inventory** to meet a predetermined **availability level** in a market rises with an increasing number of warehouses whose inventories are held to supply the market
- The effect is primarily caused by **safety stock levels**

Besides several additional advantages by using **RFID** a benchmark study (2003/04) on returnable transport items (RTI) shows that total **safety stock level can be reduced by 10 %**.**)

*) Source: Pfohl, H. (2004) Logistikmanagement, p. 117

**) Source: www.logica.com/pdf/rfid_study.pdf (2004), p. 43

2. Econ. Logistics Perspective

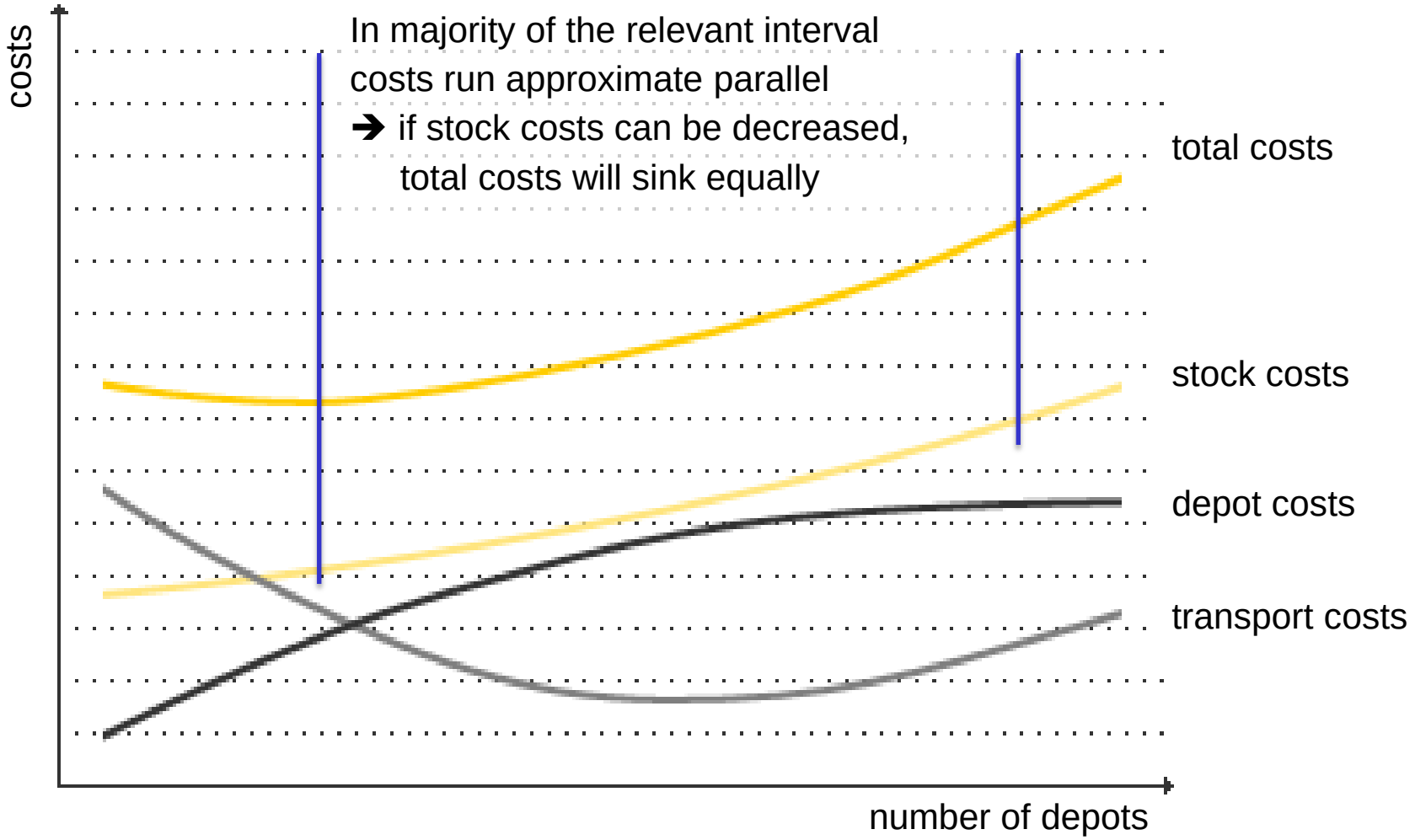


Illustration: Stock/Lambert (2001) Strategic Logistics Management, p. 409

2. Econ. Logistics Perspective

Benefit	Values
Handling costs per RTI in a distribution centre through increased efficiency	> Without RFID, the costs per pallet are € 6.14 (all handling and storage costs) > With RFID, the costs are € 5.62, saving € 0.52 > This is an increase in handling efficiency of 8.5 % per pallet
Reduction in **safety stock levels** of RTI	> The total RTI pool can be reduced by 10 % through optimization

‚RFID & RTI' - Assumptions

The chosen values are based on empirical data, on the basis of market data and interviews. Following values were used:

Costs:

- RFID tag price: € 0.50; installation of RFID readers per dock door: € 30,000.00
- In expensive pallet: € 6.50, Roll container: € 50.00

The generic supply chain is structured as follows:

- Each link occurs once in the supply chain, apart from the suppliers and stores, which occur 15 times
- Total RTI quantity to flow through the supply chain is 10,000 per day
- The total RTI stock in the chain is 100,000.
- The collection area is the pool manager and owner of the RTI
- 7 working days per week assumed
- No distinction has been drawn between central and regional distribution centres
- Each of the 15 stores has one dock door
- The production facility has a total of 25 dock doors

Depreciation period for investments:

- Tags: 7 years (same as the lifetime of the RTI); Readers and antennas: 5 years, Interest costs: 7 %

Source: www.logica.com/pdf/rfid_study.pdf (2004) p. 43

2. Econ. Logistics Perspective

Logistics costs can be lowered by using RFID, concerning e.g.

+ Handling costs
+ Stock costs
+ Others as i.e. increasing transparency, traceability

It could be possible to **decrease costs so far**, that no significant cost advantage can be reached by **centralisation** (with increasing environmental pollution)

3. Sustainable Logistics Persp.

Sustainable Logistics by ...

… new motor technologies.

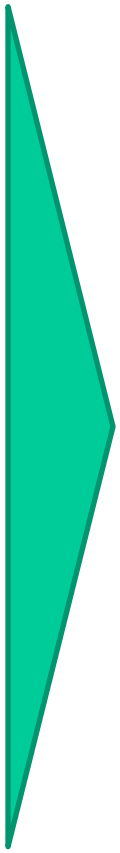
… information technologies.

… recycling and packaging.

… DGR observation.

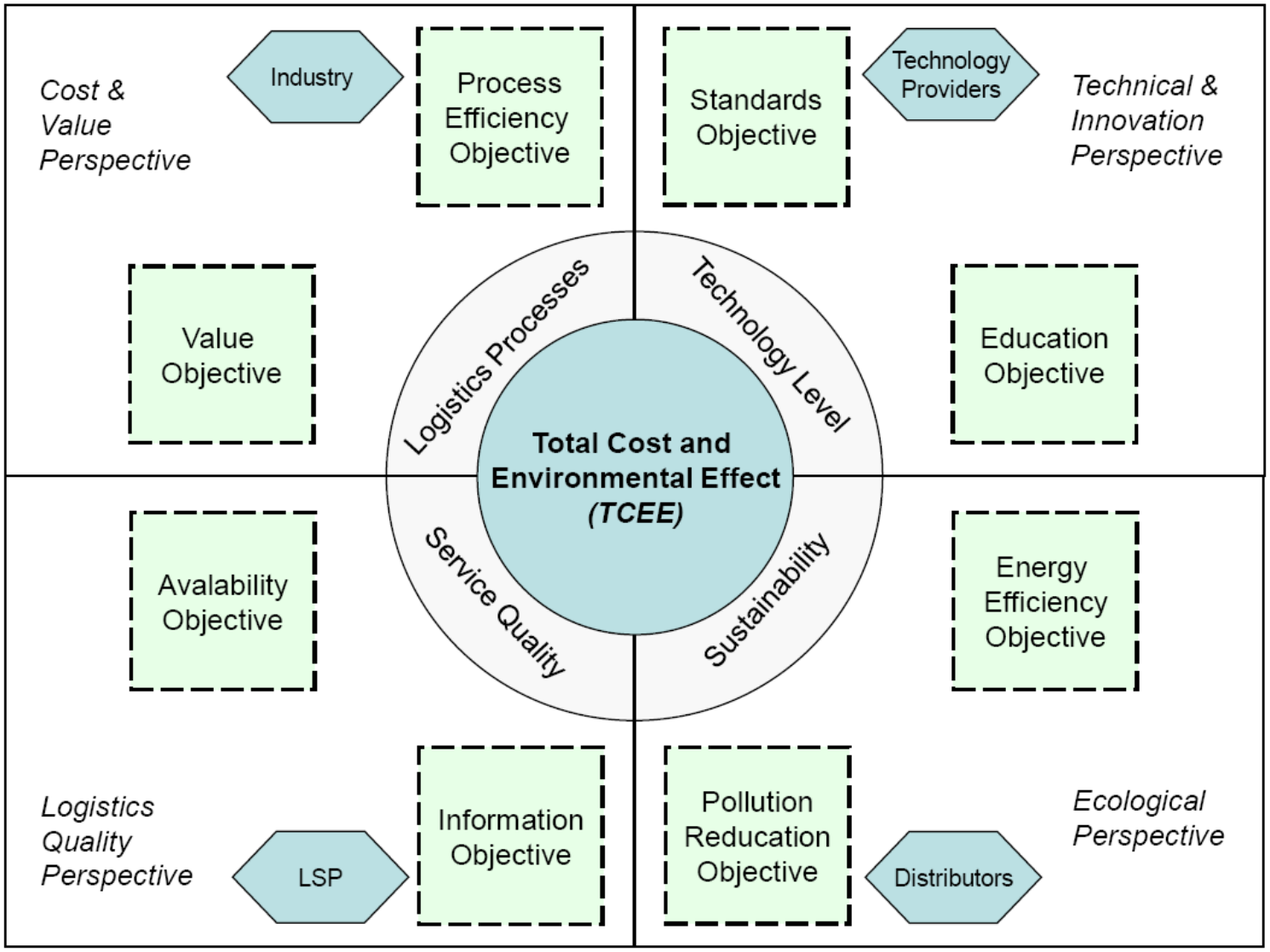
… co-operative logistics.

… optimization routines.



But still:
Single, **not integrated** solutions and innovation projects

4. Integrated Concept



5. Conclusions

- Both objectives of **technology innovation** and **sustainability** should be **included** in planning and concept outlining activities
- **Awareness** has to be enhanced: there are some crucial **concept decisions** as e.g. shown for warehousing structures which define the interaction of technology innovation and sustainability on a long-term basis
- **Best practice examples** should be identified and examples for concepts integrating technology innovation **and** sustainability in logistics should be communicated

Institut für Logistik- & Dienstleistungsmanagement
an der FOM University of Applied Sciences

Sustainability and Innovation in Logistics – Friends or Foes?

MESD 2009, ICN Nancy, 06.11.2009

Prof. Dr. M. Klumpp, FOM ild
Dipl.-Kfm. (FH) S. Bioly, FOM ild
Prof. Dr. S. Zelewski, UDE PIM

Thank you for your attention.