Logistics 2050: A Scenario Study

Project Presentation
"It is impossible to predict the future but also dangerous not to try."

Henri Deterding, Founder of Royal Dutch Shell
Background &
Key Characteristics
<table>
<thead>
<tr>
<th>Thrust</th>
<th>Focus Area</th>
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</thead>
<tbody>
<tr>
<td>A Credibility</td>
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<td>2 Simplification – DHL offers what customers need.</td>
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<td>9 Employer Image</td>
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Background: "Logistics 2050" is a Strategic Initiative within Comms Strategy 2011

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Background:
Continue Series of Thought Leadership Publications

DELIVERING TOMORROW

Delphi Study 2009
Towards Sustainable Logistics 2010
Logistics 2050: A Scenario Study...
2011/2012

... is a strategic initiative within the Group’s 2011 Comms Strategy

... will continue the „Delivering Tomorrow“ publication series which started in 2009 with the “Delphi study” and continued in 2010 with “Towards Sustainable Logistics”
Project Overview “Logistics 2050”

Objective:
Delivering the first comprehensive and far-reaching scenario study on the future of logistics

- **Time horizon:** 40 years
- **Scope:** Develop different scenarios of the logistics environment in 2050
- **Focus:** Scenarios are based on projected developments of macro-economic, geopolitical, social and technological drivers
- **Relevance:** Study not only presents different scenarios but also highlights strategies to respond to the challenges and opportunities associated with each scenario
- **Sources:** Internal as well as relevant external experts involved in the development process
Scenario Development Process
How Can We Derive Plausible and Coherent Future Scenarios From These and Many More Opinions?*

- I am rather pessimistic on the development of CO₂ emissions trends. I am not very hopeful for a 2°C temperature limitation.
- Between the leading cities, there will be more exchange and also more competition with regard to the most efficient regulatory methods.
- Continuing urbanization will lead to new transport and logistics solutions for cities.
- Broadly, fuel will become more available and prices will decrease because efficiency outruns depletion.
- Developments in material technology will open up a variety of opportunities for energy-efficiency, lightweighting, etc.
- ICT is the most rapidly developing technology and opens up many opportunities.
- In real terms, the oil price can reach a level of about factor 3 compared with the current price level.
- It is not unimaginable protectionist tendencies could lead to a reversal of globalization.
- The world might end up totally decentralized; not only local consumption but also highly localized production.
- Dematerialization (...) and 3D-printing (...) are going to shrink what we send and how often we send it.
- By 2050 we will be in the situation where we are told: You emitted x thousand kilograms of carbon emissions – here is your individual carbon tax.

* All quotes on the slide taken from the „Logistics 2050“ expert interviews.
The Scenario Development Process – Reduction and Analysis of Factors

62 Factors → 27 Factors → 14 Key Factors

1. Expert Interviews
2. Research
3. Consistency
4. Raw Scenarios
5. Expert Workshop
6. Enrichment
7. Final Scenarios
8. Management and Expert Input
9. Strategic Implications

5 Scenarios
The Scenario Development Process*

**Influencing Factors**
- Initial set of 62 factors
- Cluster and consolidate to 27 influencing factors

**Key Factors**
- Distill 14 key factors via expert input and a cross-impact analysis

**Projections**
- Assess the possible future developments for each key factor through expert interviews and additional research

**Raw Scenarios**
- Apply consistency analysis to the projections
- Use analysis results to construct five raw scenarios

**Final Scenarios**
- Fine tune and finalize the five scenarios through an expert workshop

**Implications**
- Derive strategic implications of each scenario for the logistics industry based on top management input

**Strategies**
- Finalize impact analysis through an expert workshop

**Publication**
- Integrate the scenarios and implications into the final publication

* Process implemented together with Z_punkt, an agency specialized on scenario development
The Scenarios Are Based on a Broad Range of Key Factors

| 1 | Level and Distribution of Income |
| 2 | Dominant Consumer Needs |
| 3 | Quality of Urban Development |
| 4 | Distribution of Production and World Trade |
| 5 | Energy Price and Energy Mix |
| 6 | Availability and Price of Raw Materials and Resources |
| 7 | Level of Climate Change |
| 8 | Regulatory and Spending Policy |
| 9 | Trade Regulation |
| 10 | Logistics and Transport Regulation |
| 11 | Political Stability and Economic Security |
| 12 | ICT Systems and Robotics |
| 13 | Material Technology |
| 14 | Infrastructure for International Exchange |

For a description of each single factor see pp. 34/35 (Backup)
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Thomas Bachl</td>
<td>Global Head of Consumer Tracking and Managing Director of GfK Panel Services Deutschland</td>
</tr>
<tr>
<td>Dr Fatih Birol</td>
<td>Chief Economist, International Energy Agency</td>
</tr>
<tr>
<td>Dr Emrah Cengiz</td>
<td>Associate Professor of Marketing and Production Management, Istanbul University</td>
</tr>
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<td>Prof. Robert de Souza</td>
<td>Executive Director The Logistics Institute – Asia Pacific, Singapore</td>
</tr>
<tr>
<td>Sylvia Diederichsmeier</td>
<td>Head of Markets and Customers, Society and Tech. Research Group; Daimler AG</td>
</tr>
<tr>
<td>Margareta Drzeniek Hanouz</td>
<td>Director and Senior Economist, Global Competitiveness Network, World Economic Forum (WEF)</td>
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<td>Dr Murat Erdal</td>
<td>Associate Professor; Logistics and Supply Chain, Istanbul University</td>
</tr>
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<td>Dr Bernd Flessner</td>
<td>Author, futurologist and lecturer at University of Erlangen-Nuremberg, Germany</td>
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<td>Prof. Chung-Yee Lee</td>
<td>Department of Industrial Engineering and Logistics Management, Hong Kong University of Science and Technology</td>
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<td>Dr Amory Lovins</td>
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<td>Hans Persson</td>
<td>Senior Vice President Technology &amp; Innovation; Volvo Technology Corporation</td>
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<td>Prof. Eberhard Sandschneider</td>
<td>Director of the Research Institute of the German Council on Foreign Relations</td>
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<td>Prof. Yossi Sheffi</td>
<td>Department of Industrial Engineering and Logistics Management, Hong Kong University of Science and Technology</td>
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<tr>
<td>Dr Karlheinz Steinmüller</td>
<td>Scientific Director, Z_punkt The Foresight Company</td>
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<tr>
<td>Björn Stigson</td>
<td>President, World Business Council for Sustainable Development (WBCSD)</td>
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<td>Prof. Jayashankar M. Swaminathan</td>
<td>Glaxo Distinguished Professor of Global Business, The Kenan-Flagler Business School, University of North Carolina</td>
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<tr>
<td>Professor Michael ten Hompel</td>
<td>Managing Director; Fraunhofer Institute for Material Flow and Logistics (IML)</td>
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<tr>
<td>Sven Teske</td>
<td>Renewable Energy Director, Greenpeace International</td>
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<tr>
<td>Prof. Klaus Töpfer</td>
<td>Former executive director of the United Nations Environment Program (UNEP)</td>
</tr>
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<td>Prof. Katja Windt</td>
<td>Professor of Global Production Logistics, Jacobs University Bremen</td>
</tr>
<tr>
<td>Georg Zachmann</td>
<td>Research Fellow, Bruegel (Brussels-based think tank on international economics)</td>
</tr>
<tr>
<td>Prof. Michael Zürn</td>
<td>Director of research unit “Transnational Conflicts and International Institutions”, WZB (Social Science Research Center Berlin)</td>
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Involvement of External Experts
Five Scenarios
Logistics 2050 Scenarios – Overview

1. Untamed Economy – Impending Collapse
2. Megaefficiency in Megacities
3. Customized Lifestyles
4. Paralyzing Protectionism
5. Global Resilience – Local Adaptation
Scenario 1: Untamed Economy – Impending Collapse

**Key Elements**

- Unsustainable economic development
- World driven by materialism
- Economic shift to Asian countries
- Trade barriers lifted
- Global “super grid” for transport
- Uncontrolled exploitation of natural resources
- Destruction of natural environments

**Logistics Implications**

- Massively increased global logistics market
- Manufacturers outsource their logistics needs
- Climate change opens arctic trade corridors
- Extreme weather events threaten established trade routes
Scenario 1: Untamed Economy – Impending Collapse

Arctic routes have become navigable

Constant race for resource extraction leads to destruction of ecosystems

Center of economic power has shifted to Asia

Former developing countries have turned into high-tech locations

Vessel size far bigger than before

Extreme events have increased noticeably

Former developing countries have turned into high-tech locations

Center of economic power has shifted to Asia

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Scenario 2: Megaefficiency in Megacities

Key Elements

- Megacities have become epicenters of green growth
- Nation-states have become second-tier players
- Production and services highly automated
- Manufacturing in robotized plants
- Efficient transport concepts for local and global connections
- However: rural regions left economically behind

Logistics Implications

- Global transport with mega-transporters between megacities
- Unmanned low orbit transporters for express deliveries
- Freight dispatch centers in cities to pool goods
- New transport modes like underground cargo transporters
- Electric vehicles for deliveries
- Logistics providers become megacity utilities
- Logistics situation in rural areas very poor
Scenario 2: Megaefficiency in Megacities

- Majority of population resides in urban areas by 2050
- Widening gap between urban and rural areas
- New types of transportation in cities
- Megacities are well connected to the other megacities worldwide
- Huge unmanned cargo planes
- Unmanned low orbit transporters allow quick point-to-point express delivery
Scenario 3: Customized Lifestyles

Key Elements

- Individualization has become a pervasive phenomenon
- Consumers empowered to design their own products
- Technological progress:
  - Home Fabbing
  - Local FabShops
  - Industrial Fabbing
- Regionalized trade, local product flows
- International trade of data and raw materials (for printers)

Logistics Implications

- Long distance transport of goods drops sharply
- Regional logistics capabilities important
- Supply chains less fragmented
- Logistics in 2050 consists of an online and an offline element:
  - Offline segment: raw material transport & reverse logistics
  - Online segment for secure data transfer
Scenario 3: Customized Lifestyles

- Billions of households owning a home 3D-printer in 2050
- More sophisticated items produced in fab shops
- Mobile 3D printing
- Raw material logistics that serves 3D printing cartridge manufacturers
**Scenario 4: Paralyzing Protectionism**

**Key Elements**
- Economic hardship sets globalization in reverse
- Trading mainly within regional blocs
- Regionalized supply chains
- Productivity decline
- Scarce resources (also due to protectionism)
- International conflicts over resource deposits as result

**Logistics Implications**
- Entering markets in foreign trading blocs nearly impossible
- Substantially reduced volume for global logistics operations
- Domestic markets gain importance
- Advantages for regional champions with good government relations
- “Devaluation” of logistics: Few customized solutions – very commoditized business
Scenario 4: Paralyzing Protectionism

- Almost no exchange of goods between different regions
- Switch to locally available energy sources
- Resource extraction has increased
- Clearing customs can take several weeks.
- Threat of small conflicts connected with resource deposits
- Protectionism is common practice
- International express and forwarding segment shrinking
Scenario 5: Global Resilience – Local Adaptation

**Key Elements**

The run-up (first decades of 21st century):
- Numerous disasters due to climate change
- Lean production threatened (vulnerable supply chains)
- Result: change in thinking

**Resilience** as new economic paradigm
- Change to regionalized supply chains
- Move towards redundant systems / supply safety
- Quick reactions to production failures
- Disaster relief important

**Logistics Implications**
- Supply security top priority
- Shorter transport distances favor companies with regional roots
- Logistics firms hold ready redundant capacities
  - Warehouses as buffers instead of Just in Time
  - Truck, train and ship fleets used as backup
- Major role for international providers > financial strength
- Disaster relief operations a successful business
Scenario 5: Global Resilience – Local Adaptation

- Transport capacities stand ready for emergencies
- Huge warehouse structures located close to manufacturer as buffers
- Many areas frequently threatened by disasters
- Emergency logistics providers offer comprehensive disaster response
## Implications of Scenarios

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<td>World GDP Development</td>
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<td>Quantity of global flows</td>
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<td>Environmental quality</td>
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<td>Regulatory openness</td>
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<td>Classic logistics growth potential</td>
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<td>New business perspectives for logistics</td>
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<td>Transformation intensity for logistics</td>
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The Publication and More
Key Characteristics

- 180 p. study
- 5 future scenarios & explanation of methodology
- 5 double-page color illustrations
- Various expert essays on future-related topics
- Available in English / German

Orders via: logistics2050@deutschepost.de
(study provided for free; shipping costs to be borne by ordering party)
In addition, future-related essays from various internal and external contributors also included in final publication.

**Inception**

On Looking into the Futures  
*by Professor James Allen Dator*

Winning in an Uncertain Future Through Scenario Planning  
*by Peter Schwartz*

**Issues**

The Future of Secure Communications in the Age of the Internet  
*by Jürgen Gerdes*

Beyond Double-Digit Growth: Perspectives for Sustained Prosperity in Asia  
*by Jerry Hsu*

Why I Believe in a Bright Future for Africa  
*by Amadou Diallo*

Vulnerability and Security in the 21st Century  
*by Professor Herfried Münkler*

The Future Belongs to Renewable Energies  
*Interview with Professor Klaus Töpfer*
In addition, future-related essays from various internal and external contributors also included in final publication

**Implications**

Mapping a Decarbonization Path for Logistics  
*by Professor Alan McKinnon*

Towards a More Robust Global Trade Environment  
*by Roger Crook*

Catering to Our Customers’ Future Needs  
*by Rob Siegers*

The Logistics of the Future: Revolutionary Changes or the Development of Trusted Solutions?  
*by Petra Kiwitt and Steffen Frankenber*

**Intelligence**

Recrafting Scenario Practice to Achieve Robust Long-Term Decisions  
*by Robert Lempert and Johanna Zmud*

Corporate Strategy in the Face of Volatility  
*by Jan Thido Karlshaus and Markus Reckling*
Five Animated Films of the Future Scenarios

- 5-minute films for each of the 5 scenarios (complete version)
- Adapteed to 7 languages
- 1-minute single scenario film clips
- Teaser film
- Footage material for TV broadcasting stations
www.delivering-tomorrow.com – an insightful, yet entertaining blog to be central hub for all thought leadership communication

**Insightful content**
- Articles/videos by with external and internal experts.
- Live stream of launch event
- Scenario videos and voting tool

**Interesting authors**
DPDHL and external specialists, professional theorists, practitioners, visionaries and scientists.

**Modest branding**
In order to put the relevant topics in the foreground and to underline credibility the branding is kept in the background.
## Key Factors – Definition

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<th>Level and Distribution of Income</th>
<th>Level and inequality of household incomes and wealth within and between countries, including indebtedness of private households.</th>
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<td>Dominant Consumer Needs</td>
<td>The development of the most dominant consumer preferences for products and services and the share of products and services in the buying mix.</td>
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<td>Quality of Urban Development</td>
<td>The way in which urban areas will develop. It is a given that by 2050, 6 billion people will live in cities, but it is uncertain if the urbanisation will be rather uncontrolled or dynamic in emerging countries (saturated or organic in developed countries).</td>
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<td>Distribution of Production and World Trade</td>
<td>Global dissemination of production facilities and the resulting trade flows of commodities and goods.</td>
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<td>5</td>
<td>Energy Price and Energy Mix</td>
<td>Fuel and energy price level and the share of fossil and renewable fuels in the energy mix (global and key countries).</td>
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<td>6</td>
<td>Availability and Price of Raw Materials &amp; Resources</td>
<td>Companies’ and peoples’ access to (critical) materials (e.g. water, metals, rare earths) and the price level of resources.</td>
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<td>7</td>
<td>Level of Climate Change</td>
<td>Level of the industry’s and other sectors’ GHG emissions as well as the number and impact of natural disasters.</td>
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<th>Regulatory and Spending Policy</th>
<th>The balance between spending and regulatory policies, the former including social redistribution, subsidies and public investments, the latter referring to the general economic framework (property rights, competition policy etc.).</th>
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<td>Trade Regulation</td>
<td>The rules and the framework which apply to the international exchange of goods and services (e.g. WTO rules, import restrictions, or customs).</td>
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<td>Logistics and Transport Regulation</td>
<td>Logistics and transport regulation may primarily be targeted at security objectives, environmental objectives, or monetary objectives. The rules, norms, and standards applying to the transportation of goods are designed accordingly.</td>
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<td>Political Stability and Economic Security</td>
<td>Political stability with regard to the international institutional framework, political cooperation, (inter-) national conflicts, terrorism, and corruption. Economic security in terms of property rights, criminality, and piracy.</td>
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<td>ICT Systems and Robotics</td>
<td>Precision, reach and general functionality of information, communication and knowledge management systems including tracking and tracing, geo data and robotics.</td>
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<td>Material Technology</td>
<td>Structure and functionalities of materials in regard to goods, vehicles, vessels, packaging, and 3D-fabrication.</td>
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<td>Infrastructure for International Exchange</td>
<td>Density and quality of road, train, shipping, flight, energy, and information infrastructure (also ports and airports) including funding, maintenance, and operation.</td>
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