Scenario Planning for Logistics

An Experts' View for 2025

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European Business School (EBS)

Final BESTUFS Conference “Cities of Tomorrow”
Athens, 12 June 2008
Agenda.

1. Why Futures Research and Scenarios?
2. Scenario Planning in Logistics
3. Design of Scenario Study for Logistics
4. Probable Future 2025
5. Discontinuity Analysis
6. Preliminary Results of RealTime-Delphi 2008
7. Next Steps
“The best way to predict the future is to create it.”

Peter F. Drucker
“Forecasts . . . provide an inappropriate tool to anticipate shifts in the business environment . . . as they are typically wrong when they are needed most.” (P. Wack, Chief Strategist, Shell 1985)

The oil industry’s expectations - Oil price forecasting has failed

Source: Energy Modeling Forum 2004
“Forecasting tries to abandon uncertainty by providing only one forecast – scenarios confront decision makers with uncertainty by presenting multiple futures.” (P. Cornelius, Chief Economist, Shell 2005)

Scenarios are internally consistent, plausible, and challenging narrative descriptions of possible situations in the future, based on a complex network of influence factors.

Source: Gausemeier et al. 1998; van der Heijden 2005; Bishop et al. 2007.
The high Anticipation Accuracy of the Shell Scenarios Underlines the Technique’s Value for Strategic Planning.

- **Highest level of U.S. oil production in 70s**
  - Oil industry dominant in USA until 2000

- **Crisis regarding oil resources before 2000**
  - Discontinuities sometime before 1980
  - Risk of drastic price increases

- **Dependency oil importers from OPEC in 80s**
  - Further discontinuities with price increases possible
  - No return to low prices

- **Oil resources sufficient until beyond 2010**
  - Oil producers develop "midstream"
  - Price decline possible

- **Possibilities for production cost cutting**
  - Regulations regarding sulphur reduced oil
  - Environment conditions return to fuel oil

- **Increasing market shares of Middle East**
  - OPEC production can increase onto 70 mb/d until 2020

- **Transport fuels prime oil products**
  - Trend from simple to complex refineries
  - Development of large oil vessels

- **Electric cars unlikely – liquid fuels remain dominant**
  - Car continues dominating personal mobility

- **White barrel becomes standard**
  - Strong growth in petro-chemistry

### Key Periods
- **late 1960s**
- **before 1973**
- **Mid-1970s**
- **late 1970s**
- **1980-1985**
- **1986-1990**
- **early 1990s**

Source: Royal Dutch Shell

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The Shell Success Story – How Shell Boosted its Margins to the Top of its Peer Group Through Scenario Planning.

Shell first employs scenario planning, developing one of its scenarios around an OPEC-induced price hike.

Shell responds quickly to embargo, boosting its margins to the top of its peer group.

Shell continues to employ scenario planning through a period of unrivalled profit margins among the world’s largest oil companies.

World Oil Price (Nominal Dollars per Barrel)

- Shell’s Profit Margin Rank Among Seven Sisters (British Petroleum, Chevron, Exxon, Mobil, Shell, Texaco and Gulf)

Source: Shell International; Corporate Strategy Board research.

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Turbulence in the Logistics Environment: The Effectiveness of Traditional Planning Techniques Decreases.

1. Increasing pace of globalisation
2. Increasing competition
3. Information & communication technology
4. Complexity
5. Dynamism
6. Outsourcing
7. Mergers & acquisitions
8. Changing customer demands

- Need to innovate for differentiation
- Need for systematic risk management
- Need to apply planning techniques that are suitable for such a turbulent environment

Scenario planning is of high value for strategic logistics decisions.
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A Scenario Check Included Interviews with 31 of the Top 50 Logistics Service Providers Concerning Their Scenario Planning Practices.

### Die Top 50 Logistikdienstleister in Deutschland 2006

<table>
<thead>
<tr>
<th>Rang</th>
<th>Unternehmen</th>
<th>Deutschland-Umsatz 2005 in Millionen Euro</th>
<th>Veränderung zu 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deutsche Post</td>
<td>16.170</td>
<td>3.3 %</td>
</tr>
<tr>
<td>2</td>
<td>Deutsche Bahn (DB Logistics)</td>
<td>8.000</td>
<td>3.6 %</td>
</tr>
<tr>
<td>3</td>
<td>Mühle + Nägele</td>
<td>2.404</td>
<td>15.0 %</td>
</tr>
<tr>
<td>4</td>
<td>Dachser</td>
<td>1.715</td>
<td>18.0 %</td>
</tr>
<tr>
<td>5</td>
<td>KdL Logistik</td>
<td>1.233</td>
<td>8.5 %</td>
</tr>
<tr>
<td>6</td>
<td>Volkswagen Transport</td>
<td>1.176</td>
<td>6.9 %</td>
</tr>
<tr>
<td>7</td>
<td>DHL Deutsche Paket Dienst</td>
<td>1.172</td>
<td>17.2 %</td>
</tr>
<tr>
<td>8</td>
<td>DHL Deutsche Paket Dienst</td>
<td>1.132</td>
<td>12.2 %</td>
</tr>
<tr>
<td>9</td>
<td>DHL</td>
<td>1.100</td>
<td>12.3 %</td>
</tr>
<tr>
<td>10</td>
<td>Panalpina</td>
<td>1.089</td>
<td>12.3 %</td>
</tr>
<tr>
<td>11</td>
<td>Hapag Lloyd</td>
<td>0.959</td>
<td>19.9 %</td>
</tr>
<tr>
<td>12</td>
<td>Fiege</td>
<td>0.954</td>
<td>6.0 %</td>
</tr>
<tr>
<td>13</td>
<td>Hermes Logistik Group</td>
<td>0.908</td>
<td>27.9 %</td>
</tr>
<tr>
<td>14</td>
<td>TNT</td>
<td>0.895</td>
<td>11.0 %</td>
</tr>
<tr>
<td>15</td>
<td>Lufthansa Cargo</td>
<td>0.895</td>
<td>7.7 %</td>
</tr>
<tr>
<td>16</td>
<td>Thiel Logistik</td>
<td>0.843</td>
<td>0.2 %</td>
</tr>
<tr>
<td>17</td>
<td>Hellmann Worldwide Logistics</td>
<td>0.913</td>
<td>12.6 %</td>
</tr>
<tr>
<td>18</td>
<td>Senator Lines</td>
<td>0.690</td>
<td>6.4 %</td>
</tr>
<tr>
<td>19</td>
<td>HHLA</td>
<td>0.686</td>
<td>16.5 %</td>
</tr>
<tr>
<td>20</td>
<td>Wincanton</td>
<td>0.680</td>
<td>6.3 %</td>
</tr>
<tr>
<td>21</td>
<td>Imperial Logistics</td>
<td>0.647</td>
<td>5.0 %</td>
</tr>
</tbody>
</table>

Source: Logistik inside 2006
Many Logistics Service Providers Plan Narrow Into the Future. Only Few Consider a Classical Planning Fence of 5-10 Years for Their Strategic Planning.

Are there planning situations where you consider a planning horizon of 10 years and beyond?

- Yes 48.4%
- No 51.6%

General Planning Horizons of Logistics Service Providers

<table>
<thead>
<tr>
<th>Planning Horizon</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 3 years</td>
<td>1</td>
</tr>
<tr>
<td>3-5 years</td>
<td>21</td>
</tr>
<tr>
<td>5-10 years</td>
<td>9</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>0</td>
</tr>
</tbody>
</table>

Theory-practice gap of strategic planning horizons

- Strongly medium-term or tactically focused
- No patterns regarding ranks among top 50

Nonplanners see strategic planning as inflexible process; discrepancy to scenario logic!

Planners do so for long-term strategy/ vision, expansion, investments, make or buy, innovation management

Planners use basic, hands-on tools; in some cases entirely intuitively, no formal process and documentation

No patterns regarding ranks among top 50
Compared to Industry Sector Standard, the Logistics Service Industry Shows a Backward Picture Regarding Scenario Planning Practices.

Proliferation of the Scenario Technique in the Logistics Service Industry

1] Active users 25.8%
2] Applied in the past, but given up 3.2%
3] Never applied, but interested 19.4%
4] Never applied, not interested 38.7%
5] Never applied, not sure about future use 12.9%

- 50% of planners among top 10
- Rigid deniers ranked on the lower ranks

Arguments for not Conducting Scenario Planning

- We do not know this technique at all 11
- We do not have the expert for this technique 11
- We do not have sufficient resources 9
- No need in our business environment 7
- Too expensive 6
- Other 4

Number of companies

Planners consider farther planning horizons in general, are stronger futures oriented
Planners still not fully realise potentials, basic scenario approaches
Lack of knowledge seems company size independent
What are the Experiences of Scenario Consultants? Interviews with 20 of 24* Identified Scenario and Futures Consultancies.

*German speaking market.
Logisticians Implementing Scenario Planning Soon Benefit Threefold: Future-Robust Strategies, Early Adopter Advantages, Innovativeness and Creativity.

1. Scenario technique can be tailored to any planning situation
   - Develop new strategies, services, or markets
   - Test futures-robustness
   - Early warning system
   - Environment scanning
   - ...

2. Application less a question of industry, but of situation
   - Most rewarding in dynamic and complexity environments
   - Integration in corporate culture

3. Type of scenarios strongly dependent on purpose
   - Growth market: industry scenarios
   - Market saturation: competitor scenarios
   - ...

→ **Logistics Service Providers can particularly benefit from scenario planning**
The Logistics Industry Might Even be More Challenged in the Future Than Other Industries.

Will scenario planning be of growing relevance for logistics service providers in the future?

- Yes, as for any other industry as well: 11
- Yes, even more than for other industries: 9
- No: 0

Globalisation dependency
- Complexity
- Saturation
- Radical changes/crises
- Involvement in supply chains

n = 20
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Scenario Study with 4 Futures Perspectives: “The Future of the Logistics Service Industry 2025”

<table>
<thead>
<tr>
<th>Process and Viewpoint</th>
<th>Goal</th>
<th>Guiding Question</th>
<th>Mindset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future Radar</td>
<td>Find knowledge about the future</td>
<td>What information and knowledge is available about the future?</td>
<td>attentive, open minded, searching</td>
</tr>
<tr>
<td>Assumption Analysis</td>
<td>Understand the probable future</td>
<td>Which changes are ahead in the years to come?</td>
<td>analytical, critical, conservative</td>
</tr>
<tr>
<td>Opportunity Analysis</td>
<td>Perceive the possible future</td>
<td>What opportunities and options do we have for the future?</td>
<td>creative, progressive, uncritical visionary</td>
</tr>
<tr>
<td>Vision Development</td>
<td>Define the preferred future</td>
<td>Which future do we want create?</td>
<td>critical visionary</td>
</tr>
<tr>
<td>Discontinuity Analysis</td>
<td>Prepare for the surprising future</td>
<td>Which possible and significant future surprises do we have to prepare for now and how?</td>
<td>calculated pessimism, critical</td>
</tr>
<tr>
<td>Strategy Development</td>
<td>Plan for the planned future</td>
<td>What are the milestones we have to set and projects we have to carry out to achieve our vision?</td>
<td>Realistic, pragmatic</td>
</tr>
<tr>
<td>Institutionalization Future Management System</td>
<td>Continue using Future Management</td>
<td>How can we institutionalize Future Management?</td>
<td>systematic, holistic, analytical</td>
</tr>
</tbody>
</table>

Source: FutureManagementGroup AG 2008

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Delphi was Used to Collect Expert Knowledge for Scenario Development in a Scientifically Sound Process.

The Delphi technique is an anonymous, systematic, multi-round survey procedure of experts, where feedback of the group opinion is provided after each round.

- **High instrumental value for scenario development**
- **Standard research instrument (1,300 scientific articles, 270 dissertations in 2000-2004)**

Sources: ¹ Kinkel et al. 2006; Bijl 1992; Rikkonen 2005; Sviden 1988. ² Landeta 2006.
Three-step expert selection

1. Identification
   - 30 Experts over two rounds
   - C-Level, Strategic Planning
   - Top 50 logistics service providers
   - Conference attendants, Internet, internal contacts

2. Evaluation
   - Company internal expert ranking
   - Position, functions, academic title, education, publications, age

3. Motivation
   - Personal contact
   - Professionalism
   - “Appetizer”, press release, cover letter

Content generation for projections

1. Internal expert workshop
2. External expert workshop
3. Survey among international top futurists
4. Interviews with scenario consultancies
5. Desk research of scenario studies
6. Database with future factors

38 + 3 projections for 2025

Quality criteria from science, e.g. av. no. of words, wording

Multiple pretests and revisions
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5 Projections are Stronger Related to Urban Freight. All Their Estimates Achieve Agreement Among the Expert Panel.

<table>
<thead>
<tr>
<th>No Projections related to urban freight 2025*</th>
<th>EP</th>
<th>C</th>
<th>I</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The problem of energy supply (e.g. scarcity of fossil energies, nuclear power) remains unsolved globally.</td>
<td>69%</td>
<td>✓</td>
<td>3.9</td>
</tr>
<tr>
<td>11</td>
<td>The demand for local goods and services has significantly increased primarily due to resource scarcity, environmental pollution, and the assimilation of living standards between developing/emerging countries and the industrial nations.</td>
<td>50%</td>
<td>✓</td>
<td>3.5</td>
</tr>
<tr>
<td>15</td>
<td>The supply and disposal among densely populated areas on the one hand and depopulated, rural regions on the other hand have led to location dependent price structures for logistical services.</td>
<td>65%</td>
<td>✓</td>
<td>3.3</td>
</tr>
<tr>
<td>34</td>
<td>Alternative distribution networks have been established in the CEP-market (courier, express, parcel). Petrol stations, kiosks, and local public transport are increasingly used for pickup and delivery of parcels.</td>
<td>67%</td>
<td>✓</td>
<td>3.2</td>
</tr>
<tr>
<td>38</td>
<td>Customers increasingly take ecological aspects into consideration for their establishment of international logistics networks and the selection of logistics service providers.</td>
<td>62%</td>
<td>✓</td>
<td>3.4</td>
</tr>
</tbody>
</table>

**Caption:**
- EP = Expectational probability
- C = Degree of consensus/dissent
- I = Impact on industry, if occurred
- D = Percentage of experts finding the occurrence desirable

- ✓ ✓ Strong consensus (interquartile range of 1)
- ✓ Consensus (interquartile range of 2)
- ✗ Dissent (interquartile range of 3)
- ✗ ✗ Strong dissent (interquartile range of 4)

* Total number of projections in study: 41
The 41 Projections can be Compared Along Their Probability, Impact, and the Level of Agreement Among the Expert Panel.
A Classification of the Projections Into Clusters Allows for In-Depth Analyses and the Focused Development of Strategies.

Projections for 2025

1. Energy problem remains unsolved
2. Reverse Logistics becomes legal regulation
3. Source-based allocation of costs
4. International barriers of trade significantly lower
5. Increased attractiveness of rail and sea transports
6. Decreases of investments in traffic infrastructure
7. Global alignments of political and legal conditions
8. Global sourcing, production and distribution
9. Global networks = key competitive factor
10. LDCs/ LLDCs catch up strongly
11. Increasing demand for local goods and services
12. Global standards and norms
13. Labour versus resources
14. Logistics = success factor for customer retention
15. Location dependent price structures
16. Disproportionate increase of security costs
17. Logistics decisions independent from national, cultural, and ethical interests
18. Labour shortage
19. Relocation of production activities
20. Paperless transport
21. Same day delivery of all documents
22. Reduction of resource consumption (innovations)
23. Higher and faster technology acceptance
24. High investments in ICT needed
25. Biometric identification = standard identification
26. Intelligent, automated planning & control systems
27. Recovery of traffic infrastructure (innovations)
28. E-Business, displacement of wholesale & retail
29. Decentralised production, 3D printing/ Fabbing
30. High-value, customised logistics services
31. Global networks of SMEs
32. Logistics service providers as consultants
33. Digitised document logistics displaces physical
34. Alternative distribution networks on last mile
35. Consolidation on global mass market
36. Increase in classical logistics services (THS)
37. Futures orientation in logistics
38. Logistics decisions under ecological aspects
39. Large-scale outsourcing deals
40. Document logistics as standard service
41. New competitors from adjacent industries

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...The Experts’ View of the Probable Future for the Logistics Service Industry 2025.

Projections for 2025
1. Energy problem remains unsolved
2. Reverse Logistics becomes legal regulation
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Consensus among experts (25x)
Dissent among experts (16x)
5 Dominant Challenges Could be Distilled for the Probable Long-Term Future of the Logistics Service Industry.

1. Strong social responsibility and ecological awareness
   - Changing patterns of thoughts and behaviour
   - Logistics service industry major driver

2. Intensified pace of globalisation
   - Global networks and cooperation large and SMEs
   - Political-legal aspects as stumbling blocks, e.g. protectionism, standards

3. Shortage of qualified personnel
   - Access = strong competitive factor
   - Increase industry attractiveness; build up global recruitment structures

4. Changing customer demands
   - Customers more sophisticated, segmented, and demanding
   - New service development

5. Strong digitisation
   - Document logistics
   - Keep up with the newest technological standards
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Based on the Delphi Results a Three-Dimensional Scenario Space With 8 Extreme Scenarios was Constructed.

1] Human Location Factor
2] Factory cities and Fusion Reactors
3] The Era of Energy Wars and “Urban mining”
4] Battle for Metals
5] The World of 2 Classes
6] Energy Turnaround and Viruses
7] Space Logistics
8] The Global Energy and Water Crisis

Labour = cost and location factor no. 1

Resources vs. labour

Problem of energy supply

unsolved

solved

Gap between developing/emerging countries and industrial nations has even expanded

Developing and emerging countries have strongly caught up
The Power of Scenario Planning is to Think in Alternatives!

1] **Human Location Factor**
- Access to qualified personnel is the only sustainable competitive advantage in an increasingly mobile world
- Human capital = scarce resource of knowledge society
- R&D/ knowledge centres in developing and emerging countries

2] **Factory Cities and Fusion Reactors**
- Nuclear fusion as solution for the problem of energy supply
- Contribution of human capital to profit has risen considerably
- Industry conglomerates build “factory cities”, i.e. planned cities, that offer attractive living conditions for recruitment purposes

3] **The Era of Energy Wars and “Urban Mining”**
- Worldwide struggle for natural resources; access to power and resources has become decisive competitive factor
- Waste management enterprises become resource producers (extraction of resources from waste and scrap material)

4] **Battle for Metals**
- Access to metal resources = competitive factor no. 1
- Deposits of many exotic elements already depleted
- Exploding metal prices
- Metal resources become target of organised crime

5] **The World of 2 Classes**
- Demographic shift, knowledge intensification of work
- Acute lack of skilled personnel, particularly in Europe
- Strong urbanization; 100 metropolises > 5m inhabitants
- „Cities of misery“

6] **Energy Turnaround and Viruses**
- Electricity generated up to 80% from clean, renewable energy
- HIV/AIDS widens the gap between industrial and developing or emerging nations
- Massive investments in workplace health promotion; success of global business coalitions to fights diseases

7] **Space Logistics**
- Second race to the moon to claim lunar resources
- Lunar extraction of resources; interplanetary SCM
- Future nuclear fusion with Helium-3

8] **The Global Energy and Water Crisis**
- Peak oil reached 2015 – $250/bbl
- Failure of nuclear fusion; re-concentration on the fossil fuel “coal”
- 50% of all countries in the world suffer from serious water shortages – no. of environmental refugees x 4
2025: Factory Cities and Fusion Reactors (Scenario 2)

Two-thirds of all mega-cities (> 10 million residents) are located in developing countries. Many of these cities, for example Lagos, Delhi, Bombay or Mexico City, have grown to more than 20 million inhabitants. These concentrated centres of the world economy are gateways for people, goods, knowledge, and money and produce up to 50% of the gross domestic product of the individual country [...]

One of the largest challenges in logistics after the year 2020 is mega-city logistics. In some of the largest metropolitan areas there live over 20 million people, which all have to be supplied. Since inner-city traffic often comes to a standstill, standard parcel and mail deliveries require a great deal of time. Those who need something delivered quickly resort to small special providers which offer exact time deliveries, for example per helicopter – naturally, at corresponding prices.

In most developing and emerging nations, monopoly service providers operate and provide logistics services for single districts and bundle the commodity flows to relieve at least some of the strain on the traffic situation. Several of the controlled grown mega-cities, at least in the industrial nations, meanwhile operate underground supply networks of which the operation, maintenance, and upgrading are shared by several logistics service providers [...]

The Major Deficiency of Most Scenario Studies is that They Neglect Wildcards! See e.g. 8 Selected Wildcards for Logistics 2025.

1. Personal Fabricators
2. Return of protectionism
3. Terrorist Attacks on Logistics Network
4. Dictatorship of data protection
5. Worldwide system failure
6. Revolutionary transport technologies
7. Spread of a Pandemic Through Logistics Networks
8. Fully automatic, self-monitoring logistics

Wildcards are future events or developments of low probability, but high impact on the scenario object, i.e. an industry, company, or product.*

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26 May 2008: International FUTURE OF LOGISTICS Conference with 300 Top Executives at the Convention Centre of Deutsche Messe Hannover.

**PROGRAM**

- **07.30 – 10.00**  
  Check-in & Executive Breakfast  
  Room 3
- **10.00 – 10.15**  
  Opening  
  Room 2
- **10.15 – 10.45**  
  Future of Logistics 2025  
  Room 2
- **10.45 – 11.45**  
  2+1 Keynote: People & Leadership  
  Room 2
- **11.45 – 12.15**  
  Open Discussion  
  Room 2
- **12.15 – 13.15**  
  2+1 Keynote: Access & Resources  
  Room 2
- **13.15 – 14.45**  
  Lunch  
  Room 3
- **14.45 – 15.30**  
  Executive Talk: Innovation & Sustainability  
  Room 2
- **15.30 – 16.30**  
  2+1 Keynote: Information & Competitiveness  
  Room 2
- **16.30 – 17.30**  
  Coffee-World: Logistics in 2025  
  Room 3
- **17.30 – 18.00**  
  Open Discussion  
  Room 2
- **18.00 – 18.30**  
  Conclusion  
  Room 2
- **18.30 – 19.30**  
  Open Discussion  
  Room 2
- **19.30 – 24.00**  
  CoMAT Opening Ceremony  
  Room 1

[www.future-of-logistics.com](http://www.future-of-logistics.com)
Process of the FUTURE OF LOGISTICS 2025: The RealTime-Delphi is Divided Into a Pre- and a Post-Conference Phase.

- **Study concept**: Jan. ‘08
- **Development of online tool**: Feb. ‘08
- **Pretests with academics**: March 1st
- **Recruitment of expert panel**: March 1st
- **Delphi survey process**: May 15th
- **Evaluation/analysis of interim results**: May ’08
- **Preparation of FOL* working documents**: May ’08

*FOL: FUTURE OF LOGISTICS

- **Intermediate Cut**: March 1st
- **Open RealTime-Delphi Portal**: March 1st

- **Aggregation of all data**: June ’08
- **Final analysis of Delphi data**: June 30th
- **Scenario development**: July ’08
- **Discontinuity analysis**: August/September ’08
- **Final futures report 2025**: August/September ’08

*FOL: FUTURE OF LOGISTICS

**Divided Into a Pre- and a Post-Conference Phase.**

**FOL* “2+1” key notes, discussions, coffee world**: May 26th

**Closure RealTime-Delphi Portal**: May 26th
Screen I of the RealTime-Delphi Asks for Assessment of the Expectational Probability, Impact, and Desirability for 2025.

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**2025: The productivity of economic centres (clusters) is the key success factor in global competition.**

<table>
<thead>
<tr>
<th>Your answer</th>
<th>Your arguments for...</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Probability of occurrence</strong></td>
<td>a low probability (optional)</td>
</tr>
<tr>
<td>% (0-100%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact on world economy</th>
<th>a low impact (optional)</th>
<th>a high impact (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>very low</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Desirability of occurrence</th>
<th>a low desirability (optional)</th>
<th>a high desirability (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>very low</td>
<td>5</td>
</tr>
</tbody>
</table>
Screen II of the RealTime-Delphi Provides the Statistical Group Opinion and Aggregated Expert Comments, and Allows for Revision of First Answers.

2025: The productivity of economic centres (clusters) is the key success factor in global competition.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Revision of your answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group response</td>
<td>Your final answer</td>
</tr>
<tr>
<td>Aggregated arguments</td>
<td>Your additional arguments for...</td>
</tr>
</tbody>
</table>

- **Probability of occurrence**
  - $\phi = 70\%$
  - Your: 80\%

- **Impact on world economy**
  - $\phi = 4$
  - Very low

- **Desirability of occurrence**
  - $\phi = 3$
  - Very high

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The Consensus Portal Allows for Continuous Monitoring of Delphi Progress and Revision of Previous Estimates.

Welcome to the consensus portal, Mr. [Name]

Here you have the chance to compare your estimations with the group opinion. The 20 theses are listed with their key title and coloured depending on your deviation from the group:

- Green: within the group opinion
- Yellow: moderate divergence
- Orange: significant divergence
- Red: strong divergence

From this portal, you can jump into all thesis evaluation screens independently in order to revise your initial answers. Preferably, you may choose those theses where you differ significantly from the group. Since your last visit some experts may have added plausible and striking arguments for a contrary position than yours. Take your chance for revision and contribute with your experience and expertise!

Resources vs. labour
Cluster competitiveness
Energy sources
Urban mining
Terrorist attacks
Block formation
Modal shift
Carbon footprint
Adolescence of developing and emerging countries
Global water crisis

Educational revolution
Megacities
Human capital
Global business coalitions
Health care supply chains
Bioenergy
Innovations in transport
Decentralised production
Automation and self-direction
Digitisation

Submit changes and close
These 7 Projections are of Particular Interest Since Their Result Reflects a High Level of Agreement Among the Expert Panel.

<table>
<thead>
<tr>
<th>No.</th>
<th>Consensus projections for 2025</th>
<th>Probability</th>
<th>Impact</th>
<th>Desirability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>The productivity of economic centres (clusters) is the key success factor in global competition.</td>
<td>66.8%</td>
<td>high (3.7)</td>
<td>medium (3.2)</td>
</tr>
<tr>
<td>4</td>
<td>The extraction of secondary raw material from waste and scrap (&quot;urban mining&quot;, recycling) is often more profitable than the extraction of classical primary resources.</td>
<td>62.4%</td>
<td>medium (3.4)</td>
<td>high (3.8)</td>
</tr>
<tr>
<td>7</td>
<td>Political regulations have led to a significant modal shift from transport by road to transport by water and rail.</td>
<td>39.7%</td>
<td>medium (3.3)</td>
<td>high (3.7)</td>
</tr>
<tr>
<td>12</td>
<td>Many developing nations hold significant international bargaining power because their megacities are fully integrated in world trade as hubs for goods, money, and knowledge.</td>
<td>55.5%</td>
<td>high (3.7)</td>
<td>medium (2.7)</td>
</tr>
<tr>
<td>15</td>
<td>Global health care supply chains enable professional and quick response to natural catastrophes (pandemics, floods, etc.) by providing efficient humanitarian aid (food supplies, medical supplies, etc.).</td>
<td>58.7%</td>
<td>medium (3.1)</td>
<td>very high (4.5)</td>
</tr>
<tr>
<td>17</td>
<td>Innovations in transport logistics (e.g. new types of vehicles, alternative propulsion, innovative materials) have substantially contributed to the reduction of resource consumption.</td>
<td>67.7%</td>
<td>high (4.0)</td>
<td>very high (4.7)</td>
</tr>
<tr>
<td>18</td>
<td>The decentralised production of many goods on-site in small-scale factories (digitised products, 3D printer, fabbing) has led to substantial structural changes in the logistics industry.</td>
<td>55.0%</td>
<td>medium (3.4)</td>
<td>high (3.6)</td>
</tr>
</tbody>
</table>

\[ n = 43 \]
A Classification of the Projections Into Clusters Allows for In-Depth Analyses and the Focused Development of Strategies.

Impact on world economy (average)

Expectational probability (average) [%]

very high

very low

Consensus among experts (7x)
Dissent among experts (13x)

Economic
1 Resources vs. labour
2 Cluster competitiveness
3 Energy sources
4 Urban mining
5 Terrorist attacks

Political
6 Block formation
7 Modal shift
8 Carbon footprint
9 Adolescence of LDCs/ LLDCs
10 Global water crisis

Socio-Cultural
11 Educational revolution
12 Megacities
13 Human capital
14 Global business coalitions
15 Health care supply chains

Technological
16 Biogenous fuels and energy
17 Innovations in transport
18 Decentralised production
19 Automation and self-direction
20 Digitisation

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Diverse Usage of Scenario Results:
Strategy Development – Futures Conferences – Centre for Futures Studies.

**Probable future**
- 41 projections developed and assessed

**Surprising future**
- Extremszenarien
- Wildcards

**Planned future**
- Company specific scenario planning

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Thank You Very Much for Your Attention!

Dr. Heiko A. von der Gracht
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Fax:     +49 (0) 611/ 36 018 802

Email:  vdgracht@supplyinstitute.org
Web:    http://www.supplyinstitute.org
Backup
The problem of energy supply (e.g. scarcity of fossil energies, nuclear power) remains unsolved globally.

The almost entire recycling of products and scrap within the value chain (“reverse logistics”) has become a legal regulation.

Source-based allocation of costs emerging from usage of natural resources (pollution, exhaustion of natural resources, etc.) has to a large extent been accomplished.

International barriers of trade are significantly lower than compared to the year 2007.

Intensified climate protection regulations have increased the attractiveness of rail and sea transports.

The absolute national investments in traffic infrastructure have significantly decreased in real terms.

Increasing international harmonisation has led to global alignments of political and legal conditions.

Global sourcing, production and distribution are common practice in almost all markets and value chains worldwide.

The quality of a company’s global networks and relationships has become the key determinant of competitiveness.

A multitude of developing and emerging countries has narrowed the gap to the industrial nations by economically catching up in the tertiary and quaternary industry sector.

The demand for local goods and services has significantly increased primarily due to resource scarcity, environmental pollution, and the assimilation of living standards between developing/emerging countries and the industrial nations.

**Economic**

12. Global standards and norms are established that assure the cost optimised planning, control and execution of international transports and their respective information flows.

13. The cost factor “labour” has been displaced by the factor “access to resources” leading to relocations of production to resource sites.

**Socio-Cultural**

14. The customer demands regarding convenience, simplicity, promptness, and flexibility have turned logistics into a decisive success factor for customer retention.

15. The supply and disposal among densely populated areas on the one hand and depopulated, rural regions on the other hand have led to location dependent price structures for logistical services.

16. Security costs and costs for protection against industrial espionage, crime, and terrorism have disproportionately increased in the logistics industry.

17. The social responsibility has lost its national basis. Logistics service providers increasingly make location and personnel decisions upon global ethical standards and independently from national, cultural, and ethnical interests.

18. Labour shortage concerning young, highly-qualified, mobile personnel has led to restraints in company growth.

19. The increasing knowledge expansion and the focus on knowledge generation, processing, and dissemination have led to a substantial ongoing relocation of production activities out of Germany (international division of labour).

**Technological**

20. Paperless transport has become common practice in national and international transport business.

21. Due to the integration of physical and electronic document flows almost all documents reach their receiver the same day.
| 22 | Innovations in transport logistics (e.g. new types of vehicles, alternative propulsion, innovative materials) have substantially contributed to the reduction of resource consumption. |
| 23 | New technologies in logistics obtain faster acceptance as compared to 2007. |
| 24 | Required information and communication technology demands large capital investments, which can hardly be raised by small and medium-sized logistics service providers alone. |
| 25 | Biometric identification has become standard identification technology in logistics and enables fast and secure access controls. |
| 26 | Intelligent, automated planning and control systems (agent systems, autonomous cooperation) are widely used in logistics. |
| 27 | Innovations in transport logistics (e.g. new types of vehicles, alternative propulsion, innovative materials) have substantially contributed to a recovery of the current traffic infrastructure. |
| 28 | The area-wide utilisation of e-business has led to direct sales contacts between end customers and producers, which resulted in displacement of wholesale and retail. |
| 29 | The decentralised production of many goods on-site in small-scale factories (fabbing, 3D printer, digitised products) has led to substantial structural changes in the logistics industry. |
| 30 | The demand for high-value, customised logistics services has increased disproportionately. |
| 31 | Small and medium-sized specialised logistics service providers have merged into global networks in order to stay competitive. |
| 32 | Customers increasingly demand consultancy services from logistics service providers in order to cope with the increasing complexity and dynamism in their markets. |

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>The market for digitised document logistics has largely displaced the market for physical document logistics.</td>
</tr>
<tr>
<td>34</td>
<td>Alternative distribution networks have been established in the CEP-market (courier, express, parcel). Petrol stations, kiosks, and local public transport are increasingly used for pickup and delivery of parcels.</td>
</tr>
<tr>
<td>35</td>
<td>The consolidation phase among large logistics service providers has reached saturation so that the global mass market is divided between five to nine providers.</td>
</tr>
<tr>
<td>36</td>
<td>The volumes of classical logistics services (transport, handling, storage) have significantly increased.</td>
</tr>
<tr>
<td>37</td>
<td>Large logistics service providers (more than 250 employees, more than 50 million Euros turnover) take longer planning horizons for their vision and strategy development into consideration and are therefore increasingly using corresponding futures methodologies (e.g. scenario technique, early warning systems).</td>
</tr>
<tr>
<td>38</td>
<td>Customers increasingly take ecological aspects into consideration for their establishment of international logistics networks and the selection of logistics service providers.</td>
</tr>
<tr>
<td>39</td>
<td>The logistics industry is considerably stronger affected by large-scale outsourcing deals than 2007.</td>
</tr>
<tr>
<td>40</td>
<td>Customers expect document logistics to be an integral element of the service portfolio of a logistics service provider.</td>
</tr>
<tr>
<td>41</td>
<td>Service providers from adjacent industries (e.g. facility management, IT-services, security services) increasingly enter the market for logistics services so that the classical borders between industry, retail and wholesale, and logistics services are blurred.</td>
</tr>
</tbody>
</table>
### 20 Projections of the RealTime-Delphi: FUTURE OF LOGISTICS 2025 – Global Scenarios. [1/2]

<table>
<thead>
<tr>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.</strong> The production factor “access to resources” has displaced the factor “labour” as the most important cost and location criterion.</td>
</tr>
<tr>
<td><strong>2.</strong> The productivity of economic centres (clusters) is the key success factor in global competition.</td>
</tr>
<tr>
<td><strong>3.</strong> The problem of energy supply (e.g. scarcity of fossil fuels, nuclear power, renewable energies) remains unsolved.</td>
</tr>
<tr>
<td><strong>4.</strong> The extraction of secondary raw material from waste and scrap (&quot;urban mining&quot;, recycling) is often more profitable than the extraction of classical primary resources.</td>
</tr>
<tr>
<td><strong>5.</strong> Logistics networks have increasingly been target of terrorist attacks for many years.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Political</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6.</strong> The world economy has split into a few large interest blocks. Group members are closely interrelated, but strong protectionist measures are taken against the other groups.</td>
</tr>
<tr>
<td><strong>7.</strong> Political regulations have led to a significant modal shift from transport by road to transport by water and rail.</td>
</tr>
<tr>
<td><strong>8.</strong> The declaration of carbon dioxide emitted throughout the life cycle of a product or service (carbon footprint) has been established internationally as standard.</td>
</tr>
<tr>
<td><strong>9.</strong> Many developing and emerging countries have caught up to industrial nations, also with regard to the services and information sector.</td>
</tr>
<tr>
<td><strong>10.</strong> Mankind faces a global water crisis. Fresh water is the scarcest resource worldwide.</td>
</tr>
</tbody>
</table>
## 20 Projections of the RealTime-Delphi: FUTURE OF LOGISTICS 2025 – Global Scenarios. [2/2]

### Socio-Cultural

11. The introduction of the $100 laptop 15 years ago initiated an educational revolution in many developing and emerging countries.

12. Many developing nations hold significant international bargaining power because their megacities are fully integrated in world trade as hubs for goods, money, and knowledge.

13. Human capital has become the rarest resource in today’s knowledge society. The access to qualified personnel is the only sustainable competitive factor.

14. Public pressure and social responsibility have forced international corporations to engage in global business coalitions to fight against diseases.

15. Global health care supply chains enable professional and quick response to natural catastrophes (pandemics, floods, etc.) by providing efficient humanitarian aid (food supplies, medical supplies, etc.).

### Technological

16. Biogenous fuels and bio-electricity have not prevailed.

17. Innovations in transport logistics (e.g. new types of vehicles, alternative propulsion, innovative materials) have substantially contributed to the reduction of resource consumption.

18. The decentralised production of many goods on-site in small-scale factories (digitised products, 3D printer, fabbing) has led to substantial structural changes in the logistics industry.

19. Due to revolutionary advancements in automation, robotics, and artificial intelligence, logistics has become primarily fully automated, autonomous, and self-directed.

20. The digitisation in the business environment is far advanced. The usage of paper has become an exception.