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Improving Foresight through Methodological Innovation, Cross-validation and Scientific Foundation – The Case of *Future of Logistics 2025*

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Purpose

We present insights into the design and execution of an international large-scale project on the future of logistics by the year 2025. The basis of our research was an innovative real-time Delphi application. We applied a multi-methodology framework including a real-time Delphi, a futures conference and participatory expert workshops. This allowed for cross-validation and a strong participatory inclusion of policy makers. An example shows how a multi-stakeholder environment can be approached using innovative foresight tools. We illustrate a research case study that aligns foresight activities with a rigorous scientific procedure.

Sound Planning Basis for Long-term Decisions in Logistics and Mobility

We present insights into the design and execution of a large-scale international project on the *Future of Logistics 2025* (von der Gracht et al., 2008). We contribute to the foresight community with an innovative and profound research design: First, the research included one of the few and early real-time Delphi applications worldwide (see Gnatzy et al., 2011; Gordon & Pease, 2006) for which a web-based survey software was specifically developed. Second, the research employed a multi-methodology framework, including the real-time Delphi mentioned above, a futures conference and participatory expert workshops. This allowed for significant cross-validation and a strong participatory inclusion of policy makers. Third, it is shown exemplarily how a multi-stakeholder environment can be approached using such tools. Fourth, we illustrate a

research case study that aligns foresight activities with a rigorous scientific procedure.

The project *Future of Logistics 2025* was initiated in the course of CeMAT 2008, the world's largest in-house logistics fair with approximately 60,000 attendants from 40 countries. This large-scale foresight project was organised with strong support from the German government, several research institutions, industry and Deutsche Messe (Hannover).

The research particularly focused on the linkage between the transportation and logistics industry and its expected socio-economic contributions in the future in the fields of sustainability, health care and social responsibility among others.

The aim of the project was to support companies to best prepare themselves for the future as well as weigh the risks of product innovations and entering new markets. Our approach includes projections of future trends based on extensive conversations amongst and evalua-



tions by experts. Scenarios for different future options were developed and the consequences for the logistics market described.

We aimed to encourage experts from industry, academia and politics to discuss the future of the transportation and logistics markets, of the companies operating therein as well as of the economy in general. We demonstrate that long-term analyses of the logistics environment are highly meaningful since they help companies to orient themselves in complex and dynamic environments and therefore reduce perceived uncer-

tainty. The analyses allow gaining a clearer picture of the future and identifying opportunities and threats. Our global scenario study has illuminated how top-level executives from business, academia and politics see the probable future and what major discontinuities could look like. It provides a sound planning basis for long-term decisions in logistics and mobility, demonstrates the value of scenarios as a management and planning tool, and exemplifies a systematic scenario development and communication process.

Innovative Real-time Delphi

The methodology consisted of several research phases that were interlinked and can be divided into a pre-, main-, and post-conference phase as described in Figure 1. The research initiative lasted for a total of approximately nine months.

The pre-phase included the development of the study concept, the programming of the real-time Delphi tool, a software pre-test, the recruitment of an international expert panel and the first part of the real-time Delphi survey itself among 300 internationally renowned experts (Part I). The project was launched in January 2008 when the study was designed and the online portal for the web-based Delphi survey was developed. After a pilot test, the Delphi-Internet portal opened on March 1, 2008. Everyone registered for the Future of Logistics International CeMAT Conference was sent a personal invitation link, giving them exclusive access to the Delphi portal. The experts from business, politics and academia were confronted with 20 projections in the following four subject areas: (1) economic developments, (2) political challenges, (3) socio-cultural trends and (4) technological innovations. The survey was conducted online with the help of a web-based application, which makes real-time evaluation possible. The participants were asked to assess the projections in terms of their expected probability, impact on the global economy and desirability using the ratings scale provided. They were also given the opportunity to justify their responses by providing comments.

The interim results of the survey were presented at the Future of Logistics Conference as part of the CeMAT trade fair in May 2008. Therefore, the main-conference phase with 216 attendants comprised an initial trend briefing with the Delphi survey results and their joint reflection in presentations and moderated rounds of discussions (2+1 keynotes), open discussions as well as discussions in small groups, “coffee worlds”, which is an innovative form of participatory workshop.

The post-conference phase, in turn, included a follow-up real-time Delphi (Part II). The online tool was available to the participants until the end of June 2008 so that they could modify their responses. Once the portal was closed, the final analysis and aggregation of all data, scenario development, discontinuity analysis and dissemination were conducted. Possible global future scenarios were drawn based on the Delphi data collected from the experts questioned. Conceivable opportunities and surprises were sketched out in detail. The opportunities represented future scenarios that can be actively shaped.

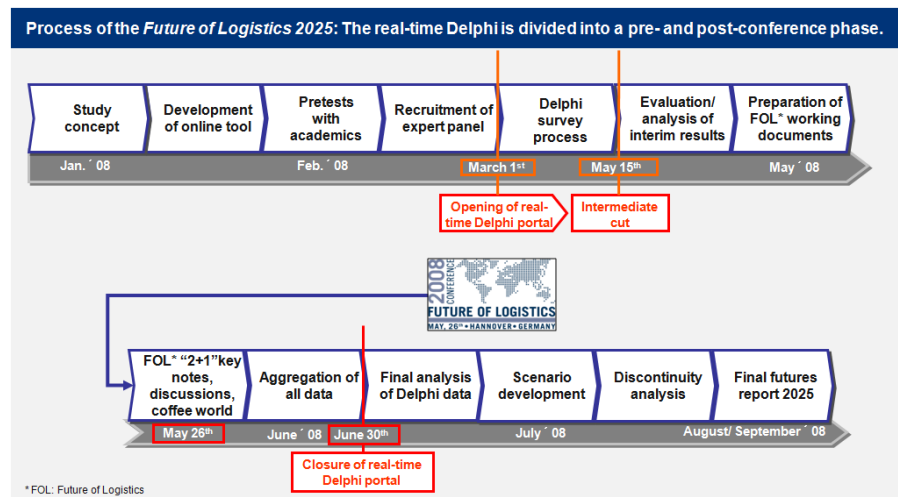


Figure 1: Process of the Future of Logistics 2025

We included extreme scenarios and wildcard scenarios in our analysis. Two projections (“Energy Sources” and “Global Water Crisis”) were selected for the former, both of which display a very high probability and impact. Four scenarios were developed out of these two projections (scenario axes), each of which describes a world that could come about. Furthermore, the wildcard scenarios described single events or developments that may seem improbable from today’s standpoint but ultimately cannot be ruled out. It is not about the probability of such events but the potential impact that they or similar occurrences could have. They could be the result of technological breakthroughs, social tension or political overthrows.

Opportunities and Discontinuities Key to Identifying Future Lines of Action

Our methodological design proves to be a profound foresight approach to research a complex and dynamic environment, such as the international transportation and logistics industry. The different research formats, several linkages and cross-validations as well as intense participatory reflections with policy makers enhanced the scope of the content and its penetration. Especially, the use of innovative approaches, such as the real-time Delphi and coffee worlds, stimulated the discourse significantly. The real-time Delphi alone generated 826 comments on 20 future projections, which were assessed by 65 participants. Overall, the situation in 16 countries from all continents was considered in the scenarios. Moreover, the web-based, real-time Delphi study was able to significantly streamline the process since all group opinion calculations were provided in real-time during the survey. Our contribution to the FTA debate is thus a methodological one by integrating multiple methodologies and designing and applying a real-time Delphi in a multi-stakeholder environment.

An analysis of the responses produced three clusters, each of which must be viewed very differently: (1) potential surprises (low-probability, high-impact cluster), (2) eventualities (medium-probability, high-impact cluster), and (3) expectations (high-probability, high-impact cluster). First, potential surprises are often neglected by companies because they are considered improbable, but they have a moderate to high impact if they do occur. The projections in this cluster all involve some kind of revolution – be it an educational revolution in developing countries, a health revolution brought about by global business coalitions, technical revolutions due to automation and digitisation or even terrorist attacks. Second, the occurrence of high-impact eventualities is not considered to be very likely, but they involve serious impacts. When they become the object of debate, a wide range of very controversial opinions usually emerges. In this study, the projections grouped under this cluster can be combined under the heading of “competition”. They revolve around the best access to resources, protectionism between spheres of interests and competing megacities. Finally, high-impact expectations are characterised by a high expected probability and high impact. They are of huge strategic importance to companies. Projections in this cluster included the availability of resources on all levels, from trained staff to energy and water. The respondents believe that the formation of industrial clusters and technical innovations will offer solutions to these urgent problems.

If we analyse the driving forces in the market environment and the developments we can expect to see on the market, we find opportunities in the form of possible ways for the logistics sector to innovate and invest

in business development. These opportunities present future scenarios that can be actively shaped. Developing these opportunities broadens companies' horizons for what may happen in the future in terms of products and services, strategies, processes and solutions. We analysed a selection of the most promising opportunities arising from the Future of Logistics Conference 2008. These are business areas that are either brand new and may at first seem rather unusual, on the one hand, or simply represent possible extensions of existing business areas, on the other. The course we take to equip ourselves for the future can be set today by developing such opportunities. Each company must decide individually which of these opportunities to pursue. The formulation of opportunities is a very creative process. Based on the results of the real-time Delphi and the material discussed at the Future of Logistics Conference 2008, 120 possible courses of action were identified for logistics in several creative workshops. Numerous areas were covered, including products and services, cooperations and networks, controlling and finance, people and culture, marketing and public relations.

Unlike many scenario studies, we also included discontinuities, which can take the form of surprising events or developments, such as natural disasters, innovations and their consequences, or societal changes. The financial crisis 2008/2009 can be classified as such a discontinuity. By excluding discontinuities, scenario planners run the risk of missing major additional opportunities.

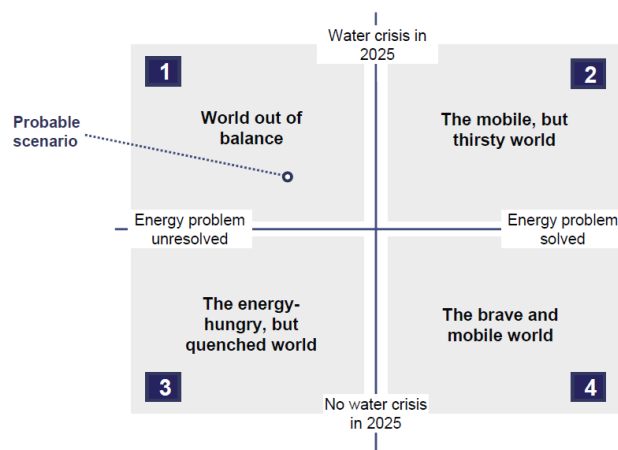


Figure 2: Extreme Scenarios *Future of Logistics 2025*

By including discontinuities, companies can identify further alternatives and increase their ability to adapt to surprises. They help to broaden the perspective and to test the robustness of strategies and decisions. There are two common ways for companies to systematically consider discontinuities: extreme scenarios and wild-card scenarios. Both approaches have been included in the *Future of Logistics* project. Discontinuities have been considered based on the results of the Delphi and the debates at the conference.

Scenario axes are a widely recognised tool for constructing extreme scenarios in a coherent and systematic way. According to this instrument, scenario planners select two driving forces or key factors that are considered to be of particular interest for scenario considerations. These factors are then plotted on two axes, resulting in four different scenario quadrants. In the scope of this study, the projection about energy sources and a global water crisis were selected due to their high probability and impact rating as well as their topicality and momentousness – an assessment shared by many conference participants (Figure 2). The scenario writing process, i.e. the definition of scenario premises and the description of the scenarios, was supported by extensive desk research.

Wildcard scenarios describe single events or developments that may seem improbable from today's standpoint but ultimately cannot be ruled out. The wildcards outlined in this study involved the fabbing society, terrorist attacks, the spread of a pandemic, and space logistics. For example, the disruption of logistical networks could have detrimental effects on the economy of a country. Such networks are therefore an attractive target for terrorists. Attacks on political, ideological or religious targets are possible at different points. Important hubs, such as seaports and airports, could be disabled by physical aggression. The same applies to bridges or tunnels that span narrow passages between geographical boundaries. Attacks on these targets could bring traffic to a complete standstill or greatly hinder transportation along the route affected.

Real-time Delphi Proves Useful Tool in Foresight

In our research, we aimed at closing a research gap with respect to future developments in the transportation and logistics industry. More specifically, two research questions guided our research: (1) How will the macro environment (political/legal, economic, socio-cultural and technological structure) of the logistics services industry change by 2025? (2) How will the micro environment (industrial structure) of the logistics services industry change by 2025? Based on empirical research, we examined possible events and developments, identified major factors and aggregated expert knowledge on the long-term future. We developed and applied a novel real-time Delphi application. We discussed the results in participatory workshops and a conference with experts from politics, academia and industry. We derived scenarios as well as recommendations for managers and governments.

Future foresight exercises should include an even broader range of participants. The real-time Delphi tool could be used to further encourage the discussion and dissemination process including application during the conference and participatory workshop sessions. The research, and especially scenario development, is mainly based on qualitative research, even though we provide statistical data to support our qualitative findings. Further quantitative data (e.g., with respect to cost implications and industry growth rates) may be included in the analyses to provide a more tangible basis for strategic planning.

The overall feedback of the participants in the research process was very positive. The experts welcomed the opportunity to share opinions and insights with the expert group assembled for this purpose and encouraged us to proceed with the approach. This led us to publish a study in 2008 to present the foresight process and its results to a broader public.

Sources and References

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