DELPHI-BASED OPPORTUNITY AND WILDCARD ANALYSIS CONCERNING THE FUTURE OF AIR TRANSPORT 2025

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Summary

Our study is intended to present disruptive and challenging events, i.e. wildcard scenarios, which have a significant impact on the aviation industry. We intend to assist decision and policy makers in preparing for the future and to enrich decision making processes on possible courses of action by presenting a robust and reliable decision support system as well as opportunities in strategy and policy. We demonstrate how an Delphi survey (in our case a real-time variant) can be applied as a starting point to systematically develop wildcard scenarios by conducting deductive wildcard analysis.

1. RESEARCH MOTIVATION

Planning in an increasingly uncertain business environment forces policy and decision makers to foster strategic forecasting and technology planning practices. We address this issue by demonstrating how an innovative web-based real-time Delphi can ensure validity and reliability of foresight activities via taking relevant change drivers as technology, socio-culture, economics, ecology and politics into account. Our highly standardized scenario development process applies qualitative as well as quantitative measures and enables policy and decision makers to judge based on a robust and reliable decision support system.

We outline specifically how the Delphi method can be used in order to identify wildcards developments in a deductive and early way [1] and present inductive wildcard analysis as well.

Furthermore, the results of our study and adjacent analyses enable the derivation of an ‘opportunity radar’, which depicts opportunities and challenges for governments and companies [2]. Our „Radar“ is the subjective outcome of several future participatory workshops based on the examined scenarios. It is designed to provide a pragmatic but also creative perspective into the future, while providing opportunities with different degrees of innovativeness.

2. METHODOLOGY

2.1. Innovative real-time Delphi survey

The study employs an innovative version of the Delphi method [3],[2] and is designed as an Internet-based, almost real-time survey that increases the validity of results by streamlining the classical procedure. Our Delphi method combines quantitative as well as qualitative research approaches to ensure a high level of scientific rigour and thus refutes earlier mentioned shortcomings, e.g. expert panel biases or time scale disadvantages [4].

The Delphi method is an established method for foresight activities [5] and has been applied in different countries such as Germany [6], Japan [7], the United States [8] and the European Union [9], for example.

Furthermore we account for Delphi’s’ past [10] and especially for its future relevance to FTA procedures due to our methodological and usability improvements like an ‘ease-of-use facilitator portal’, a ‘consensus portal’, and a ‘graphical real-time feedback’, which reduces drop-out-rates and speeds up the hole process.

2.2. Delphi data sample and analysis

Within the scope of our Delphi survey [11], 57 aviation strategists, C-level executives, aviation researchers and consultants evaluated 40 projections in terms of probability (scale from 0-100%) and desirability of occurrence (5 point

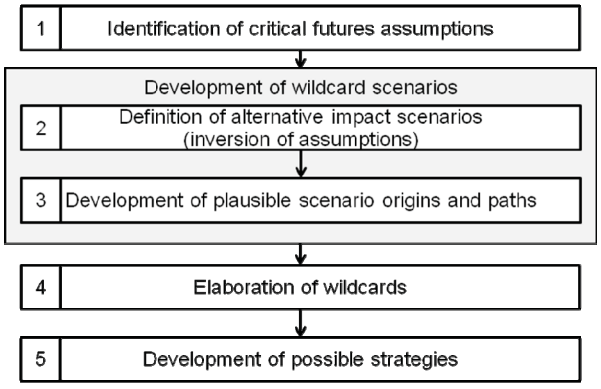
Likert scale) as well as impact (5 point Likert scale) on the aviation industry.

In addition to their quantitative assessments, participating panellists were able to provide qualitative statements, which supported their numerical estimations and to discuss relationships between factors, shaping future developments. Based on the assessments and more than 1,300 collected verbal arguments for the individual expert expectations, relevant extreme and wildcard scenarios have been deducted, enabling contingency planning and the preparation for unforeseeable and disruptive events [12],[13]. Furthermore, the arguments and comments have been the fundament for later storytelling as well as identification of weak signals, wildcards, outlier opinions and mainstream arguments.

2.3. Delphi-based deductive wildcard analysis

The deductive wildcard analysis aimed at the development and analysis of company and market-specific wildcards. Here it is generally not possible to access existing data. Rather, the wildcards have to be developed from the scratch. Due to the complexity of the future and the associated unpredictability, the number of potential surprises is endless. Therefore it is impossible to identify all possible wildcards in an exhaustive manner. Nevertheless, the deductive wildcard analysis provides an adequate approach to identify those issues relevant for a specific company at a reasonable cost.

In the first step, the critical future assumptions have to be identified. In a second step, wildcard scenarios have to be deducted on the basis of qualitative Delphi data analysis and scenario techniques, followed by the development of plausible scenario origins and paths. Fourth, relevant wildcards have to be elaborated. And finally, the wildcard transfer has to be conducted through a process of storytelling, contingency planning and the set up of an early warning system.

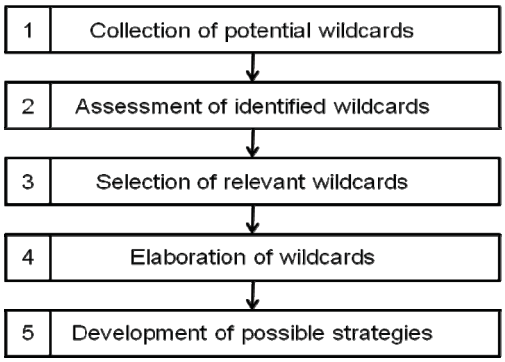


Picture 1. Delphi-based deductive wildcard analysis

2.4. Inductive wildcard analysis

The inductive wildcard analysis is based on the idea of manifold archetypical wildcards that generally have to be taken into account by policy makers and business leaders. Those wildcards can be represented by internal (e.g. financial failure) and external disruptive events (e.g. natural disaster) and consists of five incremental steps.

First, a collection of potential wildcards has to be set-up. Second, the identified wildcards need to be assessed in terms of relevance regarding politics and business. In the third step, a selection of relevant wildcards has to be made followed be the elaboration of the selected wildcards regarding its operative and strategic implications. Finally, possible strategies and policies have to be developed and implemented.



Picture 2. Inductive wildcard analysis

2.5. Outcome and impacts

Based on the survey data, we derived several wildcard scenarios for the year 2025, which address manifold aspects ranging from natural catastrophes towards technological revolutions [11].

1) Aviation Terrorism Reloaded
Since 9/11, the fear of terrorist attacks has tremendously increased. Especially important hubs and large airports could become the focus of physical aggression.

2) Spread of a Global Pandemic
New pathogens originate worldwide on a regular basis. The potential impact of a prolonged global pandemic on aviation networks has become apparent with the case of the SARS in Asia in 2002/2003.

3) Natural Catastrophes
Major impacts can evolve from volcanic activities like in 2010 but danger also might arise from space. Planet Earth has always been subject to impacts from comets and asteroids, which pose a significant danger to life and property.

4) Deglobalization, Relocation, and Protectionism
Intensified worldwide economic shocks could provoke fundamental re-thinking on free trade flows, resulting into strict protectionism.

5) Energy Revolution
An energy revolution based on a scientific breakthrough would make all the traditional energy sources obsolete. Nuclear fusion and zero-point generators, which do not require fuel to produce heat and energy, could be such a technology.

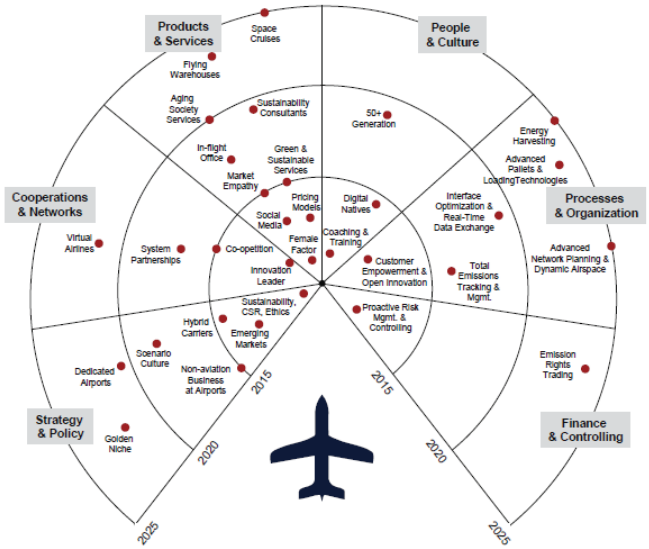
6) Revolution in Transportation Technologies/ Concepts
New transportation technologies and concepts are being discussed, which could revolutionize air transportation, or

pose significant opportunities and threats to the aviation industry.

7) The Fabbing Society
"Fabbing" means the direct fabrication of objects from computer models. Until now, the technology has only been applied in the industrial sphere. However, with technical advancements and falling equipment prices, these technologies could also be made available for private use in 2025.

Nevertheless, fundamental crises and challenges also represent a bench of chances and opportunities enabling future success of policies and strategies. Based on current and expected risks, we set up a process due to develop a set of future chances and opportunities which is represented by our 'opportunity radar' [11].

The developed 'opportunity radar' focuses on promising future opportunities related to aviation over the next 15 years. Some of these are already near implementation, while others remain visions by current standards.



Picture 3. Opportunity radar

The results of our research have already been used at several occasions. Multiple workshops with stakeholders from the aviation industry were held. Here, the implications of the measures for the different stakeholder groups were further discussed. In addition, the methodological results on wildcard and opportunity analysis contribute to the joint research project "Competitiveness Monitor" (CoMo) within the EffizienzCluster LogistikRuhr of the German Federal Ministry of Education and Research. The CoMo will combine three foresight tools in a single IT-based Futures Platform. This platform will integrate user specific information from (1) a Trend Database (TDB), (2) a collaborative Prediction Market application, and (3) an individual Future Workshop.[1]

2.6. References

[1] Däneke, E., H. A. von der Gracht, et al. (2010). Systematische Wildcard-Analyse mit Hilfe der Delphi-Methode am Beispiel Future of Aviation 2025. In: Gausemeier, Jürgen (Ed.) 2010: Vorausschau und Technologieplanung Paderborn, Heinz Nixdorf Institut. 6: 419-440.

[2] von der Gracht, H., T. Gnatzy, et al. (2010). Transportation & Logistics 2030. Volume 2: Transport infrastructure – Engine or hand brake for global supply chains?, PricewaterhouseCoopers (PwC) / Supply Chain Management Institute (SMI).

[3] Gordon, T. and A. Pease (2006). "RT Delphi: An efficient, "round-less" almost real time Delphi method." Technological Forecasting and Social Change 73(4): 321-333.

[4] EC (2004). New Horizons and Challenges for Future–oriented Technology Analysis - Proceedings of the EU-US Scientific Seminar: New Technology Foresight, Forecasting & Assessment Methods. F. Scapolo and E. Cahill, European Commission, Joint Research Centre (DG JRC), Institute for Prospective Technological Studies.

[5] von der Gracht, H. A., C. R. Vennemann, et al. (2010). "Corporate foresight and innovation management: A portfolio-approach in evaluating organizational development." Futures 42(4): 380-393.

[6] von der Gracht, H. A. and I.-L. Darkow (2010). "Scenarios for the logistics services industry: A Delphi-based analysis for 2025." International Journal of Production Economics 127(1): 46-59.

[7] Cuhls, K. (2001). "Foresight with Delphi Surveys in Japan." Technology Analysis & Strategic Management 13(4): 555-569.

[8] Linstone, H. A. and M. Turoff (1975). The Delphi Method - Techniques and Applications., Reading: Addison-Wesley Publishing.

[9] Petersen, Enei, et al. (2009). Report on Transport Scenarios with a 20 and 40 year Horizon. Copenhagen, Denmark, DG TREN.

[10] Cuhls, K. and T. Kuwahara (1994). Outlook for Japanese and German future technology - comparing technology forecast surveys. Heidelberg, Physica-Verlag.

[11] Linz, M. and Rothkopf, A. (2010). The Future of Aviation. Global Scenarios for Passenger Aviation, Business Aviation and Air Cargo. St. Gallen: BrainNet.

[12] Steinmueller (2003). "The Future as Wild Card."

[13] Cuhls, K. and R. Johnston (2006). 'Corporate FTA', Anchor Paper, Proceedings of the Second FTA Seville Seminar, Future-Oriented Technology Analysis: Impacts on Policy and Decision Making. Seville, IPTS.

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