



Scenarios for the logistics services industry: A Delphi-based analysis for 2025[☆]

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ABSTRACT

The logistics services industry will be significantly affected by future developments throughout the world. Therefore, developing future scenarios is an important basis for long-term strategy development. Nevertheless, research exposes that there is a lack of awareness among logistics researchers and practitioners about future scenarios. In this paper, we apply scenario planning and present the findings of an extensive Delphi-based scenario study on the future of the logistics services industry in the year 2025. The major contribution of our research is the development of probable and unforeseen scenarios of the future which may provide a valuable basis for strategy development in the logistics services industry.

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1. Introduction

The future of the logistics services industry will be faced with many obstacles as well as opportunities. The industry is currently experiencing strong growth rates, but is also confronted with major challenges in an increasingly complex and dynamic environment. Intensifying globalisation, stronger competition, higher customer demands and resource scarcity are just a few of the factors that lead to a more turbulent and uncertain environment. Given the potential negative impact of these factors, an analysis of future requirements is required to foster innovations in logistics in order to maintain competitiveness and the ability to adapt to changes (Halldórsson and Kovács, 2010, p. 5; Flint et al., 2005, pp. 113–114; Soosay and Hyland, 2004, p. 41; Darkow et al., 2006). Scenario planning has been identified as one of the most appropriate approaches for long-range planning and to support decisions in uncertain situations (Courtney et al., 1997, p. 78; Schoemaker, 2002, pp. 47, 48; Phelps et al., 2001, p. 223–224; Powell, 1992, p. 551). The positive impact of its adoption has been proven empirically. In a broader sense, 30 or more studies have examined a positive relationship between long-range planning and corporate performance over the past four decades (see e.g. Ansoff et al., 1970; Miller and Cardinal, 1994; Rhyne, 1986).

Recently, an increasing number of authors have also highlighted the high value of scenario planning for logistics, primarily due to the rapid changes in the competitive environment and the fast-paced growth of the logistics industry (see e.g. Piecyk and McKinnon, 2009; Boasson, 2004, p. 47; Spekman and Davis, 2004, p. 428; Waters, 2007a, p. 142; Burbank and Ways, 2004; Shapiro, 2004). Nevertheless, an extensive literature review, as well as empirical research, demonstrates that scenario planning has not been widely used in logistics as yet, both in logistics research and industry practice (Darkow and von der Gracht, 2006).

In this paper, we develop scenarios that describe potential long-term developments of the logistics environment and thereby support logistics executives in developing long-term strategies. These scenarios can support and guide managers in defining strategies contingent to potential future developments or in testing the robustness and appropriateness of strategies that are already in place. The first step in scenario planning is to systematically develop consistent and plausible scenarios. We present the results of an extensive expert-based scenario study on the future of the logistics services industry in 2025. Two specific research questions directed the design and execution of our study:

- (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?

Scenario development was based on a two-round Delphi survey with 30 CEOs and strategy experts of the top 50 logistics service providers in Germany. In order to do so, projections were structured according to PEST-analysis (political, economical,

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socio-cultural, and technological conditions related to research question 1) (see Wilson and Gilligan, 2005, p. 123) and Michael E. Porter's "Five Forces Model" (Porter, 1979) (related to research question 2). These projections include aspects such as the global energy consumption, resource scarcity, labour shortage, the role of emerging and developing countries, urbanisation, demographic change, social responsibility, global warming, digitisation, global networks, and large-scale outsourcing. The experts which participated in the Delphi study assessed each of these projections in terms of the probability of occurrence, the potential impact on the industry and their desirability. Based on these assessments and numerous verbal specifications and comments from the participants, different scenarios were developed. Probable scenarios for the future of the logistics services industry in 2025 were developed based on 12 projections with high probabilities of occurrence and consensus among experts; these included, for example, projections about the diminishing economic gap between emerging markets and developing countries and the still unresolved energy supply problem to foster globalisation. Furthermore, we examined *surprising or unexpected* scenarios, so-called discontinuities, with a low probability of occurrence but with a high impact on the industry; these include, "fabbing", terrorist attacks, and the spread of pandemics.

The remainder of our paper is organised as follows: we begin with a review of the literature relevant to our research, followed by a description of the research methodology. Subsequently, we present our findings with respect to probable scenarios and unforeseen events. Finally, we conclude by delineating various implications and further research avenues.

2. Literature review

The application of scenario planning to the business environment is a relatively new phenomenon (Bradfield et al., 2005, p. 810). Scenarios are typically defined as internally consistent, plausible, and challenging narrative descriptions of possible situations in the future, based on a complex network of influencing factors (Gausemeier et al., 1998, p. 114; van der Heijden, 2005, p. 114).

Scenario planning consists of two main parts: first, scenarios are developed through a systematic process of picturing and rehearsing future situations; second, strategic planning is based on the outcome of scenario development (Bishop et al., 2007, p. 6; Lindgren and Bandhold, 2003, p. 27). The major contributions of scenario planning include thinking in alternatives, enhancing a planners' perception, and offering a structure for dealing with uncertainty (van der Heijden et al., 2004, pp. 142–144).

Varum and Melo (2010) have recently presented results of an extensive bibliometric study on scenario planning publications in scientific journals. Furthermore, an analysis of the various scenario foci revealed that a large portion (36%) concentrated on individual companies, followed by territories (approximately 9%) and specific industries (approximately 7%). However, the most striking result of Varum and Melo's (2010) research was that 70% of all scenario articles were published after the year 2000, which confirms a substantial increase in academic research in this field recently.

Based on existing literature, we can identify different schools of thought in scenario planning: important representatives of these different schools are the Global Business Network (see Schwartz, 1998), the Stanford Research Institute (see e.g. Ralston and Wilson, 2006), and the Wharton Business School (see Schoemaker, 1991; Schoemaker and Mavaddat, 2002). More

specifically, the schools have either an intuitive-creative approach or a mathematical-logical approach to develop a scenario.

Provides an overview of the most relevant literature on scenario planning that is specifically related to logistics. In this table, we only list articles with a minimum time horizon of 5 years and an empirical approach (e.g. through expert interviews or surveys) to data gathering. The different research contributions are classified by type, focus, planning horizon in years, methodology, and content.

The overview of relevant articles for logistics reflects the general trend in publication patterns, as revealed by Varum and Melo (2010). The number of publications has steadily increased for years. In terms of the planning horizon, we can observe a concentration of papers that considers either a range of 8–10 years or a planning horizon of more than 20 years. This development reflects the need for a more profound and systematic approach to manage long-term planning in the volatile and uncertain environment of the logistics services industry. The trend towards globalisation has steadily increased with the effect that supply chains have become longer and more complex (Ballou, 2004, p. 15).

Recent research identified three major trends relevant for the logistics industry: outsourcing of logistics services; more severe competition; and differentiation or competitive advantages achieved through the added value offered to the customer (Grant et al., 2006; Waters, 2007b). Grant et al. and Waters expect that companies will go on to focus on their core competences. As in the course of cost reduction and flexibility improvement, the vertical integration will further be reduced. On the other hand, the regional scope of production is still expanding. Therefore, information and goods flows have to be synchronised on a global level, leading to high complexity in the system. Managing these systems efficiently is one of the major challenges for the logistics services industry and reflects the need for long-term planning and scenario planning.

In general, scenario publications often have a quantitative focus, building on oil price development, GDP (gross domestic product) growth or transport volumes (see e.g. European Community, 2004; Stead and Banister, 2003; Sviden, 1988). Many scenarios actually include forecasts through trend extrapolations of historical data. A few publications exhibit a qualitative focus, i.e. scenarios based on a narrative description of the future (see e.g. Institute for Mobility Research (ifmo), 2002, 2005). This may be due to the fact that most of the scenario studies were intended to serve as a basis for decision makers in public policy. Especially in logistics, scenario planning often focuses on macro-environmental aspects, such as infrastructure, roadwork, transportation markets, and policies (see e.g. Pietyk and McKinnon, 2009; European Community, 2004; Stead and Banister, 2003). In the PROTRANS project, funded by the European Commission, scenarios were developed with a focus on intermodality in the European logistics services industry. Two models for the focused field of intermodal transportation were developed, which were considered in a best, average and worst case simulation (Protrans, 2003). Hardly any studies exist which consider industry scenarios to support decision making in companies (see e.g. Bergman et al., 2006). Furthermore, many studies follow a classical, functional understanding of logistics, i.e. transportation, handling, warehousing (see e.g. Duin et al., 2005; English and Keran, 1976; European Community, 2004), and scenario research so far has not focused on the logistics services industry taking a holistic, supply chain perspective into consideration.

Our research is a first step in closing this research gap. We develop future scenarios that logistics service providers can use as a basis and starting point for strategy development. We integrate

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