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# Scenario Analysis of Online Food Supply Chains
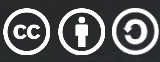
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# Scenario Analysis of Online Food Supply Chains

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**Purpose:** *For a long time, online food retail, especially in Germany, lagged strongly behind other e-commerce industries. The COVID-19 pandemic gave this market an unforeseen boost in demand. Nevertheless, numerous problems still exist in the industry, such as lack of profitability, staff shortages, and product returns. Identifying possible future developments can help to design meaningful strategies for the fulfillment within online food supply chains.*

**Methodology:** *The scenarios are built using Porter's Five Forces in combination with a STEPE analysis examining socio-cultural, technological, economic, political, and ecological factors. The findings are validated and ranked by four interviews with experts working in the online food retail industry.*

**Findings:** *The literature research and the assessment of the experts show that above all socio-cultural (e.g., customers' price sensitivity) and technological factors (e.g., warehouse automation) will be decisive for the future development of the industry. These are combined to form three scenarios (best-case, worst-case, focus on shelf-stable food). Implications for online food retailers are given for each scenario.*

**Originality:** *This paper applies methods of trend and future research to the areas of online food retail and logistics and supply chain management research. In this area only little original scientific research exists.*

# 1    Introduction

For a long time, online food retail, especially in Germany, lagged strongly behind other e-commerce industries. In most other industries, e.g., "Fashion & Accessories", "Consumer Electronics" or "Home & Living", the share of e-commerce sales makes up a significant portion of total turnover, namely between 10 and 25 percent (IFH Institut für Handelsforschung GmbH, 2017). In contrast, the share of online food retail in Germany was stagnating at under one percent with a share of slightly over 1 billion euros online versus a total food market share of 123.1 billion euros (Statista, 2020).

However, the demand for food ordered on the Internet changed abruptly in early 2020 with the outbreak of the COVID-19 pandemic in Germany. Consumers' fear of the virus led to enormous growth rates for online food retailers. GetNow, for example, recorded an increase in the number of new customers of over 500 percent in some cities. Picnic stated that the demand for their service more than doubled in March of 2020. Similar experiences were made by other online food retailers such as Rewe and Amazon Fresh (Reimann, 2020).

It seems that food retail, especially online food retail, is one of the big winners of the COVID-19 crisis, almost doubling the sales comparing the last quarter of 2019 with the last quarter of 2020 (Reimann, 2021). Despite this encouraging development, the enormous surge in demand also on one hand caused problems. The retailers had to extend their delivery time from usually 1-3 days to 14 days, some even had to ban new customers from registration for a certain time (Reimann, 2020). On the other hand, already existing problems were highlighted, such as lack of profitability, shortage of staff, and product returns.

The aim of this paper is to glimpse into potential future developments of online food retail in Germany. Identifying possible scenarios can help to design meaningful strategies for the business model of online food retailers, especially on the supply chain and logistics aspects of fulfilling customer orders.

Following this introduction, the theoretical background for the paper is presented. This includes a definition of the online food retail industry, an overview of the German online

food retail market and a characterization of the different business models with a logistics and supply chain focus. Next, the research design is presented, which comprises the data collection and analysis of primary (four expert interviews) and secondary data (case studies and literature). Subsequently, we list our research findings resulting from each research method. This includes an internal (Porter's Five Forces) and external (STEPE) analysis of the German online food retail market as well as three future scenarios (best-case, worst-case, focus on shelf-stable food) and their implications. The paper finishes with a short conclusion and the limitations of our research.

## 2      Theoretical background

Before describing the German online food retail market and characterizing the different business models, we first need to give a definition of what we refer to as online food retail. In this paper, only companies that deliver food in a narrower sense of the word are considered, i.e., retailers selling goods to end customers which are meant for eating or drinking, which are part of the daily needs of life. This excludes catering services and online delivery services such as Deliveroo or Delivery Hero (Foodora) because they deliver prepared meals from restaurants.

The companies included in this definition can be distinguished into three major groups:

(1) The first group are online supermarkets offering a full range of products typically found in a supermarket, i.e., frozen food, chilled food, fruits, and vegetables, packaged food articles, beverages packed in crates as well as non-food articles like toiletries (Beckmann et al., 2020). The largest online food retailer in Germany in terms of sales and delivery locations is Rewe. Other companies with a smaller number of delivery locations are Bringmeister (formerly Edeka, in March 2021 sale to the Czech investment group Rockaway was announced (Kausch, 2021)), Picnic (a Dutch company with participation of Edeka) and Amazon Fresh. The market is subject to strong change. For example, the online delivery service of supermarkt.de (Ortmann, 2013) and Kaufland (Pieringer, 2017) were discontinued after only about a year. GetNow had to file for insolvency in October 2020 (Gassmann, 2020). Nevertheless, new companies are constantly entering the

market, most recently instant delivery services such as Gorillas and Flick, and the Czech company Rholik (knuspr.de).

(2) In contrast to the first group, niche providers focus on a specific product or product range. They only offer an excerpt of a typical supermarket assortment (Beckmann et al., 2020). There seems to be an infinite number of companies in this group. For almost every possible food item an online food retailer can be found. Table 1 gives an overview of food categories with company examples. The food categories are an excerpt of the categories used by HDE in their retail report food 2018 (IFH Institut für Handelsforschung GmbH, 2018b).

Table 1: Examples for niche providers by food category

| Food category | Niche provider |
| --- | --- |
| Canned/prepared/fixed products | dm, Netto Marken-Discount |
| Dairy products | Hemme Milch, Käsewelten, Käse Willie, kaeseversand24.de, Käs Hütte Fischen, Milchbubie.de, okäse.de |
| Ice cream | Florida Eis, Gelato Vannella, O-Mochi |
| Delicatessen/Spices/Convenience | Bremer Gewürzhandel, Gewürzland, Gewürz Mayer, Just spices, Spicebar |
| Fruit and vegetables | Freshorado, Fruchtknall, Gesunde Tüte, Obstkorb |
| Confectionery/Pastries | Candy and more, Candyhouse.de, Sugafari, sweets-online.com, torten.de, World of sweets |

| Food category | Niche provider |
| --- | --- |
| Alcoholic beverages | Alkoport, Belvini, Jacques', Hawesko, weinlieferservice.net |
| Non-alcoholic beverages | Durst.de, Flaschenpost, Getränke.jetzt, getraenkedienst.com |
| Frozen food | Bofrost, Eismann |

(3) Vendors of cooking boxes or meal kits make up the third group of companies in the online food retail market. They sell food pre-packaged according to the ingredients for a specific recipe. Customers can order the box and cook dinner without having to worry about the necessary amounts. In 2010, seven such companies started in Germany of which three are still in the market in 2021: HelloFresh, Marley Spoon and Kochhaus, although the latter had to file for insolvency, suggesting that this business model is a niche in which only a few players can operate profitably (Beckmann et al., 2020).

Several authors highlight the importance of logistics and supply chain management for e-commerce as an integral part of the business model (i.a., Beckmann et al., 2020; Seidel et al., 2016; Grant et al. 2014). Beckmann et al. (2020) summarize their findings in a morphological box detailing the current business model characteristics and fulfillment concepts used in the food online retail market in Germany. We updated the morphological box by updating the 23 case studies used originally and adding five case studies of new companies in the market. Figure 1 shows the adjusted morphological box. The changes made are highlighted with a light grey background.

The first column presents the categories in which the business model is broken down. Each row includes the expressions the categories can take on. For example, there are three basic types of delivery cost models: (1) a monthly or yearly flat rate, (2) a fixed delivery fee, and (3) a dynamic delivery fee, which can depend on factors such as delivery date and time window or minimum order value (Beckmann et al., 2020).

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| Type of provider | Start-up | | Online retailer | | Food retailer | |
|---|---|---|---|---|---|---|
| Cooperation partner | Food retailer | Food wholesaler | Small shops | Food producers | E-commerce platform | None |
| Type of distribution | Outsourcing to LSP (DHL, Hermes, DPD or others) | | | Own delivery service | | |
| Distribution center | Own existing DC (multi-channel) | | Own DC "dark store" (only online food retail) | Bricks-and-mortar store | | Urban mini distribution hub |
| Depth of product range | ≤ Ø supermarket (10.000 SKU) | | 2-3x Ø supermarket (20-30.000 SKU) | 5-10x Ø supermarket (50-100.000 SKU) | | > 100.000 SKU |
| Delivery area | Nationwide | | Many regions, but not nationwide | Some cities and surrounding area (3-10) | | Few cities and surrounding area (2-3) |
| Delivery location | Home (adress) | | Click-and-collect (store) | | Pick-up station or store | |
| Delivery options | Same-day within < 1h | Same-day within 1-4h | Same-day evening (> 4h delivery time) | Day with <1h window | Day with 1-2h window | Day with halfday window | 1 day | 2-3 days |
| Delivery cost model | Flatrate | | Fixed delivery fee | | Dynamic delivery fee | |
| Min. order value | No min. order value | | Min. order value < 40 € | Min. order value 40-50 € | | Min. order value >50 € |
| Free shipping | No | Min. order value < 40 € | Min. order value 40-50 € | Min. order value 50-100 € | Min. order value >100 € | |
| Surcharges | None | | Beverage crates | | Fresh goods | Frozen goods |
| Cold chain | Active cooling (delivery vehicle) | | Passive cooling (packaging) | | None | |

Figure 1: Morphological box of fulfillment concepts

# 3 Research design

This study is based on the research published by Beckmann et al. (2020), who used secondary multiple case studies according to the example of Herden and Bunzel (2018) and analyzed the case studies using qualitative content analysis. We extend these findings. Primary data was collected by semi-structured interviews with experts working for online food retailers. Secondary data, namely industry reports, news articles and research papers, were used to establish the status quo of the online food retail market in Germany and to complement the information gained in the interviews.

## 3.1    Data collection

Four semi-structured interviews were conducted with experts working for online food retailers between November 2019 and March 2020. The experts represent different positions and companies from different groups of the online food retail market. The experts were asked to assess the status quo of the industry. They were also presented with the morphological box from Figure 1. Further, they were asked to state whether this reflected the market for them and whether they would add anything. Then the factors of the STEPE analysis were discussed, and the experts were asked to evaluate them regarding the importance of the market. Finally, existing problems of the market, their possible solutions and market developments were discussed. The interviews were subsequently transcribed. The experts were asked to validate the transcripts.  Any comments made were adopted accordingly.

## 3.2    Data analysis

The data is structured and analyzed using Porter's Five Forces, STEPE analysis and scenario analysis.

Porter's Five Forces Framework is a method to analyze the competition of a business with the help of five forces, namely (1) threat of new entrants, (2) threat of substitutes, (3) bargaining power of customers, (4) bargaining power of suppliers, and (5) competitive rivalry. They determine the competitive intensity and attractiveness of an industry and are referred to as the microenvironment of the business (Porter, 1979).

The macroenvironment can be characterized using the STEPE analysis. STEEP and PESTE are other abbreviations commonly used for this variant of the PEST framework. STEPE is an acronym formed by the following factors: (1) socio-cultural, (2) technological, (3) economic, (4) political and (5) ecological. STEPE analysis is used as a strategic tool for understanding a market's potential for growth or risk of decline as well as the general business position (Richardson, 2017). Table 2 lists more detailed factors for each category of the STEPE analysis (Bensoussan and Fleisher, 2008).

Table 2: Factors of the STEPE analysis

| STEPE analysis category | Factors |
| --- | --- |
| Socio-cultural | Age distribution, income, working hours, price sensitivity, convenience, urbanization |
| Technological | Automation, rate of technological change, technological shifts |
| Economic | Economic growth, inflation rate, interest rate |
| Political | Tax policy, labor law, trade restrictions, tariffs, political stability |
| Ecological | Weather and climate, waste, $CO_2$ emissions |

### 3.2.1   Scenario analysis

In the literature and in practical applications, the terms scenario technique and scenario method are used synonymously for scenario analysis. There is no comprehensive or even uniform theoretical-methodical foundation for scenario analysis in the scientific literature. (Kosow et al., 2008). For this work, we apply scenario analysis following a five-step process as described in the following:

(1) Scenario environment definition: The scenario environment is defined by employing the Porter's Five Forces Framework on the online food retail market.

(2) Key factor identification: The key factors are provided by the STEPE analysis and narrowed down by interviews with industry experts.

(3) Key factor analysis: For the third step of the process, we generate expressions for those factors which the experts see as most important for the development of the market.

(4) Scenario generation: The so-called funnel model (Figure 2) serves to illustrate a set of alternatively imaginable scenarios. Here it is shown that developments in the near future are largely determined by the conditions of the present. The further into the future the forecast is to be made, the less influence the current situation has and the wider the spectrum of possibilities opens, like a funnel.

From today's perspective, several future constellations are conceivable. In practical application, it has proven useful to develop a few scenarios. As a rule, the edge points of the funnel are chosen, so-called extreme scenarios, since this completely spans the funnel, and all other scenarios move between the extreme with particularly favorable (best-case scenario) and the extreme with particularly unfavorable (worst-case scenario) assumptions.

Accordingly, the generated expressions from the third step are combined in a way to form a best-case and a worst-case scenario.
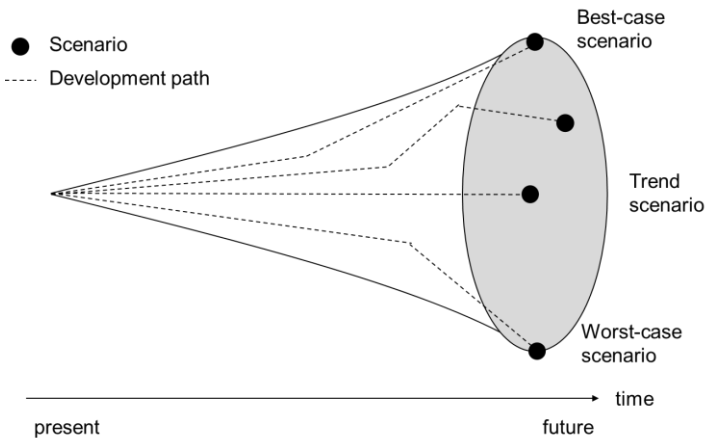


Figure 2: Funnel model

(5) Scenario transfer: The last step is to discuss implications for online food retailers resulting from the different scenarios.

# 4     Review of results

The analysis of the collected data gives a comprehensive picture of the micro- and macroenvironment of the German online food retail market.

## 4.1     Microenvironment (Porter's Five Forces)

Firstly, we present the results for the microenvironment of the market. This also serves as a description of the status quo for the scenario analysis. Figure 3 summarizes the findings of the Porter's Five Forces Analysis.
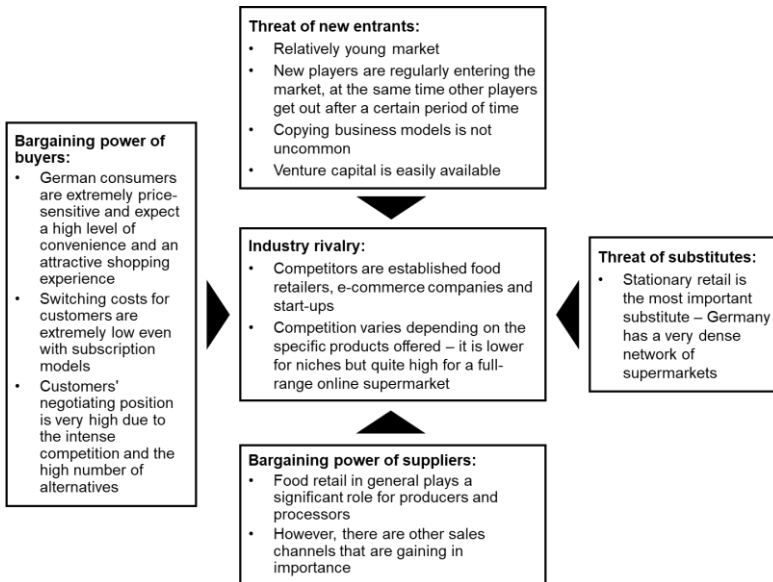
Figure 3: Porter's Five Forces analysis of the online food retail market in Germany

## 4.1.1   Industry rivalry

The market is characterized by many different companies, with only a few retailers offering a full range of products. Market players here are, on the one hand, established food retailers (Edeka formerly with Bringmeister now in cooperation with Picnic, Rewe, Real). There are also online retailers that have previously traded in other product groups and are now expanding their product range into this area (primarily Amazon with Amazon Fresh). On the other hand, there are numerous start-ups that want to revolutionize traditional grocery shopping (e.g., Allyouneedfresh.de, GetNow, Gorillas, Rholik).

Most companies focus on specific product groups, with both pure player concepts and omnichannel concepts. The focus on exclusive food products, such as the business model of gourmondo.de, seems to be particularly worthwhile to achieve profitability.

Finally, a sub-market of companies that ship so-called cooking boxes has formed. Subscription users receive recipes and the exact ingredients to go with them delivered directly to their homes and are supposed to be able to prepare a fresh meal within about 30 minutes. The convenience for users is that they do not have to search for recipes themselves or shop for the appropriate ingredients. In addition, the precise combination of ingredients means that there are no leftovers that need to be recycled. Depending on the provider, the number of people, the delivery days offered, and the type of recipes can differ. However, the concept is basically very similar, which is why significant consolidation has already been observed in the cooking box market. Of ten providers on the German market, only three are still active after just under 10 years, namely HelloFresh, Marley Spoon and Kochhaus.

Overall, competition within the sector varies greatly. In the full-range segment, it appears to be high, while the sub-market for cooking boxes has already consolidated and competition has therefore decreased. The more companies focus on a specific product group and the more specific the target group, the less competition a provider will face.

## 4.1.2   Threat of new entrants

The German online food retail market is a relatively young market, compared to other countries like Great Britain, France, or the USA. It is characterized by companies trying out the online supermarket concept (e.g., Kaufland and supermarkt.de) and then leaving after a certain period of time due to it being a loss-making business or even having to file for insolvency (e.g., GetNow). At the same time, new players are regularly entering the market, such as Amazon Fresh in 2017, Picnic in 2018, Gorillas and Flink in 2020, as well as Crisp and knuspr.de (Rholik) in 2021. It is interesting to note that - in contrast to the offline market - with Picnic and Rholik, foreign companies are also venturing into the German market. In general, therefore, there is a high risk from new competitors, as these are usually also endowed with large amounts of venture capital. Additionally, it is not uncommon in e-commerce to copy successful business models (Deges, 2019). HelloFresh

copying the model of Middagsfried and the very similar business models of Gorillas and Flink can be seen as examples.

### 4.1.3    Bargaining power of suppliers

Similar to traditional food retail, online food retail suppliers include food producers, processors, and wholesalers. Food retail in general plays an important role for food producers and processers. However, the food industry has numerous alternatives for selling their products outside the food retail (offline or online), e.g., hotels, restaurants, catering, export abroad, which are gaining in importance. Another option is direct marketing to the consumer, which bypasses retailers through vertical integration (IFH Institut für Handelsforschung GmbH, 2018a). Thus, the bargaining power of suppliers can be described as medium.

### 4.1.4    Bargaining power of buyers

The most important target groups for online grocery shopping are young professionals, families with young children, and so-called silver surfers, i.e., older people who are confident in their use of the Internet. For these people, shopping in brick-and-mortar stores often does not offer a special experience or fun factor. More important are the time aspect and certain stress factors, such as searching for products, products that may be out of stock, distracting products at the checkout, and the heavy weight of purchases (Seitz, 2013). Single people are seldom the focus for online grocery shopping, as it is difficult for them to achieve the necessary minimum order quantities or amounts.

According to Suhr (2020), 30 percent of Germans have already ordered food online. In the case of online supermarkets, this figure has risen to 19 percent since the COVID-19 pandemic, compared with only 7 percent previously (Suhr, 2020). However, customers still cite concerns about the quality and freshness of the goods as the biggest barrier, especially in the case of fruit and vegetables. Insufficient trust and a higher price level are further reasons for not buying groceries online (Ahrens, 2021; Grant et al., 2014).

Generally, it can be said that German consumers are extremely price-sensitive when it comes to food and expect a high level of convenience (Seitz, 2013) and an attractive

shopping experience (Ahrens, 2020; Yeao et al., 2017). They also want to have individual wishes realized online, such as bananas with a certain degree of ripeness or sausage cut into particularly thin slices.

It should also be noted that e-commerce places the focus on customer needs so that processes are designed to be as simple and convenient as possible. However, this leads to low switching costs for customers from one provider to another. Some retailers are trying to counter this with monthly or annual subscription models (e.g., Rewe). It saves customers delivery costs and keeps them loyal to a retailer for longer.

In conclusion, the customers' negotiating position is high due to the great competition and the large number of alternatives. Customers decide to buy on the Internet when they see a major benefit for themselves. Heavy products such as cans or beverage cartons are therefore successful.

## 4.1.5    Threat of substitutes

The most important substitute for online food retail is stationary retail. Germany is characterized by a very dense network of supermarkets and is therefore quite different from, for example, France and the USA (Ahrens, 2020; Seidel et al., 2016). In total, there are just short of 38.000 grocery stores in Germany with a retail space of 36,2 million square meters (IFH Institut für Handelsforschung GmbH, 2018a).

The biggest disadvantage for online retailers compared to brick-and-mortar stores is delivery fees. Due to the low prices in the German grocery market, retailers calculate tightly, and the margins are low compared to other countries (Seitz, 2013). Therefore, in most cases, the delivery fees cannot be covered by the margins. At the same time, many consumers find the delivery charges too high.

The biggest advantage lies in offering a wide range of products. An average supermarket, for example, offers between 2,000 and 20,000 different items (Nitsche and Figiel, 2016). Online grocery retailers can offer assortments ranging from 30,000 to over 100,000 items in some cases (so called long-tail effect).

The chance of replacing the normal weekly shopping trip to the supermarket with an online order for a significant proportion of the population can be regarded as low in

Germany. However, as a supplement to traditional shopping with an additional channel for certain products or occasions, online food retailing certainly has its justification.

## 4.2    Macroenvironment (STEPE analysis)

Comparing the answers given by the four experts regarding the different factors of the STEPE analysis, the following results could be derived (cf. Table 3).

All one of the experts describe socio-cultural factors as highly relevant or medium relevant. The customer's wish for convenience and their price sensitivity are named by several experts as key factors. German customers are regularly described as particularly price sensitive. Also, a trend to focus more on convenience can be found in the literature (Yeo et al., 2017; Saarijärvi et al., 2014).

Again, the industry experts agree on the relevance of technological factors to be highly important. They state that an automation of the processes is necessary to achieve the profitability of the business model for online food retail. In their opinion, an automation of the warehouse processes will be likely, citing Ocado in Great Britain as an example, on the one hand. On the other hand, however, they believe that an automation of the delivery processes is unlikely.

Regarding the economic factors, no specific relevance is identified. The interviewees believe that a good economic environment might speed up the market development and that an economic crisis might slow the development down. However, economic factors will not influence the path of development.

Political factors will only play a little role in the development of the online food retail market according to the experts. They agree that the political system in Germany is stable. Antitrust laws and minimum wage are mentioned as factors with a certain relevance for the industry.

Ecological factors are assessed with medium to high relevance. Important topics in this are waste (food and packaging) and $CO_2$ emissions. The fleet electrification of delivery vehicles is stated as an important development and a solution for the reduction of emissions, which coincides with different studies (Nitsche and Figiel, 2016).

Table 3: Factors of the STEPE analysis ranked by the experts

| STEPE analysis category | Expert A | Expert B | Expert C | Expert D |
|---|---|---|---|---|
| Socio-cultural | +++ | +++ | +++ | ++ |
| Technological | +++ | +++ | +++ | +++ |
| Economic | + | 0 | 0 | 0 |
| Political | ++ | 0 | + | + |
| Ecological | +++ | ++ | ++ | ++ |

+++ high relevance   ++ medium relevance   + little relevance   0 no relevance

In summary, it can be stated that the experts are in accordance that social-cultural and technological factors will have the most relevance for the future development of the industry.

## 4.3    Scenarios

Following the identification of the relevant factors, expressions are formulated for each of the key factors. The results of this step are given in Table 4.

Table 4: Possible key factor manifestations

| STEPE analysis category | Key factor | Possible manifestations |
|---|---|---|
| Socio-cultural | (1) Price sensitivity of consumers | (1a) Price sensitivity decreases, customers are willing to spend a higher percentage of their income on food. |
| | | (1b) Price sensitivity stays the same. |
| | (2) Need for convenience of consumers | (2a) Convenience becomes very important to German consumers. |
| | | (2b) The need for convenience stays at the current level. |
| | (3) Experiencing look and feel of products | (3a) Consumers trust in retailers to pick their products even for fresh foods. |
| | | (3b) Most consumers still want to examine their fresh foods themselves and experience the look and feel firsthand before the purchase. |
| Technological | (4) Automation | (4a) Warehouse automation is profitable, so companies invest into automation technologies like picking robots. |
| | | (4b) Automation of warehouse or delivery are not profitable. Processes stay mostly manual. |
| Political | (5) Minimum wage | (5a) The minimum wage stays at its current level. |

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| STEPE analysis category | Key factor | Possible manifestations |
|---|---|---|
| | | (5b) The minimum wage for untrained workers is increased significantly. |
| Ecological | (6) Waste avoidance | (6a) Political requirements for waste avoidance stay the same, also consumer awareness of the issue is unchanged. |
| | | (6b) Legal requirements for packaging and food waste avoidance are stricter. |
| | (7) $CO_2$ emissions | (7a) Legal requirements for $CO_2$ emissions stay at the current level. |
| | | (7b) Legal requirements for $CO_2$ emissions become stricter. Companies have to undertake greater efforts to save $CO_2$ emissions and become carbon neutral. |

The fourth step is the scenario generation. The manifestations of the factors are now combined in a way that extreme scenarios form which open the scenario funnel. We also decided to create a third scenario with a specific property based on findings from the literature. The combinations of possible manifestations are presented in Table 5.

### Table 5: Scenarios generated

| Scenario generated | Combination of key factor manifestations |
|---|---|

| | |
|---|---|
| Best-case scenario | (1a), (2a), (3a), (4a), (5a), (6a), (7a) |
| Worst-case scenario | (1b), (2b), (3b), (4b), (5b), (6b), (7b) |
| Scenario with focus on shelf-stable food | (1a), (2a), (3b), (4a), 5-7 not relevant |

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(1) Best-case scenario: Many consumers had positive experiences ordering food online during the COVID-19 pandemic, which can be seen as a wildcard event breaking with the trend. Their price sensitivity has weakened somewhat, and they attach great importance to convenience. The larger order volume makes warehouse automation feasible for retailers. Despite political requirements for a minimum wage and the use of electric vehicles and waste avoidance, profitable business models can be developed in this way.

The share of online retail in the overall food trade is increasing, as is already the case in other countries.

(2) Worst-case scenario: The positive development during the COVID-19 pandemic cannot be continued. Sales figures fall back to the level before 2020. The price sensitivity of customers remains high. It is also extremely important to most customers to assess the touch and feel of fresh produce for themselves (Seitz, 2013). Automation in the warehouse or for delivery remains unprofitable. Political requirements such as the increase in the minimum wage and ecological requirements to avoid waste and reduce $CO_2$ emissions are putting retailers under further pressure.

Start-ups do not receive renewed financial injections after a few years. All companies in the online food retail market that offer a typical supermarket product range continue to make losses. One by one, retailers are discontinuing their online business or filing for insolvency. Larger retailers may succeed in converting their online business to profitable niches. Most niches are served by only one monopolist (e.g., cooking boxes by HelloFresh).

(3) Scenario with focus on shelf-stable food: The creation of this scenario was considered for three reasons. Firstly, studies show that preferably shelf-stable foods are bought online (PWC, 2018). Secondly, supply chain and delivery processes are less complex for

non-refrigerated and more durable products. Finally, some big German retailers offer online services only for products of this kind (e.g., dm and netto).

Consumers have had positive experiences with ordering food online. However, it is important to them to choose fresh products such as fruits and vegetables themselves. As a trend, it can be deduced that mainly heavy and long-life foods are ordered online. Online retailers are adjusting their product ranges and fulfillment concepts. Not having to handle fresh and delicate products makes automation easier and cheaper. The increase in online retailing for shelf-stable products is having an impact on traditional supermarkets. They are focusing on fresh products in their stores. Long-life products, which customers do not want to examine on site, can be ordered in advance and then picked up on site (click-and-collect) if fresh products are also purchased from the retailer.

The online share of total business will increase in the coming years but will not reach the same level as in other industries or countries.

## 5 Conclusion

In this paper, we investigate the future development of the German online food retail market with the help of a scenario analysis. Socio-cultural and technological factors have the highest relevance for the online food retail market. Three different scenarios are developed based on different manifestations of the factors price sensitivity, need for convenience, automation of the fulfillment processes, as well as minimum wage, waste avoidance and $CO_2$ emission reduction:

(1) Best-case scenario: Online food retail establishes itself in Germany due to changing consumer preferences that enable profitable business models. In the long term, the online share will rise to a double-digit percentage, as in other industries and countries. However, the market is also consolidating, so that only a few retailers compete.

(2) Worst-case scenario: Online food retail is not successful in Germany except in special niches. These are mostly occupied by monopolists. Retailers who do not serve a niche continue to make losses, so they either leave the market or change their offer fit a niche.

(3) Scenario with focus on shelf-stable food: Online food retail is successful for long shelf-life food. However, consumers prefer to buy fresh products on site. Online retailers adjust their business models accordingly, which also leads to traditional supermarkets changing their approach. They become multi-channel retailers offering click-and-collect fulfillment options for shelf-stable food and focusing the product presentation on site on fresh products and produce.

# 6      Limitations

The research results presented are on the one hand based on four interviews with industry experts. Due to the fast pace of the online food retail market, some insights gained may already be outdated. For further investigation, more interviews with a broader variety of experts should be conducted to validate the results obtained.

On the other hand, further data was collected by studying industry and media reports using a secondary case study analysis. Here we were dependent on those reports being publicly available at the time of the survey, which may skew the results.

# Acknowledgements

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