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Company views of consumers regarding sustainable packaging

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ABSTRACT

In the transition towards more sustainable food packaging, food companies play a key role: they decide what type of packaging to use in their production. Past research posits that corporate decision making on sustainable packaging is driven by perceived consumer demand, making it important to understand how companies see consumers, a topic largely neglected in the literature. Our study aims at uncovering how food packaging professionals see consumer demand for sustainable packaging. We performed qualitative interviews with packaging professionals from food companies in Germany, Austria, Spain, and Portugal; we then performed qualitative content analysis on the responses. The results show that half of our interviewees think that sustainability in packaging does not matter to consumers. Further, pertaining to the packaging life cycle, packaging professionals believe that consumers pay more attention to attributes related to raw materials, i.e. the beginning of the packaging life cycle, preferring paper and rejecting plastics. Interviewees demonstrate scant awareness of consumer research which shows that bio-based materials, biodegradability and recycled materials matter to consumers. Our interviewees frequently criticized consumers, presenting what we identify as *narratives of disempowerment* whereby responsibility for sustainable packaging is not theirs. First, they perceive consumers as an obstacle. Second, they describe their own position as not very powerful vis-à-vis packaging manufacturers and retailers. And third, they are often unsure about consumer attitudes, knowledge or behavior. This assignment of responsibility for packaging decisions to retailers and consumers emerges as a strong barrier to the expansion of sustainable packaging. Analyzing the perceptions that companies have of consumers may help in better aligning consumer attitudes and behaviors and company strategies for sustainable packaging.

1. Introduction

Food packaging can help to prevent food losses and waste (Gustavo et al., 2018; Herbes et al., 2018) and thus can have a positive sustainability effect. But packaging, of which food packaging is a large part, also accounts for nearly 59 % of all plastic waste in Germany (Lindner et al., 2022). Plastics production requires large amounts of resources, especially oil, with plastic for packaging accounting for 44 % of global plastics production (Plastics Europe, 2022). Households can reduce their food and beverage packaging related footprint substantially when receiving information on packaging and packaging waste prevention (Caspers et al., 2023).

Especially plastic waste is a great concern: it poses risks to both wildlife and human health (Ilyas et al., 2018), particularly microplastics

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have been identified as a severe problem, because they can through marine littering and the food chain end up in the human body where they can cause cancer amongst other diseases (Li et al., 2016). Moreover, plastic contributes to climate change across its life cycle (Ford et al., 2022).

This has led many stakeholders to act to reduce the negative environmental effects of food packaging across the life cycle. Legislators, for one, have enacted legislation to increase the circularity of plastic materials (European Parliament, 2019). Extended producer responsibility (EPR) regulation in particular has in many countries led to an increase in recycling rates (Tumu et al., 2023). Bans on single use plastic in a number of countries and regions have put additional regulatory pressure on producers (Cowan et al., 2021; Tan et al., 2021).

But also consumers have developed greater awareness of waste, especially of plastics (Walker et al., 2023); NGOs are lobbying for more sustainable packaging (Pinsky and Mitchell, 2019); and research institutions and companies are working on technical solutions to increase sustainability of food packaging (Akin et al., 2023).

Sustainable packaging can be defined in different ways. Two definitions that are used frequently have been developed by the Sustainable Packaging Coalition (SPC) (Sustainable Packaging Coalition, 2011) and the Sustainable Packaging Alliance (SPA). The SPAs sustainable packaging principles demand that sustainable packaging is effective, efficient, cyclic and clean. Effective pertains e.g. to the avoidance of overpackaging. The efficiency principle demands an optimized use of energy and materials. Cyclic includes options such as making packaging reusable, recyclable or biodegradable. And the Clean principle stipulates that packaging should not pose risks for humans or the eco system (Lewis et al., 2007). Throughout this paper, we refer to the SPA principles. However, that does of course not mean that our interviewees have the same understanding, since all of them only mention single elements of the principles.

However, while acknowledging the important role of regulatory actions, if the transition to sustainable packaging will be successful or not, is also a matter of the behavior of market actors. If companies do not produce and offer sustainable packaging, or if consumers do not buy it, change will not happen. A recent study showed that decision making processes on packaging in food companies are often not well-structured; rather, companies tend to take a wait-and-see approach to sustainable packaging (Weinrich et al., 2024). Authors such as Ma et al. (2020) point out that barriers in companies to reduce or eliminate plastics in packaging are not well understood. This probably applies also to barriers to sustainable packaging beyond plastics. One of these may lie in how the companies view consumers and the understanding of consumers that companies use to make their decisions on sustainable packaging.

The literature on packaging assumes that companies follow what they think are consumer preferences, with a recent literature review having identified consumer pressure as one of key drivers of the demand for sustainable packaging (Afif et al., 2022). An expert quoted in a recent study on reusable packaging says: “I think that the reusable business will mainly be driven by what I will call the dark-green or light-green consumers” (Kleine Jäger and Piscicelli, 2021). I.e. the approach is: sustainable production follows sustainable consumption.

But none of these studies provides convincing evidence that this assumption of companies following consumer preferences regarding sustainable packaging holds true. It is probably not too far-fetched to say that product protection and thus extending shelf life will still be a priority for packaging choices by manufacturers. This is probably especially true for the small and medium enterprises (SMEs) that form the backbone of the food industry and often do not have strong expertise in market research.

But let us accept the assumption that, besides technical criteria such as product protection, companies build their packaging (re-) design on their conceptualization of consumer preferences. Then it is key to understand how companies see consumers and consumer priorities. Therefore, the focus of our study is not on understanding consumers but on understanding the picture that companies have of consumers. Because that picture, and not the knowledge that the research community has on consumes, is decisive for company decision making on sustainable packaging. Depending on what these pictures are, company perceptions of consumers may foster or hinder the transition towards sustainable packaging. Policy makers need to know about these perceptions to design regulation that incentivizes companies in this transition.

However, while there is a plethora of academic studies on consumer preferences for sustainable packaging (Ketelsen et al., 2020), the literature is conspicuously silent on the views that company professionals hold on consumers. When company experts are interviewed, consumers are in nearly all studies treated as merely one of several influencing factors. Only the study by Ryynänen and Rusko (2015) covers the company view on consumers in more detail. The relevant studies are portrayed in more detail in the second part of the literature review section (2.2).

Specifically, the research gap can be described as follows: the few studies that cover (mostly besides other topics) the view on consumers held by company experts have not identified what the experts think sustainable packaging is for consumers. Moreover, past research has not yet explored in detail the view of company experts on consumer knowledge of sustainable packaging beyond reporting generic complaints about a knowledge gap and consumer confusion. As to the experts' view on the importance of sustainable packaging for consumers, there is a contradiction between studies that report a high importance and a positive role of consumers and studies that claim the opposite, as we will point out in the literature review section.

Beyond the abovementioned research gap, there is also an interesting contradiction: The literature on packaging portrays consumers as drivers of change towards more sustainable packaging. But studies that analyze the views of industry professionals (see literature review section, 2.2), reveal a far less optimistic mindset in the industry. There, consumers are portrayed as lacking know-how and motivation, while their role in driving change is ambiguous at best.

Our objective was to contribute to closing the abovementioned research gap and to look further into the disparity between the portrayal of consumers in the consumer research literature on packaging and the views expressed by industry professionals. It is important to understand potential differences between the perception of industry professionals and the ‘real’ attitudes and behaviors of consumers as we find them in consumer research. This is because these differences may offer opportunities for companies to reexamine their view of consumers and adjust their marketing mix with regard to sustainable packaging accordingly. If industry professionals changed their pessimistic view of consumers and align their packaging strategies more with consumer attitudes and behaviors, they might be more prone to adopt sustainable packaging and thus make a more effective contribution towards achieving sustainability goals. We sought insight into how professionals involved in making packaging decisions in food companies perceive consumers and sustainable packaging. Our research questions were:

- How do packaging professionals perceive the importance of sustainable packaging for consumers?
- What packaging attributes do professionals think consumers use to judge sustainability?
- How do professionals view the role of consumers in driving the transition to sustainable packaging?

This study is, to our knowledge, the first uncovering the multifaceted understanding that company experts have of consumers and sustainable packaging regarding the abovementioned research questions. It also answers the call of Ryynänen and Rusko (2015) who suggested exploring the perspective of professionals in packaging intensive industries. Along the abovementioned research questions, we conducted qualitative interviews with 18 professionals from the food sector involved in packaging decisions of their companies. They reveal that consumers are often seen as a barrier in the transition towards more sustainable packaging, that companies have a limited and simplified view of which attributes consumers use to define sustainable packaging. In this regard, there are significant differences to the nuanced picture of consumers from academic consumer research. Our qualitative content analysis also revealed 'narratives of disempowerment' in which the interviewees present their food producing companies as not really being in the position to succeed with sustainable packaging initiatives.

This picture will, for the first time, allow a better understanding of one important driver of packaging (re-)design decisions in companies. Food companies can use our results to reflect on their own understanding of consumers and challenge hitherto unquestioned assumptions. This can enable better decision making. Especially moving forward from their often undifferentiated negative image of consumers may encourage decision-makers to introduce more sustainable packaging solutions. Policy makers and NGOs who work with companies will gain a more precise picture of one of the underlying factors in their design decisions. Thus, policy makers may focus on those areas in their regulatory efforts where even a more nuanced understanding of consumer attitudes and behaviors by companies will most likely not create enough incentives to move towards more sustainable packaging. In the next section, we outline results from existing research on which we will build in our study.

2. Literature review

2.1. Consumer research on sustainable packaging

Our study does not aim at contributing to a better understanding of consumer attitudes and behavior in the area of sustainable packaging but to a better understanding how companies see consumers in this area. Therefore, results from consumer research are merely the background against which we contrast the views of our interviewees and thus we keep this part of the literature review rather brief. Consumer research on attributes (see Fig. 1) that consumers use for defining sustainable packaging thus serves the purpose of demonstrating where company professionals are probably mistaken or exhibit white spots in their understanding of consumers. In subsection 4.4, we will explicitly contrast consumer research findings and results from our study.

Consumer research on sustainable packaging distinguishes two packaging characteristics that influence consumer behavior. The first is packaging attributes (Herbes et al., 2018; Ketelsen et al., 2020), such as recyclability, and the second, cues (Herbes et al., 2020; Ketelsen et al., 2020) such as logos or colors that consumers use to make inferences about the attributes (Dörnyei et al., 2022). The concepts of attributes and cues from consumer research are helpful for framing company views on consumer thinking. In this paper, we will focus on attributes.

Consumer research has shown that different attributes make a packaging 'sustainable' for consumers. These attributes, such as recyclability or biodegradability, are mostly linked to the end of packaging life. Partly, these attributes are connected to the beginning of packaging life, especially to raw materials. But attributes related to production or transport tend to be neglected (Herbes et al., 2018).

Past studies also looked into factors related to the consumer and have identified factors such as awareness (Martinho et al., 2015; Wensing et al., 2020) and attitudes, e.g. attitudes towards the environment and environmental problems (Martinho et al., 2015) as well as specific attitudes towards packaging waste and sustainable packaging (Martinho et al., 2015), shopping at retailers practicing sustainable grocery packaging (Su et all. 2021) and towards new products and brands (Testa et al., 2020).

Other important factors from past studies are norms towards sustainable packaging and recycling (Martinho et al., 2015) (Martinho et al., 2015; Moorthy et al., 2021) and knowledge (Moorthy et al., 2021), specifically, knowledge on the environmental benefits of sustainable packaging (Su et al., 2021).

To summarize: Consumer research on which attributes consumers use in defining sustainable packaging is very well developed and has identified a multitude of attributes across packaging life. These can serve in our study to explore in which areas the perception that companies have of consumers differ from consumer research results.

2.2. Research on the perceptions of company executives of consumers regarding sustainable packaging

While consumer research on packaging is abundant, research into how food company executives view consumers is rather scarce. Table S1 in the Supplementary Information gives a structured overview of nine relevant studies that we identified. In what follows, we give a condensed overview of the current state of knowledge.

Only one of the relevant studies (Ryynänen and Rusko, 2015) focuses solely on how packaging professionals view consumers. Professionals in this study mentioned the interaction between product, packaging, and packaging fashions; they emphasized that the interaction of consumers with packaging is embedded in everyday practices, as consumers experience packaging visually and by touching it. The strength of this study is to provide a deep and rich understanding of how packaging

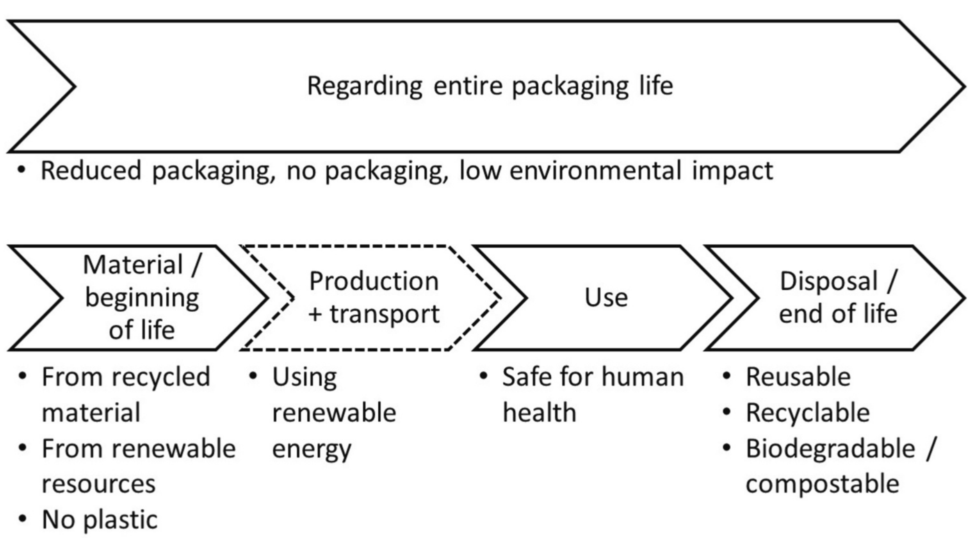

Fig. 1. Attributes of sustainable packaging from a consumer view, based on Herbes et al., 2018

professionals see the interaction of consumers with packaging in daily life, which goes beyond the buying process. However, this study did not focus on sustainable packaging and did not involve interviewees from producing companies.

All other studies treat consumers merely as one of many factors that influence packaging strategies of companies or the success of packaging solutions.

Moreover, the samples of all studies comprise stakeholders from academia, politics, and NGOs in addition to experts from companies and design agencies. Too often, they are based on the statements of very few producing companies (two brand owners out of 25 participants in the study by Bening et al. (2021), five food producers out of 17 experts in the study by Kleine Jäger and Piscicelli (2021), seven experts from food companies out of 17 interviewees in the study by Molina-Besch and Keszleri (2023), two producers out of 28 interviewees in the study by Steinhorst and Beyerl (2021) and no interviewees from manufacturers in Gustavo et al. (2018), Roy et al. (2023) as well as Ryynänen and Rusko (2015). This severely limits the opportunity to get a deeper understanding of the views of producing companies while our study focuses solely on industrial professionals.

For these two reasons, consumers only as one factor and no focus on participants from producing companies, the conceptual models of consumers presented are often superficial, or limited to specific issues.

Past studies reveal contradictory views held about consumers by industry. Experts in Steinhorst and Beyerl (2021), including experts from companies, did not see consumers as the most important change agents. Moreover, they clearly stated that other stakeholders, primarily from politics and business, are responsible for removing barriers and introducing incentives to make consumers change their behavior. Interviewees in Roy et al. (2023) on the other hand saw them at the center of the plastic problem because they do not practice correct waste-sorting behavior but the interviewees also saw government as responsible to increase recycling through regulation. Packaging experts in Kleine Jäger and Piscicelli (2021) identified green consumers as potential drivers for reusable packaging, while retailers in Gustavo et al. (2018) saw consumers mainly as a risk in redesigning packaging for more sustainability. In their case, a bigger package containing a higher amount of product would mean less packaging per number of product units, but the higher price per package that comes with a bigger package could deter price-sensitive customers. The interviewees in Ma et al. (2020) portrayed consumers as a "double-edged sword" (Ma et al., 2020, p. 6) on a path towards zero plastic in FMCG packaging, since they are seen both as enablers, if educated properly about plastic packaging and its impact on the environment, and barriers because convenience is perceived to come first for consumers and many consumers are perceived not to care about the environment.

If, partly in contradiction with consumer research (see 2.1), a negative view of the consumer prevails, which some of the above-mentioned studies suggest and which we will further explore in our study, this may lead to inertia on the part of food producing companies. This in turn may lead to them missing market opportunities for more sustainable packaging.

Experts from companies in several studies stated their belief that consumers are confused by the information on the packaging (Roy et al., 2023), especially with bioplastics (Bening et al., 2021; Molina-Besch and Keszleri, 2023). Consumer confusion about bioplastics concerns, in the experts' view, the fact that biodegradable packaging cannot simply be left in the environment to degrade and that it is often sorted wrongly by consumers (Molina-Besch and Keszleri, 2023) and may thus contaminate waste streams (Bening et al., 2021).

Further, consumer awareness (Steinhorst and Beyerl, 2021) and knowledge (Ma et al., 2020; Kleine Jäger and Piscicelli, 2021; Roy et al., 2023) need to be raised in the experts' view, especially on how to sort plastic packaging for recycling (Roy et al., 2023) or on the benefits of plastic reduction (Ma et al., 2020). Experts from these studies maintain that consumers choose packaging based on convenience (Chakori et al., 2022) and low price. Convenience pertains to buying to-go drinks or fruits and vegetables in plastic packaging (Ma et al., 2020), while more sustainable solutions like bringing your own bottle are less convenient. Moreover, they are believed not to care about sustainability (Gustavo et al., 2018; Ma et al., 2020).

This way of thinking sees eco-driven packaging re-design as risking the loss of customers. Only those re-designs that yield a cost or convenience advantage are seen as feasible (Gustavo et al., 2018).

A look at the methods of the nine studies we identified reveals that all are qualitative, mostly using interviews as their data acquisition method and qualitative content analysis as their data analysis method. This is not surprising, first, because understanding company views of complex subjects such as the choice of packaging in detail is difficult to accomplish in a quantitative survey and second, it would be difficult for most researchers to identify and reach a large sample of packaging decision makers.

Theories are not widely used in this field: Five out of nine studies did not use any theories. One uses systems theory and network theory (Chakori et al., 2022) but not to explain the behavior of companies and in one study, the authors developed their own theoretical framework including process steps and roles in collaborations between companies (Kleine Jäger and Piscicelli, 2021).

Two studies used theories to explain company behavior which is close to our research subject. One used the Theory of Planned Behavior (TPB) (Molina-Besch and Keszleri, 2023) and one the COM-B model (Roy et al., 2023). Both models posit influencing factors for behavior: The TPB is used for a wide array of behavior of individuals and hypothesizes that attitudes, subjective norms and perceived behavioral control (PBC) influence behavioral intent. Although it was developed for the behavior of individuals and is predominantly used for this purpose, Molina-Besch and Keszleri (2023) use it for analyzing companies. The COM-B model is far less used than the TPB and seems to a certain extent similar to the latter. It posits that capability, opportunity and motivation are the factors that drive a specific behavior. Opportunity is about outside factors and thus would cover a part of the TPBs PBC. Capability (psychological and physical) would cover another part of PBC. And motivation is similar to attitudes in the TPB. Norms are not an explicit construct of COM-B, but as opportunity includes outside factors that can drive behavior, norms could be part of that.

To summarize the research gap for the literature on the company view of consumers regarding sustainable packaging, we can say that the only study focusing on the company view of consumers regarding packaging did not focus on sustainable packaging and did not include producing companies. This is also true for two other studies while in all others, experts from producing companies were only a minority. This leaves the views of experts from food producing companies largely unexplored although it is precisely those companies that decide on the (sustainable) packaging of their products.

Moreover, the studies on company views of consumers regarding sustainable packaging have not analyzed what the experts think sustainable packaging is for consumers (attributes). So, we do not know where the picture that companies have of consumers regarding sustainable packaging deviates from academic consumer research. That gap is especially relevant because if real consumer attitudes and behavior differ significantly from the company view, company decisions on sustainable packaging may underutilize the potential of sustainable packaging in the market.

In addition, past research has not yet explored in detail the view of company experts on the role of consumers including their knowledge of sustainable packaging beyond reporting generic complaints about a knowledge gap and consumer confusion. Again, if companies are mistaken about these issues, they cannot address knowledge gaps on the customer side appropriately.

As to the experts' view on the importance of sustainable packaging for consumers, there is a contradiction between studies that report a high importance and a positive role of consumers and studies that claim the opposite, as we will point out in the literature review section.

3. Methods

3.1. Sample description

Between June and September 2022, we conducted 18 interviews of food company executives in four different countries. The interviews each lasted approximately one hour; the companies all had at least 250 employees (with the exception of one with 200). Table 1 depicts the companies and positions of interviewees, all of whom were directly involved in making packaging decisions. Departments represented include Marketing, Sustainability, Research and Development, Purchasing, Quality Management, Packaging Development and Product Management.

The goal of our sampling process was to ensure variation within the sample. Therefore, we chose countries with different food packaging relevant characteristics: While in Germany and Austria the market share of the three biggest food retailers stands at 65 % (Mihr, 2024) and 84 % (RegioData Research, 2022) respectively, it is approximately 40 % (Kantar, 2022) in Spain and 60 % (Statista, 2024) in Portugal. These different rates influence the power position of the retail sector towards food companies. The amount of packaging waste per capita in 2021 ranged between 164 kg for Austria and 237 kg for Germany (Eurostat, 2024). While the recycling rates for packaging waste were rather similar, the overall recycling rates for municipal waste ranged between 27 % for Portugal (European Commission, 2023b) and 67 % for Germany (European Commission, 2023a) which may influence the picture that professionals have of consumers.

We also sought variation with regard to company characteristics. In the sample (see Table 1), we have companies with different products, from dry products with a shelf life of months like cereals to fresh and perishable produce like fruit and vegetables. These products pose different demands to their packaging and thus influence the options that companies have for sustainable packaging. Companies also differ in size, which influences the resources they can devote to packaging-specific market research, their power position towards retailers and their decision-making processes. The latter are probably also different between family-owned companies and subsidiaries of large conglomerates, why our sample includes both. We excluded one interview from the sample in which the interviewee did hardly make any statements on consumers. Since the company was a convenience food company from Austria and we still have convenience food companies and Austrian companies in the sample, the exclusion did not compromise the overall variation in the sample.

Table 1
Overview of interviewees.[1]

Number	Country	Food sector (focus)	Position	Company size (employees)
1	Germany	Cereal and confectionary	Manager	250–500
2	Germany	Cereal and confectionary	Executive position	250–500
3	Austria	Meat and fish	Manager	501–1000
4	Germany	Dairy	Executive position	5001-10,000
5	Austria	Dairy	Executive position	250–500
7	Germany	Retail	Manager	> 100,001
8	Austria	Fruits and vegetables	Head	501–1000
9	Austria	Other / convenience food	Executive position	501–1000
10	Portugal	Fruit and vegetables	Head	<250
11	Austria	Cereal and confectionary	Executive position	501–1000
12	Spain	Meat and fish	Director	1001-5000
13	Germany	Cereal and confectionary	Executive position	250–500
14	Portugal	Fruits and vegetables	Director	250–500
15	Germany	Fruits and vegetables	Head	250–500
16	Spain	Other / convenience food	Manager	> 100,001
17	Portugal	Fruits and vegetables	Director	1001-5000
18	Germany	Meat and fish	Manager	10,000-50,000
19	Spain	Cereal and confectionary	Director	250–500

[1] Interview number six was removed from the sample, since the interviewee provided very few insights on the company view of consumers

3.2. Data acquisition

We conducted expert interviews to collect the data for our qualitative research. This research method uses structured interview guidelines with open-ended questions to gain deep and detailed information from people with specialized knowledge (Flick, 2021). For our study, these were experts in the field of packaging processes.

The interview guideline consisted of predefined questions to structure the process, ensure comparable interview results, and guide the interviewer to focus on topics and themes relevant to the research questions.

The interviews followed the interview guideline in the Supplementary Information (Table S2). We started with an introductory question asking about the role that packaging plays for consumers, followed by more specific questions on the attributes and cues[1] and on consumer knowledge. The interview was concluded with a question on how the interviewees had gained their assessment of consumers.

The guideline structure was derived from the research questions outlined in the Introduction section. Specific content aspects (left column) in the guideline for the attribute- and cue-related questions were based on the literature on sustainable packaging attributes and cues. The guideline was developed in a core team consisting of four researchers, then discussed in the entire research team and finally pre-tested and adapted in a training event for the research team which also served the purpose of preparing the members for conducting the interviews. The guideline can be found in the Supplementary Information. The researchers carried out the interviews in their native language.

To comply with data protection regulations, a data protection agreement was created by the respective national research teams. The data protection declarations were made available to the participants in advance, signed and returned. The ethics committee of the university leading this study consented to our study by issuing an ethical approval.

We used virtual meeting software to record and carry out the interviews online. Audio files of the interviews were transcribed for textual analysis.

3.3. Data analysis

For the analysis of our data, we used qualitative content analysis (QCA) according to Kuckartz (Kuckartz, 2014). We chose this method over thematic analysis (TA) and over grounded theory (GT) primarily because there is extensive research on consumers and sustainable packaging and we wanted to utilize the results from past research to analyze our data while also allowing new inductive categories. This is a typical feature of QCA while both TA and GT-based studies often abstain from a deductive approach. Although QCA usually does not include statistical analyses, we wanted to report how many interviews contained certain categories to allow at least a first indication of frequency. This is

[1] The results on cues are not reported in this paper

also typically not done in TA and GT. Moreover, the former often focuses on high-level themes while we wanted to explore also details like specific attributes of sustainable packaging. GT on the other hand usually involves line-by-line coding of the entire text, but we wanted to focus on those passages of the text that contained meaningful data with regard to our research questions. However, despite pointing out the beforementioned differences, we have to concede, that the three methods have a lot in common and depending on who applies them they may be more or less different from another. Some authors go as far as questioning that TA and QCA are two distinct methods (Braun and Clarke, 2021).

Following the steps stipulated by Kuckartz (2014), we first went through the interview transcripts, took notes and gained a first overview. Then we built the category system. Main categories were initially derived deductively from the interview guideline which again was based on the literature (see section 2). This pertained to the following main categories: 'importance of sustainable packaging for consumers', 'attributes', 'cues', 'consumer knowledge on sustainable packaging' and 'basis for assessment (market research)'. Based on the literature, we also defined some detailed categories, such as 'paper' and 'no plastics' in the main category 'attributes'.

Then, thematic sub-categories and codes were developed inductively based on the data (Kuckartz et al., 2014). In addition, we developed categories inductively which did not fit into any of the deductive main categories. We grouped these into the main categories 'criticizing consumers' and 'narratives of disempowerment'. 'Criticizing consumers' was sub-divided into 'topic' (containing categories such as 'recycling'), 'criticizing what?' (containing categories such as 'knowledge', 'behavior' and 'exculpating consumers').

The main category 'narratives of disempowerment' emerged after repeatedly going through the inductive categories that could not be allocated to any main category. One example of these categories was 'very little room for maneuver'. We started with statements like "In any case, within our product range, the range of packaging is limited […] because the point of sale determines a lot. More and more of our products are destined for food and go to food retailers. That conditions you a lot about what type of packaging you can use." (I19, Pos. 24) and allocated it to this category. Then we grouped the categories which finally ended up in the main category 'narratives of disempowerment' into the following middle-layer categories: 'ascription of responsibility to other actors', 'packaging not so important compared to product', 'very little room for manoeuvre', 'failure story' and 'insecurity' Discussing these categories, we found that it made sense to group them into a new main category 'narratives of disempowerment' because they all convey a position of food companies in which they have limited opportunities for transitioning towards sustainable packaging. In that sense, 'narratives of disempowerment' could be called an analytical or theoretical category according to Kuckartz (2014). How did we move from raw data to categories? Other than in the approach by Mayring (Mayring, 2010), which requires a two-step reduction after paraphrasing the original text, we followed Kuckartz (2014) who describes that categories can be constructed directly using the text. All interviews were first coded by one person to minimize consistency problems in the coding process and then discussed with two other members of the research team (Kuckartz, 2014).

After finalizing the category system, we went through all interview transcripts again for coding and assigned relevant interview segments to categories. With the consensual coding approach, we ensured the quality of our coding system insofar as two other persons from the team checked the codings and discrepancies in the view of how a specific text fragment should be coded were discussed (Hopf and Schmidt, 1993).

For further analysis, we also explored potential links between company size, country or product and specific categories but did not find any meaningful links. The same applies to links between categories.

Our work was supported by the MAXQDA software (2024 edition) which allows building a category system, coding text passages and further analysis, such as building cross tables to identify relationships between different categories (VERBI Software, 2023).We did not use any artificial intelligence software or AI functionalities in MAXQDA to analyze our data.

4. Results and discussion

The following sub-sections are organized by research questions. We report results under each question, including the number of interview instances in which a specific sentiment was expressed by an interviewee. Where we think it instructive, we illustrate these with direct quotes (translated if the interview language was German, Portuguese or Spanish) and added the interview number and the position number of the quote within the interview transcript. We then juxtapose our findings with those from the literature and point out implications. We conducted further analyses to uncover potential links between company characteristic and the perception of consumers, but there were none.

4.1. Consumers as a barrier for transitioning towards sustainable packaging

In this subsection, we report the results to our research question 'How do packaging professionals perceive the importance of sustainable packaging for consumers?' and 'How do professionals view the role of consumers in driving the transition to sustainable packaging?' Results on the perception of consumer knowledge are integrated into the part on the role of consumers.

The results are based on the sub-categories in the main categories 'importance of packaging for consumer buying decisions', 'consumer knowledge on sustainable packaging' and 'criticizing consumers' (see section 3).

4.1.1. Importance of sustainable packaging for consumers

Our interviewees were divided over the questions of how aware consumers are of sustainability issues pertaining to packaging and how important sustainable packaging is for consumers. Five interviewees (5) rated the awareness/importance of sustainable packaging for consumers as high but qualified their statements by underlining their uncertainty. Interviewees with neutral ratings (4) mostly adhered to the notion that consumer value derived from sustainable packaging does not translate into a higher willingness-to-pay (WTP). This is known as the consumer-citizen gap in literature, and it causes WTP to be higher in experimental settings than in the real market (Weinrich et al., 2014). Both sets of interviewees hedged their statements by saying that sustainable packaging was only important for some consumers or that it had not been important but the importance was growing now.

Half of the interviewees (9) indicated that sustainability packaging was not an important topic for consumers, especially compared with other attributes which adds a decidedly negative view of companies to the divided picture described in section 2.2. This belief is contradicted by extant research findings. Otto et al. (2021) found that consumers have become more conscious of food packaging, and they judge food packaging by criteria such as recyclability, biodegradability and preventing product waste. But Otto et al. (2021) pointed out a different problem: Consumers do not rate the environmental footprint of food packaging correctly (e.g. glass vs. plastic). But this is caused by a lack of knowledge or misconceptions about sustainable packaging, not lack of interest. That consumers often make less environmentally friendly food packaging decisions than they intend to (Otto et al., 2021) does not detract from the significance of their intent.

Research findings also challenge the opinion held by food industry experts about consumer willingness to pay for sustainable packaging (see Table S1). Consumer attitudes towards sustainable packaging vary; they are influenced by multiple factors, including demographic variables, attitude towards environmentally friendly packaging, and the product brand (Otto et al., 2021).

In any case, it should be clear that assuming sustainable packaging is a low priority for consumers, who will not pay for it, is barrier enough in an executive's mind to preclude even thinking about redesigning for sustainable packaging. We will address this further in the conclusion, but the disparity between the beliefs of food company executives and the findings from consumer research emerges here as an impediment to a more sustainable food industry.

4.1.2. The role of consumers in the transition towards sustainable packaging

Although this was not one of our direct research questions, and we did not invite our interviewees to criticize consumers, they did so at such length that we would like to report it in this sub-section on the consumer role. Consumers were criticized in every interview, and in many cases, interviewees framed consumers as an obstacle to more sustainable packaging. Criticism focused on the areas mapped in Fig. 2.

The interviewees perceive consumers as largely uninterested in packaging and the sustainability of packaging. Nearly all interviewees talked about misconceptions and lack of knowledge on the part of consumers regarding sustainable packaging, although they were not asked about it. This topic took up much time in the interviews. Criticism was twofold: First, our interviewees contrasted consumer perception of the environmental benefits of specific packaging solutions or materials with reality. Second, they presented consumer perceptions as overly simplistic.

Regarding materials and the relative environmental friendliness of different packaging solutions, interviewees criticized, that consumers think recycling to be less important than it really is. They also criticized the frequent rejection of plastics as well as the often too positive evaluation of paper and glass. This can, in the view of our interviewees, get in the way of establishing a circular economy using plastic recycling. Moreover, consumers do not consider the environmental benefit of reducing food waste that plastic packaging can confer.

The following illustrate some of these points:

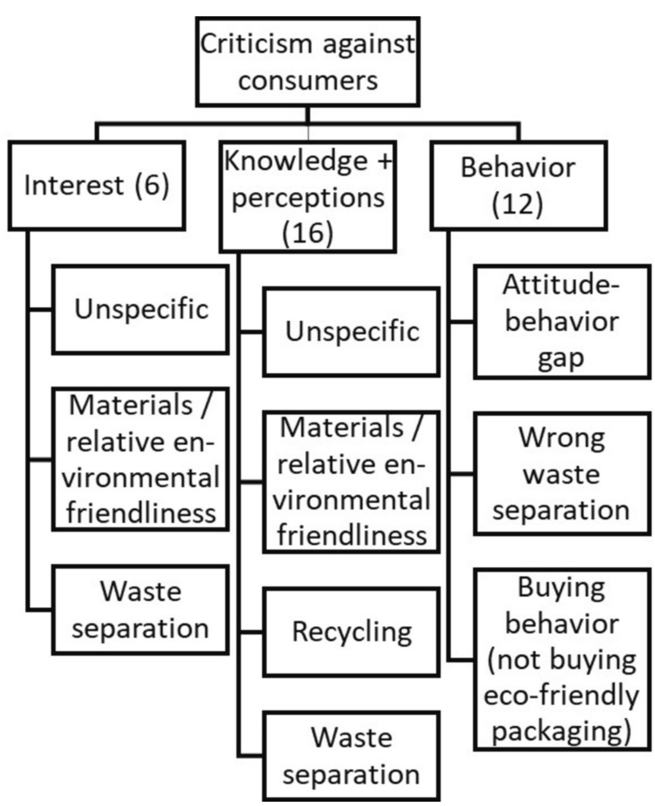

Fig. 2. Areas of criticism against consumers.

> [in a sarcastic tone:] Must be paper, hello? Everything else is bad. It's an exaggeration, but I think many people think that paper equals sustainability and they're not so differentiated, even if they do their shopping consciously […] (I11, Pos. 105)

> People have gotten a phobia of this [plastics]. If we go to paper, we are more ecological. It's not necessarily true, but this idea is followed very quickly […]. Whereas with plastic, people don't have this idea. This is plastic, it's going to pollute, it's going to go into the oceans, it's going to impact the environment. It's more like this that people make their associations. (I14, Pos. 40)

> I think that the issue of reduction, incremental reduction of packaging materials is clearly overrated compared to the issue of recycling. (I7, Pos. 61)

Also, our interviews believe consumers lack a differentiated perception of what happens with packaging they put in the recycling bin; some consumers, according to the experts, think everything is burned; others, say the experts, think everything is recycled.

The third area of criticism was consumer behavior, especially attitude-behavior gaps and misguided waste separation practices. Our interviewees often mentioned that consumers claim high environmental awareness but are not willing to pay for eco-friendly packaging or to accept the inconvenience of, say, unpackaged vegetables.

> When I ask: do you think sustainability is important? Yes, of course. But when they [consumers] stand in front of the shelf and they have the choice: something that [costs] three euros and is not so environmentally friendly [versus something that is] four euros and environmentally friendly, then they go for three euros. That's a big problem. (I18, Pos. 50)

> Everyone still goes for the most convenient option. Everyone says: sustainability, absolutely. But the moment it comes to your own convenience, I think it [the importance of sustainability] is rapidly reduced. (I3, Pos. 94)

On the other hand, our interviewees also recognize the challenges consumers face. Interviewees pointed out that it is difficult to evaluate the relative environmental benefits of different packaging solutions or how to dispose of different packaging types. Second, they stated that consumers are not given enough information. And third, they mentioned that both the government and consumer goods companies sow confusion in the consumer mind. They accused competitors of elaborate greenwashing activities that deceive consumers on the environmental friendliness of packaging solutions.

> […] anything that looks like paper and I'm talking about anything that looks like paper with emphasis on ‚looks‘. Because, […] I think it's [competitor name] that still has salads that are plastic packaging but then it has a thick layer of paint, that is, actually called paper touch so when it touches it feels like paper. But, in fact, it's not only plastic but it has a thick layer of ink which is as far from sustainability as you could get. But, for the consumer, he looks at it and […] it looks like paper. Hence, it's more sustainable […] for the consumer, paper equals good, plastic equals bad and it's as simple as that. (I17, Pos. 19)

Consistent with their views on consumer knowledge and perceptions, company executives said they think consumers need to be educated (5), partly allocating this role to companies themselves.

Criticism of consumers is reflected in consumer research, where problems of consumer awareness, knowledge and behavior have been summarized in a recent review (Ketelsen et al., 2020). Past research has shown that consumers often evaluate the relative environmental friendliness of different packaging materials incorrectly when compared with actual life-cycle studies (Steenis et al., 2017; Otto et al., 2021; Larranaga and Valor, 2022; Ruf et al., 2022). It is especially plastic that often evokes strong negative consumer evaluations that ignore the potential benefits in the application cases.

However, we found the consistently negative view of the consumer held by our interviewees to be out of touch with the evidence that consumers are aware of packaging problems (Cichocka et al., 2020; Norton et al., 2022). But the narrative of the 'problem consumer' may also be driven by the overall narratives of disempowerment that we discuss in subsection 4.3. Moreover, it may be influenced by the limited market research that companies do on consumers and sustainable packaging (see subsection 4.3).

Another potential influencing factor is the discourse in mass media on sustainable consumption in general. Past studies on sustainable consumption, e.g. sustainable food, have revealed that mass media are often calling for more consumer education implying a lack of knowledge (Diaconeasa et al., 2022). Also, a lack of awareness on the side of the consumer on non-sustainable consumption, e.g. eating red meat, was stated in mass media and the responsibility for these consumption practices is attributed to individual consumers in the press (Sievert et al., 2022; Mroz and Painter, 2023). One study summarized the media portrayal of consumers as follows: "Finally, the media also pointed fingers at consumers. Consumers were frequently framed by journalists as complacent, ignorant of food origins and contradictory in their stated desires (e.g. wanting food that was both environmentally friendly AND cheap)" (Sievert et al., 2022, p. 584). Also regarding a transition in plastics, media report a necessary change in consumer behavior (Colijn et al., 2022).

4.2. *Limited awareness of attributes that consumers use for defining sustainable packaging*

This subsection presents the results on our research question 'What packaging attributes do professionals think consumers use to judge sustainability?' The category from our QCA framework is 'attributes' whose sub-categories were partially built on the results from consumer research.

Our interviewees were very clear on what they think sustainable packaging is for consumers: sustainability for a consumer, in their view, is defined by packaging material, where paper is perceived as sustainable (13) and plastic is not (12). Also, recyclable material (8) was mentioned quite often; so too was no or little packaging (8). All other attributes, such as biobased, recycled or biodegradable, were mentioned in three or fewer interviews.

> We received direct suggestions from consumers because [name] is a product company that uses […] a lot of plastic. And we've noticed that in the last three years, principally, we've had a lot of suggestions from consumers, against plastic […]. (I10, Pos. 47)

> Consumers here, at least in Germany, are extremely plastic-focused. And anything that avoids plastic in the broadest sense is perceived as sustainable. (I7, Pos. 51)

As shown in Table 2, only four interviewees mentioned five or more different attributes. Two-thirds (12) did not mention more than three.

Given that we interviewed professionals from companies whose business depends on understanding their customers, we were surprised to see our interviewees mentioning only a limited number of the attributes that consumer research has shown to be important.

While our interviewees' assessment of consumer perception of paper and plastics certainly agrees with the literature (Ketelsen et al., 2020; Nuojua et al., 2024), it is surprising that only a small minority mentioned biodegradable (2), reusable (2), recycled (3) or biobased (3) as packaging attributes important to consumers, particularly as reusability and biodegradability have both been shown to rank high on the consumer agenda (Herbes et al., 2018). The much higher number of interviewees mentioning recyclable (i.e. packaging material that can in principal be recycled) than those mentioning recycled (packaging material that stems from a recycling process) suggests, that industry professionals, like consumers, are very much focused on the end-of-life. In a further analysis, we tried to find commonalities between the attributes that were mentioned most often. It seems that these attributes (paper and no plastics) were attributes that are easily visible even to an untrained eye. On the other hand, rarely mentioned attributes like mono-material, biodegradable or long shelf life would not be easy to spot for consumers. Our experts seem to imagine consumers as being driven by attributes that can be identified visually without effort.

Potential reasons for the low awareness of the importance of the attributes biodegradable and biobased could lie, besides the limited market research (see section 4.3) in the consumer confusion about the concepts, environmental benefits and potential risks of biodegradable and biobased plastics that public media write about (Molina-Besch and Keszleri, 2023).

It seems that companies are working with a simplified understanding of the consumer and the attributes the consumer is looking for. This could cause them to miss opportunities for introducing sustainable packaging that is really environmentally friendly and that fits their product and brand. Especially glaring is the neglect of recycled material,

Table 2
Attribute mentions by interview; green = mentioned, red = not mentioned.

Interviewee	Paper	No plastics	Recyclable	No / less packaging	Glass	Recycled	Biobased	Long shelf life	Biodegradable	Reusable	Mono-material	Total
1	green	green	green	green	red	red	green	red	green	green	red	7
7	green	green	red	green	red	green	green	red	red	green	red	6
17	green	green	green	green	red	green	red	red	red	red	red	5
13	green	green	green	green	red	red	green	red	red	red	red	5
16	green	green	green	red	red	red	red	red	red	red	green	4
12	green	green	green	red	red	green	red	red	red	red	red	4
11	green	red	green	green	red	red	red	red	red	red	red	3
4	green	red	green	red	red	red	red	green	red	red	red	3
3	green	green	red	green	red	red	red	red	red	red	red	3
2	green	green	red	green	red	red	red	red	red	red	red	3
18	green	green	red	red	red	red	red	red	red	red	red	2
15	red	red	red	green	green	red	red	red	red	red	red	2
14	green	green	red	red	red	red	red	red	red	red	red	2
9	red	red	red	red	green	red	red	green	red	red	red	2
8	red	green	red	red	green	red	red	red	red	red	red	2
5	green	red	red	red	red	red	red	red	green	red	red	2
19	red	red	green	red	red	red	red	red	red	red	red	1
10	red	green	red	red	red	red	red	red	red	red	red	1
Total	13	12	8	8	3	3	3	2	2	2	1	

since it often offers superior environmental performance (Toniolo et al., 2013; Civancik-Uslu et al., 2021). Also, for many products, such as wet products, paper packaging is not a feasible option, and adding a paper sleeve to comply with perceived consumer demand may make things worse. We therefore would advise food companies to consider a broader portfolio of materials while of course having a keen eye on the factual environmental benefits of these materials.

In this paper, we do not report in detail results on which cues company professionals think consumers use for recognizing sustainable packaging. But we would like to briefly mention that our interviewees had far less answers here than for the attribute-related question. So, companies may not just miss opportunities to choose sustainable packaging options, as described in the previous section, but also opportunities to communicate sustainability-related attributes through claims, labels, color etc. Therefore, if they make sustainability efforts, those may go unnoticed by consumers and thus not translate into competitive advantages.

4.3. Narratives of disempowerment

As mentioned in subsection 3.3, our interviewees made statements (for examples see interview excerpts below) that we grouped into the following middle-layer categories. First, in statements that we grouped into the category 'packaging not so important compared to product', some interviewees pointed out that the environmental effect of the packaging is relatively small compared to that of the product. Second, they stated that their room to maneuver ('very little room for maneuver') was limited because they just took packaging solutions offered by suppliers, had to comply with requirements of retailers, and were limited by consumer awareness, knowledge and behavior ('ascription of responsibility to other actors'). Also, they often indicated that they were insecure about what consumers want, know or do and ('insecurity') and talked about initiatives for sustainable packaging that were not successful ('failure story') All of these expressed a perception of having little opportunities to make effective changes with regard to sustainable packaging, especially vis-à-vis other actors which were presented as more powerful. The latter is expressed in the following quote:

> Well, I think, that we have two main challenges, one is that we are a vegetable grower company and so, [...] we don't have the technological ability and interest, it's not our business to develop packaging so we are takers of what is available in the industry so I would love to have a paper-based product that is more sustainable. That is everything, but in fact, I'm very small in the packaging world and so, I really have no leverage so, I can only take what is available and within what is available I try to make the best choices. But we are not big enough to really influence what is available and to set the course for whatever innovation there could be in packaging. (I17, Pos. 11)

This is also reflected in the study by Ma et al. (2020) who pointed out that manufacturers of fast-moving consumer goods (FMCG) have limited control over packaging design since design and production of packaging is done by packaging material suppliers.

Almost half of our interviewees (7) referred to how important retailers are in the transition towards sustainable packaging and how retailers put pressure on producers although retailers were not a topic we raised in the interviews. At the same time, interviewees often criticized these same retailers (4) for being too hesitant to adopt products with sustainable packaging, for not sharing knowledge with producers, and for bothering them with non-sensical reporting sheets.

> More and more of our products [...] go to food retailers. That conditions you a lot about what type of packaging you can use. I mean, one of the big retailers that we have here in Spain won't let you put any other type of packaging than what they can put [on their shelves, the authors]. I mean, if they have hooks for fold bags, it will be a bag. Normally made of plastic materials, but you have no choice but to have that. (I19, Pos. 24-27)

Indeed, a recent study documented the power of retailers in packaging re-design by showing how Wal-Mart drove non-concentrated liquid detergents from the market by forcing its suppliers to switch to reduced packaging (Pak et al., 2022). Retailer power also shows in market concentration as measured by four firm concentration ratios (CR4) that represent the market share of the top four firms in a market. In packaged foods, the ratios were only 9 % in Germany, 13 % in Austria, 19 % in Portugal and 15 % in Spain (van Dam et al., 2021). For comparison, the same ratio for food retailers stands at 76 % in Germany (Bundesvereinigung der Deutschen Ernährungsindustrie, 2023). Interestingly, the differences in the food retailer concentration between the four countries (see section 3.1) did not show in the interviews, nor did the differences in size of our interviewees' companies. We would have expected large food companies from countries with a lower retailer concentration to talk less about retailer power.

We also heard a number of failure stories in which our interviewees presented narratives of pro-environmental packaging initiatives they started but which failed mostly because consumers or retailers did not accept the new solution.

> I have a very clear example, which is that they gave us the opportunity, in a large [name of retail company] supermarket, in [place name], to put a product that was all plastic [packaging], one hundred grams. And a product that was all paper [packaging], one hundred grams. And just because it looked more filled [in that pack than this pack, the authors], people didn't take this one. Ten to one. People were buying the one that they had bought until today. [...] It was brutal. But there was no more. People thought they were buying more product here than here. (I12, Pos. 76)

> Our customers are the supermarket chains, [...]. And that's not always easy, because the supermarket chain's big fear is, I don't want to lose my customers. Will my customers accept that? [...] We have two customers, the consumer [...] and the supermarket. They both have to be convinced. (I18, Pos. 12)

Moreover, in 12 interviews, our interview partners expressed insecurity when asked about consumers. This took three forms: first, responding to a specific question by saying they did not know. Second, framing a statement they gave as a personal opinion and saying that they were not sure. Third, admitting that they did not have any facts to back up a statement.

This insecurity probably reflects the depth of market research companies do. Twelve companies in this study mentioned surveys, although the surveys seem to focus more on the product than on the packaging, and two companies admitted that they did very little market research. Seven of these also said more or less clearly that they did not do any market research that would allow them to make statements on consumers and packaging and two said that they did very little research.

Apart from surveys, some of our interviewees also mentioned interviews, focus groups, test supermarkets, but apparently, they do not use these methods frequently.

Interestingly, the interviewees also referred to information sources which we would deem anecdotal or lacking analytical rigor. Examples include listening to impressions from friends and relatives, using company employees as consumer proxies, or referring to themselves as consumers.

Lastly, some our interviewees pointed the finger at other actors, shifting responsibility to policy makers and retailers which they often criticized at the same time. Policy makers and authorities were held responsible for a lack of harmonized waste management infrastructure (5) and for a better communication towards consumers on how to separate waste correctly (3).

> […] there's so much you could do, but of course you also have to raise people's awareness. And it's not up to us as a company or all our colleagues, it has to come from the very top, from politics or the ministry, to really do a bit of educational work. (I3, Pos. 94)

> So, the supermarket chain has to be in the lead to actively reduce packaging, [promote] better packaging, reusability, recycling and so on and so forth. (I18, Pos. 38)

This is in line with (Aschemann-Witzel et al., 2023), who found an emerging narrative of a "hybrid responsibility expansion," meaning consumers also see supermarkets as equally responsible as their own behavior.

The diversion of responsibility has also been observed by (Roy et al., 2023, p. 12) in the UK: "[…] the scapegoating of consumers […] is an example of responsibility deflection, which should not be overlooked, particularly because this belief generates feelings of disempowerment." (pg. 12). While their study considers the perceptions of different stakeholders in the implementation of policies for circular plastics, the perceptions of food industry executives in our study reflect the same mindset.

The food and packaging producers in the study by Molina-Besch and Keszleri (2023) also see the responsibility to educate consumers on biobased packaging waste with other players. It also ties in with recently published articles on the topic of enablers or challenges for circular food packaging. For instance, (Nielsen and Hakala, 2023) identified four types of external enablers in their research on internationally operating producers of food packaging in Finland. These are political (e.g., voluntary sustainability measures, cooperation), regulatory (e.g., legislation), socio-cultural (e.g., customer demand passed along the supply chain) and technological (e.g., material development and introduction). In their systematic literature review on challenges for circular food packaging, (Ada et al., 2023) further identified a total of 26 challenges that can be divided into 7 categories of which governmental challenges is a prominent one.

Fig. 3 summarizes our findings on narratives of disempowerment. The elements play together as follows: First, company experts perceive consumers as an obstacle for sustainable packaging, believing consumers are not interested in packaging, lack adequate knowledge, and make purchasing decisions that impede progress. Second, they describe their own position as lacking influence vis-à-vis other players; they are not powerful enough to drive packaging manufacturers, and they have to comply with the requirements of retailers and consumers. And third, they are often unsure about consumer attitudes, knowledge or behavior, largely a result of doing almost no market research.

These narratives of disempowerment are further buttressed by failure stories of unsuccessful pro-environmental packaging initiatives. The upshot is our interviewees place the responsibility for more sustainable packaging on retailers and the state, notwithstanding the weighty share they place on consumers. These narratives create inertia that obstructs the expansion of sustainable packaging.

What are potential reasons for our interviewees to make statements that we allocated to the main category 'narratives of disempowerment'? First, there are, as we have shown, facts that support e.g. the perceived power of retailers. Second, the lack of understanding of consumers due to limited market research, certainly contributes to that. And third, presenting one's company as not being in a position to initiate change may also be a defensive narrative strategy that results from the interview situation in which the interviewees do not like their company to be perceived as inactive by the interviewers.

Diverting the responsibility for communication to retailers and the government is also consistent with a number of our interviewees admitting that their company did not do much to communicate information about the sustainability of packaging to consumers. Four companies said that they did no or little communication on sustainability on their packages. This may be one of the reasons for the abovementioned failures.

> […] in some cases, we don't even advertise anything that goes towards the sustainability of the packaging, such as FSC certification. All our corrugated cardboard packaging is FSC certified and we don't have the FSC logo on any of our packaging. (I11, Pos. 95)

4.4. Juxtaposing the experts' perceptions to results from consumer research

In this sub section we would like to juxtapose the expert perceptions we have presented in the previous subsections to the corresponding results in a summarizing table (Table 3) in more detail to support the above discussion. Overall, the table shows that while the attributes that the experts mentioned were reflected in consumer research, but that there are a lot more attributes that the experts apparently were not aware of. Also, the lack of knowledge that consumers exhibit regarding

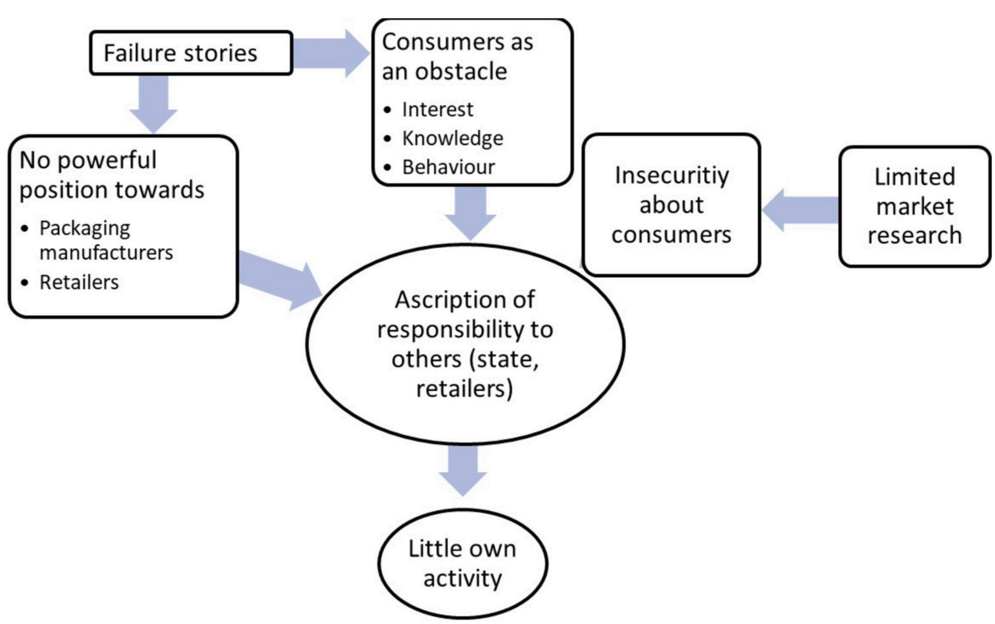

Fig. 3. Factors relating to the narratives of disempowerment.

Table 3
Expert perceptions and corresponding results from consumer research.

Thematic area	Expert perception of consumers	Results on consumers from consumer research
Role of the consumer in the transition to more sustainable packaging	Majority was negative or neutral on the importance of sustainable packaging for consumers	Product attributes are more important than eco-friendly packaging (Ketelsen et al., 2020), but the results on WTP for sustainable packaging show that it must have importance for consumers
	No or low extra willingness-to-pay for sustainable versus conventional packaging	Positive willingness-to-pay for sustainable packaging (Prakash and Pathak, 2017; Hao et al., 2019; Ketelsen et al., 2020)
	Consumer interest in sustainable packaging (practices) is low	Interest was, to our knowledge, not the subject of past studies
	Consumers knowledge on sustainable packaging is low, particularly on the relative environmental friendliness of packaging materials, on recycling and waste separation.	• Knowledge on eco-friendly packaging is limited (Hao et al., 2019) • Bio-based is a concept that is not well understood and often confounded with biodegradable (Sijtsema et al., 2016) • Biodegradable is also often misunderstood (Allison et al., 2021) • Lack of knowledge on recycling procedures (Norton et al., 2022) • Lack of knowledge on the relative environmental friendliness of different packaging materials (Norton et al., 2022)
	Consumers exhibit an attitude-behavior-gap with regard to sustainable packaging, especially they are not buying eco-friendly packaging	The attitude-behavior-gap has been pointed out frequently by past studies for sustainable products (Munro et al., 2023) and also specifically for sustainable packaging (Dieli et al., 2024)
	Consumers practice wrong waste separation	• Consumers are uncertain how to sort various types of food packaging (Nemat et al., 2020) which inevitably leads to wrong sorting • Uncertainty on how to sort material leads to wrong sorting (Mielinger and Weinrich, 2024)
Packaging attributes consumers pay attention to	Very few attributes pertaining to packaging material dominates consumer sustainability evaluation of packaging	Consumers consider a much wider set of attributes than suggested by the interviewees: • Reused (Herbes et al., 2018) • Made from recycled material (Jerzyk, 2016; Herbes et al., 2018) • Made from renewable material (Herbes et al., 2018; Norton et al., 2022) • Reusable (Scott and Vigar-Ellis, 2014; Herbes et al., 2018; Nguyen et al., 2020) • Biodegradable (Scott and Vigar-Ellis, 2014; Jerzyk, 2016; Nguyen et al., 2020) • Non-toxic / safe for human health (Jerzyk, 2016; Nguyen et al., 2020) • Non-harmful (Scott and Vigar-Ellis, 2014) • Eco-friendly production (Scott and Vigar-Ellis, 2014; Nguyen et al., 2020; Norton et al., 2022) • Production using renewable energy (Jerzyk, 2016) • Local production (Herbes et al., 2018) • Fair production (Herbes et al., 2018) • Shelf life (Norton et al., 2022) • Lightweight and space-saving (transport and use) (Herbes et al., 2018)
	Consumers see paper as sustainable	This perception is supported by past studies (Lindh et al., 2016; Nguyen et al., 2020)
	Consumers see plastic as not sustainable	This perception is supported by past studies (Lindh et al., 2016)
	Consumers see recyclability as an important attribute	This perception is supported by past studies (Scott and Vigar-Ellis, 2014; Lindh et al., 2016; Herbes et al., 2018)
	Consumers see no / less packaging as an important attribute	This perception is supported by past studies (Scott and Vigar-Ellis, 2014; Lindh et al., 2016; Herbes et al., 2018)

sustainable packaging in the experts' view was found in previous consumer studies. But the gloomy picture that the experts painted of the role of consumers in the transition towards sustainable packaging is not unequivocally supported by past studies.

4.5. Practical implications

We see three major practical implications of our study.

First, the insecurity about consumer issues that our interviewees voiced, and the partly inaccurate picture of consumers they have suggest a role for industry associations like FoodDrinkEurope. Associations could build an easily accessible online knowledge base to summarize scientific results from consumer research and help companies identify more sustainable packaging alternatives for their products. This would also enlarge the portfolio of sustainable packaging solutions companies consider today. This is especially relevant, since companies in our study missed a number of packaging attributes that are relevant to consumers and which should be part of the set of alternatives that companies consider when designing sustainable packaging.

Commissioning consumer research on specific target groups and how they see sustainable packaging would be especially helpful for food companies to tailor their sustainable packaging solutions to the expectations of their specific target groups. The same applies to specific product groups. These product group and target group specific results would be easier to translate into packaging design decisions for food companies than the often less specific academic studies today are.

But even if companies were more aware which sustainable packaging solutions have the highest sustainability impact and would meet the highest consumer acceptance, that would not necessarily mean a quick shift to new solutions. Weinrich et al. (2024) have examined the decision-making processes for sustainable packaging in food companies and have identified a number of challenges: First, companies in their study did not mention LCA or other data-driven approaches that would allow a substantial evaluation of the relative sustainability of different packaging solutions. Second, cost aspects often take precedence over sustainability aspects. And third, the existing machine park poses a restriction with regard to which packaging design and material can be used. Beyond these intra-company barriers, Bening et al. (2021) summarize a plethora of regulatory barriers for the circular economy such as low resource taxes, rigid food contact laws and material standards. They also point out technical challenges for circular packaging such as material diversity and contaminations.

Associations could increase retailer awareness of sustainable packaging solutions, helping food companies overcome resistance to their use. Associations could work as liaisons between public research, e.g. at universities, on sustainable packaging and small and medium-sized enterprises. This liaison role could involve building up a “market place” in which SMEs post their research questions and in which young researchers or even students planning their thesis work look for relevant research topics. They could also coordinate ‘consumer packaging labs’ in which students of packaging designs and companies together test consumer perceptions and consumer handling of new sustainable packaging solutions. But SMEs could also work directly with universities in publicly funded inter- and transdisciplinary projects. Past research has already proposed frameworks how to integrate consumer preferences with the environmental impact when designing new packaging (Yokokawa et al., 2021). Here, industry associations need both to make executives aware of their knowledge gaps and to encourage them to actively share the experience they do have with sustainable packaging. Our interviewees were hesitant to communicate sustainability-related attributes of their packaging, perhaps because, similar to the interviewees in the study by (Turkcu and Tura, 2023) they were afraid of greenwashing, a practice openly scorned by our interviewees.

The second implication of our research arises by taking our interviewees as representative of the broader population of SMEs in the food industry. Then we can infer that narratives of disempowerment are dominant. The actors present their companies to be in a position to initiate a transition towards more sustainable packaging and rather shift responsibility to consumers, retailers, and the state. The responsibility of the latter has already been discussed in other studies where experts call for regulation to solve issues of circular packaging and other packaging-related issues (Bening et al., 2021; Steinhorst and Beyerl, 2021). While companies, supported by industry associations, could certainly take a more proactive stance on sustainable packaging, the fact that the food retail sector is much more concentrated than food production remains a challenge for food producers.

This leads to the third implication of our research, which pertains to government regulation. Current regulations are partly inconsistent or not yet finalized, and this leads to cautious actions by food companies. An important example of this is the revision of the EU's Packaging and Packaging Waste Directive will affect both packaging design and packaging waste management (European Parliament, 1994, 2022a). Further, the proposals for a directive on substantiation and communication of explicit environmental claims, the Green Claims Directive (Directorate-General for Environment, 2023), as well as the proposal for a directive on empowering consumers for the green transition (Directorate-General for Justice and Consumers, 2022) or the started revision of the food contact materials legislation (European Parliament, 2022b) leave the industry in limbo until they are finalized. A timely finalization of these important regulations is paramount to change the wait-and-see approach that prevails in companies. In the authors' view, these and potential further regulation could lead to food packaging on the market exhibiting an increased recycled material content which reduces the reliance on virgin plastics and raw materials, consisting of innovative or bio-based and/or biodegradable materials, consisting of a reduced number of materials (e.g., single-use plastics, harmful substances) or having a somewhat standardized design (e.g., separability) or labeling (e.g., recyclability, ecological footprint). Further, objectivity in (e.g., sustainability) assessment and certification, eco-design and even further extended producer responsibility can be named.

4.6. Theoretical implications

In this subsection, we would like to contextualize our findings with theories that have been employed in our research field. Like Roy et al. (2023), we can harness the much-used COM-B model for interpreting our results. The COM-B model posits that three factors influence behavior: Capability, Opportunity and Motivation. Capability is defined as “ […] the individual's psychological and physical capacity to engage in the activity concerned.” (Michie et al., 2011, p. 4). The insecurity about consumer attitudes, knowledge and behavior can be categorized as capability. The second factor, opportunity is defined as “[…] all the factors that lie outside the individual that make the behavior possible or prompt it.” (Michie et al., 2011, p. 4). This seems to be a fitting category for the power and the requirements of retailers, the power of packaging manufacturers and the attitudes, knowledge and behavior of consumers mentioned by our interviewees.

But there are also other models such as the more popular Theory of Planned Behavior (Ajzen, 1991) in which the construct ‘perceived behavioral control’ which comprises aspects of capability and opportunity is an antecedent of behavioral intention. Motivation, the third factor in the COM-B model was not part of our inquiry and only showed in the failure stories which demonstrated that the companies tried to introduce more sustainable packaging.

As our paper shows, the perception of consumers by company professionals is a phenomenon that is influenced by factors situated in between purely individual characteristics of our interview partners like their experience in the private sphere with packaging and consumers as outlined in section 4.3 and results they gleaned from market research in the company context. Also, the room for maneuver they have when taking decisions on sustainable packaging is influenced by their personal knowledge on the subject as well as by the resources and power position of their company and its formalized and informal decision-making processes. Therefore, it is difficult to capture the company perception of consumers and decision-making on sustainable packaging with theories that were designed to reflect individual processes and perceptions such as the TPB or the COM-B model because these do not include the complex nature of organizational opinion formation and decision making. Likewise, models that aim at describing organizational decision making, like the model by Nutt (Nutt, 1984) used by Weinrich et al. (2024) for analyzing company decision-making processes on sustainable packaging, fail to picture individual perceptions. Solving this fundamental conundrum is beyond the scope of this paper, but a theoretical contribution of our paper could be seen in the construction of the theoretical category ‘narratives of disempowerment’. This category and its subcategories could be utilized in future research to analyze representations of company activities (or inactivity) in different sustainability-related areas and the perception of disempowerment in organizational decision-making processes on sustainable packaging.

5. Conclusions

This study for the first time has looked in detail into the perceptions of consumers harbored by company experts from the food industry. It uncovered that most experts in our sample did not think that sustainable packaging was important to consumers which adds a decidedly negative view to the divided picture from past studies on company views of consumers. It also showed that sustainability for a consumer, in their view, is defined by a narrow set of attributes primarily pertaining to packaging material, where paper is perceived as sustainable and plastic is not. Also, recyclable material and no or little packaging were mentioned quite often. These detailed views of consumer perceptions and attitudes are novel, since past studies (see section 2.2) did not look into as much detail. They are significant, because they show where limited consumer insights may hinder companies to pursue sustainable packaging innovations. Although not a part of our interview guideline, the interviewees frequently voiced criticism against consumers pertaining to a lack of interest, a lack of knowledge and a knowledge-behavior gap. Lastly, our study brought to light narratives of disempowerment.

Uncovering narratives of disempowerment in which food company executives portray their organization as relatively powerless vis-à-vis consumers as well as retailers and place the responsibility for a transition towards more sustainable packaging on the state and the retail sector is from our perspective a main contribution of this study.

This study has three key practical implications. First, industry associations could help SMEs in the food sector by creating accessible knowledge bases to provide scientific consumer research and guidance on sustainable packaging alternatives. This would assist food companies in identifying overlooked consumer preferences and packaging attributes when designing sustainable packaging. Second, SMEs, while recognizing the challenges they have with consumers and retailers, should take a more pro-active stance in the move towards more sustainable packaging and also expand their market research in order to gain a better picture of consumer preferences. Third, timely finalization of pertinent regulations is crucial for fostering innovation in sustainable packaging.

The limitations of our study lie in two areas. First, it is possible that company professionals other than our interviewees in the companies under review have a better understanding of consumers. However, it is reasonable to expect that those involved in the entire production process and who participate in cross-departmental meetings have sufficient insights into consumer-related issues influencing the process. Second, our interviewees came from companies of different sizes in different parts of food manufacturing and from different countries. Therefore, we were not able to allocate differences in our interviewees' perceptions and attitudes clearly to one of these factors due to sample size which is, however normal for qualitative studies.

We suggest the following research questions for future research in this area:

- (How) do food companies communicate their sustainable packaging initiatives to consumers? Benchmarking could help companies to better perform in marketing communication strategy.
- How do food producers see different potential regulatory approaches regarding sustainable packaging? A qualitative interview study in this area would directly build on the call for government action that interviewees voiced in our study.
- How do packaging material suppliers and retailers see the power position of food companies with regard to sustainable packaging?
- (How) do packaging machine makers, packaging manufacturers, food producers and retailers cooperate on sustainable packaging across the value chain? Case studies would be a very insightful research approach for this question and would probe the narratives of disempowerment that interviewees from food producers presented in our study.
- Which challenges do food retailers perceive in transitioning towards more sustainable packaging? Again, a qualitative interview study followed by a quantitative study could be instructive.

While there is a growing volume of food packaging waste around the world, and the associated problems are well documented, the food industry is still far away from reducing waste or transitioning to a circular economy. Our interview study reveals that producers yield decision-making power to consumers, retailers, and government authorities, justifying their position through narratives of disempowerment. If all stakeholders follow such a wait-and-see approach, wasteful food packaging practices are not likely to change soon.

CRediT authorship contribution statement

Carsten Herbes: Writing – review & editing, Writing – original draft, Visualization, Supervision, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ellen Mielinger:** Writing – review & editing, Visualization, Validation, Investigation. **Victoria Krauter:** Writing – review & editing, Project administration, Investigation. **Elena Arranz:** Writing – review & editing, Investigation. **Rosa María Cámara Hurtado:** Writing – review & editing, Investigation. **Begonya Marcos:** Writing – review & editing, Investigation. **Fátima Poças:** Writing – review & editing, Investigation. **Salvador Ruiz de Maya:** Writing – review & editing, Investigation, Conceptualization. **Ramona Weinrich:** Writing – review & editing, Validation, Project administration, Methodology, Investigation, Conceptualization.

Declaration of competing interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

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References

Ada, E., Kazancoglu, Y., Gozacan-Chase, N., Altin, O., 2023. Challenges for circular food packaging: circular resources utilization. Applied Food Research 3, 100310.
Afif, K., Rebolledo, C., Roy, J., 2022. Drivers, barriers and performance outcomes of sustainable packaging: a systematic literature review. BFJ 124, 915–935.
Ajzen, I., 1991. The theory of planned behavior. Organ. Behav. Hum. Decis. Process. 50, 179–211.
Akin, M., Eyduran, S.P., Krauter, V., 2023. Food packaging related research trends in the academic discipline of food science and technology: a bibliometric analysis. Cleaner and Circular Bioeconomy 5, 100046.
Allison, A.L., Lorencatto, F., Michie, S., Miodownik, M., 2021. Barriers and enablers to buying biodegradable and compostable plastic packaging. Sustainability 13, 1463.
Aschemann-Witzel, J., Randers, L., Pedersen, S., 2023. Retail or consumer responsibility?—reflections on food waste and food prices among deal-prone consumers and market actors. Bus. Strat. Env. 32, 1513–1528.
Bening, C.R., Pruess, J.T., Blum, N.U., 2021. Towards a circular plastics economy: interacting barriers and contested solutions for flexible packaging recycling. J. Clean. Prod. 302, 126966.
Braun, V., Clarke, V., 2021. Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. Couns and Psychother Res 21, 37–47.
Bundesvereinigung der Deutschen Ernährungsindustrie, 2023. Jahresbericht 2022 / 2023. Berlin, p. 84. https://www.bve-online.de/presse/infothek/publikationen-jahresbericht/bve-jahresbericht-ernaehrungsindustrie-2023. (Accessed 14 January 2024).
Caspers, J., Coroama, V.C., Sadetzky, L., Süßbauer, E., Finkbeiner, M., 2023. Measuring the climate change impact of household food and beverage packaging — a life cycle assessment of a living lab. Sustainable Production and Consumption 42, 259–267.
Chakori, S., Richards, R., Smith, C., Hudson, N.J., Abdul Aziz, A., 2022. Taking a whole-of-system approach to food packaging reduction. J. Clean. Prod. 338, 130632.
Cichocka, I., Krupa, J., Mantaj, A., 2020. The consumer awareness and behaviour towards food packaging in Poland. Econ. Soc. 13, 304–317.
Civancik-Uslu, D., Nhu, T.T., van Gorp, B., Kresovic, U., Larrain, M., Billen, P., Ragaert, K., Meester, S. de, Dewulf, J., Huysveld, S., 2021. Moving from linear to circular household plastic packaging in Belgium: prospective life cycle assessment of mechanical and thermochemical recycling. Resour. Conserv. Recycl. 171, 105633.
Colijn, I., Fraiture, F., Gommeh, E., Schroën, K., Metze, T., 2022. Science and media framing of the future of plastics in relation to transitioning to a circular economy. J. Clean. Prod. 370, 133472.
Cowan, E., Booth, A.M., Misund, A., Klun, K., Rotter, A., Tiller, R., 2021. Single-use plastic bans: exploring stakeholder perspectives on best practices for reducing plastic pollution. Environments 8, 81.
Diaconeasa, M.-C., Popescu, G., Maehle, N., Nelgen, S., Capitello, R., 2022. Media discourse on sustainable consumption in Europe. Environ. Commun. 16, 352–370.
Dieli, C., Priyadarshini, A., Ludgate, R., Foley, L., 2024. Bridging the gap: determinants of Consumers' willingness to pay for environmentally friendly packages of leafy greens. Sustainability 16, 3128.
Directorate-General for Environment, 2023. Proposal for a directive on green claims. https://environment.ec.europa.eu/publications/proposal-directive-green-claims_en.
Directorate-General for Justice and Consumers, 2022. Proposal for a directive on empowering consumers for the green transition and annex. https://commission.europa.eu/publications/proposal-directive-empowering-consumers-green-transition-and-annex_en.
Dörnyei, K.R., Bauer, A.-S., Krauter, V., Herbes, C., 2022. (not) communicating the environmental friendliness of food packaging to consumers-an attribute- and Cue-based concept and its application. Foods 11, 1371.

European Commission, 2023a. Germany, 2025 EU waste recycling targets, state of play. https://op.europa.eu/en/publication-detail/-/publication/ca0ecad0-0353-11ee-87ec-01aa75ed71a1/language-en.

European Commission, 2023b. Portugal, 2025 EU waste recycling targets, state of play. https://op.europa.eu/en/publication-detail/-/publication/4bf52d5d-0350-11ee-87ec-01aa75ed71a1/language-en.

European Parliament, 1994. European Parliament and Council Directive 94/62/EC on packaging and packaging waste.

European Parliament, 2019. Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment.

European Parliament, 2022a. Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on packaging and packaging waste, amending regulation (EU) 2019/1020 and directive (EU) 2019/904, and repealing directive 94/62/EC. https://eur-lex.europa.eu/resource.html?uri=cellar:de4f236d-7164-11ed-9887-01aa75ed71a1.0001.02/DOC_1&format=PDF. Last checked: 30.10.2024.

European Parliament, 2022b. Proposal for a regulation revising EU legislation on food contact materials. https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-revision-of-eu-legislation-on-food-contact-materials?sid=8301.

Eurostat, 2024. Packaging waste by waste management operations. https://ec.europa.eu/eurostat/databrowser/view/env_waspac_custom_12775196/default/table.

Flick, U., 2021. Qualitative Sozialforschung: Eine Einführung, 10th ed. rowohlts enzyklopädie im Rowohlt Taschenbuch Verlag, Reinbek bei Hamburg, 623 pp.

Ford, H.V., Jones, N.H., Davies, A.J., Godley, B.J., Jambeck, J.R., Napper, I.E., Suckling, C.C., Williams, G.J., Woodall, L.C., Koldewey, H.J., 2022. The fundamental links between climate change and marine plastic pollution. Sci. Total Environ. 806, 150392.

Gustavo, J.U., Pereira, G.M., Bond, A.J., Viegas, C.V., Borchardt, M., 2018. Drivers, opportunities and barriers for a retailer in the pursuit of more sustainable packaging redesign. J. Clean. Prod. 187, 18–28.

Hao, Y., Liu, H., Chen, H., Sha, Y., Ji, H., Fan, J., 2019. What affect consumers' willingness to pay for green packaging? Evidence from China. Resources, Conservation and Recycling 141, 21–29.

Herbes, C., Beuthner, C., Ramme, I., 2018. Consumer attitudes towards biobased packaging – a cross-cultural comparative study. J. Clean. Prod. 194, 203–218.

Herbes, C., Beuthner, C., Ramme, I., 2020. How green is your packaging—a comparative international study of cues consumers use to recognize environmentally friendly packaging. Int. J. Consum. Stud. 44, 258–271.

Hopf, C., Schmidt, C., 1993. Zum Verhältnis von innerfamilialen sozialen Erfahrungen, Persönlichkeitsentwicklung und politischen Orientierungen: Dokumentation und Erörterung des methodischen Vorgehens in einer Studie zu diesem Thema. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-456148.

Ilyas, M., Ahmad, W., Khan, H., Yousaf, S., Khan, K., Nazir, S., 2018. Plastic waste as a significant threat to environment - a systematic literature review. Rev. Environ. Health 33, 383–406.

Jerzyk, E., 2016. Design and communication of ecological content on sustainable packaging in young Consumers' opinions. Journal of Food Products Marketing 22, 707–716.

Kantar, 2022. Spain's top 3 retailers now hold 40% of the FMCG market. https://www.kantar.com/inspiration/inflation/spains-top-3-retailers-now-hold-40-of-the-fmcg-market.

Ketelsen, M., Janssen, M., Hamm, U., 2020. Consumers' response to environmentally-friendly food packaging - a systematic review. J. Clean. Prod. 254, 120123.

Kleine Jäger, J., Piscicelli, L., 2021. Collaborations for circular food packaging: the set-up and partner selection process. Sustainable Production and Consumption 26, 733–740.

Kuckartz, U., 2014. Qualitative Text Analysis: A Guide to Methods, Practice & Using Software. Sage, London.

Kuckartz, U., Rädiker, S., op., 2014. Datenaufbereitung und Datenbereinigung in der qualitativen Sozialforschung. In: Baur, N., Blasius, J. (Eds.), Handbuch Methoden der empirischen Sozialforschung. Springer VS, Wiesbaden, pp. 383–396.

Larranaga, A., Valor, C., 2022. Consumers' categorization of eco-friendly consumer goods: an integrative review and research agenda. Sustainable Production and Consumption 34, 518–527.

Lewis, H., Fitzpatrick, L., Verghese, K., Sonneveld, K., Jordon, R., Alliance, S.P., 2007. Sustainable Packaging Redefined. Sustainable Packaging Alliance, Melbourne, Australia.

Li, W.C., Tse, H.F., Fok, L., 2016. Plastic waste in the marine environment: a review of sources, occurrence and effects. Sci. Total Environ. 566-567, 333–349.

Lindh, H., Olsson, A., Williams, H., 2016. Consumer perceptions of food packaging: contributing to or counteracting environmentally sustainable development? Packag. Technol. Sci. 29, 3–23.

Lindner, C., Schmitt, J., Fischer, E., Hein, J., 2022. Stoffstrombild Kunststoffe in Deutschland 2021: Zahlen und Fakten zum Lebensweg von Kunststoffen. Conversio Strategy, Mainaschaff. https://www.bvse.de/dateien2020/2-PDF/01-Nachrichten/03-Kunststoff/2022/Kurzfassung_Stoffstrombild_2021_13102022_1_.pdf.

Ma, X., Park, C., Moultrie, J., 2020. Factors for eliminating plastic in packaging: the European FMCG experts' view. J. Clean. Prod. 256, 120492.

Martinho, G., Pires, A., Portela, G., Fonseca, M., 2015. Factors affecting consumers' choices concerning sustainable packaging during product purchase and recycling. Resources, Conservation and Recycling 103, 58–68.

Mayring, P., 2010. Qualitative Inhaltsanalyse. Grundlagen und Techniken, Beltz, Weinheim.

Michie, S., van Stralen, M.M., West, R., 2011. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implementation science : IS 6, 42.

Mielinger, E., Weinrich, R., 2024. Insights into plastic food packaging waste sorting behaviour: a focus group study among consumers in Germany. Waste Manag. 178, 362–370.

Mihr, R., 2024. Top 30 Ranking im deutschen Lebensmitteleinzelhandel 2023. https://lebensmittelpraxis.de/top-30-unternehmen-im-leh.html.

Molina-Besch, K., Keszleri, H., 2023. Exploring the industrial perspective on biobased plastics in food packaging applications – insights from Sweden. Sustainable Production and Consumption 35, 72–84.

Moorthy, K., Kamarudin, A.A., Xin, L., Hui, L.M., Way, L.T., Fang, P.S., Carmen, W., 2021. Green packaging purchase behaviour: a study on Malaysian consumers. Environ. Dev. Sustain. 23, 15391–15412.

Mroz, G., Painter, J., 2023. What do consumers read about meat? An analysis of media representations of the meat-environment relationship found in popular online news sites in the UK. Environ. Commun. 17, 947–964.

Munro, P., Kapitan, S., Wooliscroft, B., 2023. The sustainable attitude-behavior gap dynamic when shopping at the supermarket: a systematic literature review and framework for future research. J. Clean. Prod. 426, 138740.

Nemat, B., Razzaghi, M., Bolton, K., Rousta, K., 2020. The potential of food packaging attributes to influence Consumers' decisions to Sort waste. Sustainability 12, 2234.

Nguyen, A.T., Parker, L., Brennan, L., Lockrey, S., 2020. A consumer definition of eco-friendly packaging. J. Clean. Prod. 252, 119792.

Nielsen, I.B., Hakala, H., 2023. External enablers for the circular economy: a case study of the food packaging industry. J. Clean. Prod. 417, 137915.

Norton, V., Waters, C., Oloyede, O.O., Lignou, S., 2022. Exploring Consumers' understanding and perception of sustainable food packaging in the UK. Foods 11.

Nuojua, S., Pahl, S., Thompson, R.C., 2024. Plastic alternatives and substitutes in the packaging sector – a UK consumer perspective. Sustainable Production and Consumption 46, 68–81.

Nutt, P.C., 1984. Types of organizational decision processes. Adm. Sci. Q. 29, 414.

Otto, S., Strenger, M., Maier-Nöth, A., Schmid, M., 2021. Food packaging and sustainability – consumer perception vs. correlated scientific facts: a review. J. Clean. Prod. 298, 126733.

Pak, O., Galbreth, M., Ferguson, M., 2022. Retailer strategies to encourage reduced packaging adoption. J. Clean. Prod. 354, 131318.

Pinsky, D., Mitchell, J., 2019. Packaging Away the Planet: U.S. Grocery Retailers and the Plastic Pollution Crisis. Greenpeace USA, Washington, DC. https://www.greenpeace.org/usa/wp-content/uploads/2019/06/packaging-away-the-planet.pdf.

Plastics Europe, 2022. Plastics - the Facts 2022, Brussels, 81 pp. https://plasticseurope.org/de/wp-content/uploads/sites/3/2022/10/PE-PLASTICS-THE-FACTS_20221017.pdf. Accessed 31 July 2023.

Prakash, G., Pathak, P., 2017. Intention to buy eco-friendly packaged products among young consumers of India: a study on developing nation. J. Clean. Prod. 141, 385–393.

RegioData Research, 2022. Konzentration im Einzelhandel spitzt sich weiter zu. https://www.regiodata.eu/oesterreich-konzentration-im-einzelhandel-spitzt-sich-weiter-zu/.

Roy, D., Berry, E., Orr, K., Dempster, M., 2023. Barriers to recycling plastics from the perspectives of industry stakeholders: a qualitative study. J. Integr. Environ. Sci. 20.

Ruf, J., Emberger-Klein, A., Menrad, K., 2022. Consumer response to bio-based products – a systematic review. Sustainable Production and Consumption 34, 353–370.

Ryynänen, T., Rusko, E., 2015. Professionals' view of Consumers' packaging interactions - a narrative analysis. Packag. Technol. Sci. 28, 341–355.

Scott, L., Vigar-Ellis, D., 2014. Consumer understanding, perceptions and behaviours with regard to environmentally friendly packaging in a developing nation. Int J Consum Stud 38, 642–649.

Sievert, K., Lawrence, M., Parker, C., Russell, C.A., Baker, P., 2022. Who has a beef with reducing red and processed meat consumption? A media framing analysis. Public Health Nutr. 25, 578–590.

Sijtsema, S.J., Onwezen, M.C., Reinders, M.J., Dagevos, H., Partanen, A., Meeusen, M., 2016. Consumer perception of bio-based products—an exploratory study in 5 European countries. NJAS: Wageningen journal of. Life Sci. 77, 61–69.

Statista, 2024. Food retailers market share in Portugal from 4th quarter 2021 to 4th quarter 2023, by brand. https://www.statista.com/statistics/1396506/portugal-food-retailers-market-share-by-brand/.

Steenis, N.D., van Herpen, E., van der Lans, I.A., Ligthart, T.N., van Trijp, H.C., 2017. Consumer response to packaging design: the role of packaging materials and graphics in sustainability perceptions and product evaluations. J. Clean. Prod. 162, 286–298.

Steinhorst, J., Beyerl, K., 2021. First reduce and reuse, then recycle! Enabling consumers to tackle the plastic crisis – qualitative expert interviews in Germany. J. Clean. Prod. 313, 127782.

Su, D.N., Duong, T.H., Dinh, M.T.T., Nguyen-Phuoc, D.Q., Johnson, L.W., 2021. Behavior towards shopping at retailers practicing sustainable grocery packaging: the influences of intra-personal and retailer-based contextual factors. J. Clean. Prod. 279, 123683.

Sustainable Packaging Coalition, 2011. Definition of sustainable packaging. https://sustainablepackaging.org/wp-content/uploads/2019/06/Definition-of-Sustainable-Packaging.pdf.

Tan, W., Cui, D., Xi, B., 2021. Moving Policy and Regulation Forward for Single-Use Plastic Alternatives. Front. Environ. Sci, Eng, p. 15.

Testa, F., Iovino, R., Iraldo, F., 2020. The circular economy and consumer behaviour: the mediating role of information seeking in buying circular packaging. Bus. Strateg. Environ. 29 (8), 3435–3448.

Toniolo, S., Mazzi, A., Niero, M., Zuliani, F., Scipioni, A., 2013. Comparative LCA to evaluate how much recycling is environmentally favourable for food packaging. Resources, Conservation and Recycling 77, 61–68.

Tumu, K., Vorst, K., Curtzwiler, G., 2023. Global plastic waste recycling and extended producer responsibility laws. J. Environ. Manage. 348, 119242.
Turkcu, D., Tura, N., 2023. The dark side of sustainable packaging: battling with sustainability tensions. Sustainable Production and Consumption 40, 412–421.
van Dam, I., Wood, B., Sacks, G., Allais, O., Vandevijvere, S., 2021. A detailed mapping of the food industry in the European single market: similarities and differences in market structure across countries and sectors. The international journal of behavioral nutrition and physical activity 18, 54.
VERBI Software, 2023. Innovationen in der qualitativen & Mixed Methods-Datenanalyse. https://www.maxqda.com/de/about.
Walker, T.R., Baechler, B.R., Markley, L., Grünzner, M., Akuoko, I.S., Bowyer, C., Menzel, C., Muntaha, S.T., Macdonald, A., Allen, D., Cowan, E., 2023. Plastic pulse of the public: a review of survey-based research on how people use plastic. Camb. prisms Plast. 1.
Weinrich, R., Franz, A., Spiller, A., 2014. Analyses into consumers' willingness to pay a certain price in multi-level labelling systems: the animal welfare label as an example. Berichte über Landwirtschaft 92.
Weinrich, R., Mielinger, E., Krauter, V., Arranz, E., Camara Hurtado, R.M., Marcos, B., Poças, F., Maya, S.R. de, Herbes, C., 2024. Decision-making processes on sustainable packaging options in the European food sector. J. Clean. Prod., 139918.
Wensing, J., Caputo, V., Carraresi, L., Bröring, S., 2020. The effects of green nudges on consumer valuation of bio-based plastic packaging. Ecol. Econ. 178, 106783.
Yokokawa, N., Amasawa, E., Hirao, M., 2021. Design assessment framework for food packaging integrating consumer preferences and environmental impact. Sustainable Production and Consumption 27, 1514–1525.