Lenka Branska
University of Pardubice
Faculty of Chemical Technology
Department of Economy and Management of Chemical and Food Industries
532 10 Pardubice, Czech Republic
lenka.branska@upce.cz

Michal Patak
University of Pardubice
Faculty of Chemical Technology
Department of Economy and Management of Chemical and Food Industries
532 10 Pardubice, Czech Republic
michal.patak@upce.cz

Zuzana Pecinova
530 06 Pardubice-Svítkov,
Czech Republic
pecinovi@seznam.cz

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CIRCULAR PACKAGING INNOVATION FROM BUSINESS AND CONSUMER PERSPECTIVES: DESIRABLE DIRECTIONS FOR INNOVATION IN SMALL AND MEDIUM-SIZED ENTERPRISES

Abstract

Purpose: The aim of the paper is to identify desirable circular packaging innovations for fast-moving consumer goods in small and medium-sized enterprises.

Methodology: We carried out two quantitative surveys among 60 enterprises and 200 consumers in two separate phases. The data were processed by exploratory analysis and the significance of the detected differences was verified by confirmatory analysis (ANOVA, Friedman test).

Results: We found that the main innovation drivers are consumers themselves and reduction in packaging costs. The main barriers to innovation are concerns held by businesses regarding unacceptable product prices and consumer unwillingness to engage in collection, sorting and return of packaging, and to accept packaging-free sales. Replacing non-recyclable materials in packaging with 100% recyclable or biodegradable alternatives can be considered the most appropriate packaging innovation that is preferred by businesses and consumers. However, consumer attitudes depend significantly on their inclination to protect the environment. In other words, it is also advisable for green customers to implement use of returnable packaging.

Conclusion: The most successful innovations will be those that require minimal changes in consumer shopping behaviour and are not overly burdensome for businesses. The results can help companies develop packaging innovations under the circular economy paradigm.

Keywords: Circular economy, circular packaging, fast-moving consumer goods, packaging innovation, small and medium-sized enterprises, sustainable packaging

1. Introduction

Packaging must be understood as a sustainable practice to develop a circular economy (CE) (Meherishi et al., 2019). Leaving the linear business model behind and adopting a circular model could constitute the basis of a new concept for use of packaging (Casarejos et al., 2018).

The main effect of this change in packaging approach may occur in volume reduction, in particular in solid waste in cities and municipalities. It is therefore important to focus on products whose packaging makes up a large part of this waste. This particularly concerns fast-moving consumer goods (FMCG), i.e. products sold at relatively low prices to meet everyday needs. According to Urbinati et al. (2017), FMCG product categories particularly include food (such as smoked meats, biscuits, pasta, fruit and vegetables, etc.), alcoholic and non-alcoholic beverages, cleaning and laundry products (including fabric softeners) and pet food. Research to date has tended to focus on the packaging of selected items within the framework of FMCG products, in particular food (e.g., Palsson & Sandberg, 2022); however, this research has already shown specific barriers to sustainable packaging innovation depending on the type of product (Palsson & Sandberg, 2022).

Research in the field of sustainable packaging has, for the time being, not been overly focused on specifics related to the size of the company. Yet it is known that small and medium-sized enterprises (SMEs) are more flexible, dynamic and have the capacity to create the desired innovations (Hansen, 2016). But unlike large companies, they usually have less information about legislation in the given field, different strategic priorities relating to sustainable packaging, different reasons for these investments, different levels of investment, different expectations of return on invested capital, and their decision-making is more heavily influenced by considerations regarding cost (Mattia et al., 2021; Afif et al., 2022). At the same time, there are doubts as to whether companies of different sizes face the same problems. This is why Afif et al. (2022), who have already revealed that drivers and barriers depend on the size of the company, recommend further investigation to help us understand how decisions in the field of sustainable packaging vary depending on the size of the company. The article presented here also aims to contribute to this area, as the existing literature has mainly focused on large enterprises (Palsson & Sandberg, 2022).

The aim of the paper is to identify desirable circular packaging innovations for FMCG products in SMEs. In order to achieve this objective, it was necessary to identify and compare attitudes towards circular packaging innovation among both businesses and consumers.

This dual approach to the issue in question is unique compared to the existing literature, as previous studies have addressed sustainable packaging innovations either from the customers' perspective or solely from the business perspective (Wandosell et al., 2021).

2. Theoretical background

Innovation of packaging constitutes an important part of CE practices in SMEs. For example, within the framework of the research performed by Mura et al. (2020) into CE practices in Italian SMEs, 20 CE practices were identified, 3 of which were associated with packaging. This concerned "reduction of material content in packaging, recovery/reuse of plastic and derivative packaging, and use of biodegradable materials (i.e. no plastics and derivatives) for packaging". It is clear from the essence of the CE and the examples mentioned above that any innovation of packaging contributing to reduction of resources needed for the manufacturing of packaging (reduce innovations), prolonging the length of its life cycle (reuse innovations) and ensuring better utilisation of waste from packaging as input raw materials for further manufacturing (recycle innovations) may be regarded as packaging innovations.

2.1 Reduce innovations

Reduce innovations can primarily be used to reduce material and energy input into manufacturing of packaging (Chen, 2008). Saving raw materials and optimising logistics are the most frequent sustainable practices adopted by companies to improve the circularity of packaging (Cozzolino & De Giovanni, 2023).

The basic methods to achieve material reduction include resizing the packaging, changing the amount of product per packaging, changing the number of primary packaging per secondary packaging and/or tertiary packaging, standardising materials and dimensions, and changing the packing

process (García-Arca et al., 2017). These options aimed at reducing the material needed for packaging are feasible even for SMEs. However, they typically require closer collaboration with the packaging supplier (Vognarova et al., 2024). Reduction of packaging size through product innovation can also be regarded as a specific approach to reducing packaging materials, for example, by increasing the concentration of liquid products (Van Sluisveld & Worrell, 2013). However, this option is difficult to implement for SMEs if they do not have their own research and product development (Branská et al., 2020).

Businesses reduce consumption of the packaging material through design changes affecting the weight and thickness of packaging (Lekesiztürk & Oflaç, 2022). This reduction of packaging materials is usually associated with minimisation of the amount of waste that is generated. However, an appropriate redesign of packaging can achieve several other positive impacts in the CE (Svanes et al., 2010). For example, reducing the weight of packaging can reduce transportation costs, energy consumption and greenhouse gas emissions (Hanssen et al., 2017). On the contrary, excessive minimisation of packaging thickness may endanger its protective function or increase demands on other packaging levels, the result of which could be much greater losses during transportation and handling (Verghese et al., 2015). Reducing packaging weight and/or thickness is feasible for SMEs if they manufacture their own packaging or if their packaging supplier implements such forms of packaging innovation (Vognarova et al., 2024).

When redesigning packaging, consumer behaviour and habits should also be taken into consideration (Gustavo Jr. et al. 2018), particularly the relationship between packaging size and the amount of product actually consumed (Silvenius et al., 2014). For example, according to Williams et al. (2012), 20-25% of consumer waste from food is linked to incorrect packaging design (difficult to empty and too big packaging). Therefore, the most effective method to reduce losses in the CE is through packaging innovation that minimises waste generation, not only in manufacturing and distribution, but also in consumers' households.

2.2 Reuse innovations

A key activity in the CE, which prevents waste generation, is reuse of packaging (Rigamonti et al., 2019). According to Greenwood et al. (2021), reusable packaging can be classified into two main categories - returnable packaging and refillable packaging (at home with auxiliary products or in the packaging-free shops). Both options are feasible for SMEs. However, returnable packaging poses a greater challenge for them, both organisationally and financially.

The literature focused on reusable packaging in the field of FMCG addresses return flows of packaging within the supply chain. Rigamonti et al. (2019) propose a methodology for collecting data to compare countries in achieving objectives related to packaging reuse. Comparison of the expediency of using reusable packaging as compared to disposable packaging is, for example, addressed by Kuo et al. (2019). The literature also addresses systems of imposing a deposit on packaging and the problems associated with this, particularly in the case of drinks (Simon et al., 2016; Zhou et al., 2020).

Barriers to and drivers of the development of the zero-packaging concept are presented by Beitzen-Heineke et al. (2017). Salkova and Regnerova (2020) and a study by Price, Waterhouse and Co (2015) also present the main reasons for shopping in packaging-free shops. The study by Price, Waterhouse and Co (2015) also draws attention to the fact that although the majority of consumers do view packaging-free shops positively, only the minority would be prepared to pay a higher price. The professional literature also addresses changes in the method of sale (e.g., Fuentes et al., 2019).

2.3 Recycle innovations

The recycle category comprises innovations which allow either direct chemical or mechanical reworking of waste material or reuse of resources after biological transformation (e.g., after composting). However, any direction or specific type of innovation should ensure or preserve the packaging characteristics such as availability from renewable sources, recyclability, and compostability. Packaging should, at the same time, be easily adaptable for a wide range of uses and be cost-effective (Farooque et al., 2019). The current trend is to introduce new sustainable packaging materials such as biodegradable and bio-renewable materials, bio/compostable inks and natural pigment, lacquers with a microbial barrier and biopolymers (Mattia et al., 2021; Lekesiztürk & Oflaç, 2022) and to use recycled materials (Mattia et al., 2021). These options are feasible for

SMEs, but they typically require an adequate supply of packaging from suppliers (Vognarova et al., 2024).

Studies addressing the use of alternative or reusable materials are frequently focused on plastics. They address the issue of how to replace plastic, for example with glass, paper or metal (Almeida et al., 2017; Branska et al., 2020), and the advantage of such alternatives from an economic and environmental point of view (Simon et al., 2016). Other studies address replacement of plastics with bioplastics. It is anticipated that this could be one of the most frequently used packaging materials in the future (Dobrucka, 2019). The issue of plastics is, for example, addressed by Casarejos et al. (2018), Dobrucka (2019), Farooque et al. (2019). Interest in reduction or elimination of the volume of plastic waste from packaging has also given rise to an effort to produce an alternative and renewable raw material for manufacturing packaging plastics (Dow, 2020) or efforts to replace petrochemicals in the manufacturing of packaging plastics with widely available mineral fillers (Civancik-Uslu et al., 2019).

Some studies address complete or partial replacement of plastics with recyclable plastics (Civancik-Uslu et al., 2019; Branska et al., 2020). Usability in relation to packaged products is usually addressed alongside their combination with other materials. These studies also include a study focused on the quality of recyclable plastics, the presence of contaminants in them (e.g., Brouwer et al., 2019) and safety aspects of recycled packaging (Geueke et al., 2018).

3. Research methodology

As far as businesses are concerned, it has already been revealed that CE principles are being promoted in packaging innovation (Mura et al., 2020), but it is not yet clear which specific directions of packaging innovation are preferred by SMEs and why. For this reason, the research questions were determined as follows:

RQ1: What is the scope of adoption of different types of circular packaging innovations in SMEs?

RQ2: What are the main drivers for the introduction of circular packaging in SMEs?

RQ3: What are the main barriers to the introduction of circular packaging in SMEs?

In order to be successful in the market, packaging innovation must first and foremost be accepted by end consumers (Ma et al., 2020). For certain types of circular packaging innovation, this requires the involvement of consumers in the sorting of packaging waste or the reuse of packaging in packaging-free shops. This is why the following research questions were formulated:

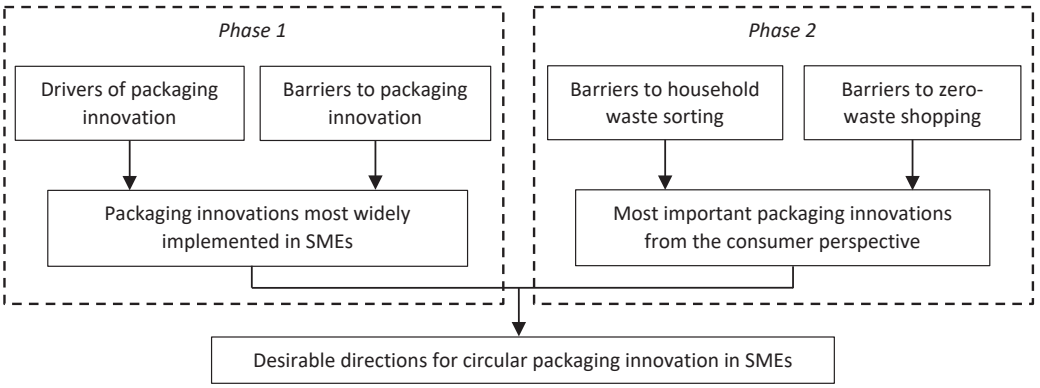
RQ4: Which circular packaging innovations do consumers prefer when buying FMCG?

RQ5: What challenges do consumers face when sorting waste from packaging?

RQ6: What challenges do consumers face when buying goods in packaging-free shops?

Two-phase quantitative research was proposed in order to fulfil the research objective and find answers to the research questions (see Figure 1).

Figure 1 Research framework



Source: Authors

Because attitudes towards circular packaging innovations can be significantly influenced by the lifestyles of the consumers (Popovic et al., 2020), data analysis focused on identifying differences between regular and green customers. Synthesis of the findings ascertained from both quantitative surveys and their comparison with the professional literature allowed us to identify the desirable directions for circular packaging innovation in SMEs.

3.1 Collection of data from manufacturers

Data were collected via an electronic survey conducted among randomly chosen Czech businesses. Support for selection was based on the Administrative Register of Economic Subjects (The Ministry of Finance of the Czech Republic, 2021). From this register, companies in liquidation were eliminated, as were those with more than 250 employees or a turnover exceeding EUR 50 million, and businesses that did not have CZ-NACE codes 10+, 11+, 20+ (production of food products, production of drinks, production of chemical substances and chemical products) indicated as their primary field of economic activity. A total of 1,000 businesses from this database were contacted in March 2021 (a simple random sample) with a request that they participate in the survey. However, most of these businesses failed to participate in the research despite repeated calls to do so. After elimination of unsuitable respondents (businesses outside of the FMCG sector), 60 questionnaires were then submitted for analysis.

All circular packaging innovations which had been successfully introduced in the business over the past 5 years were first of all ascertained in the questionnaire survey. Respondents were able to indicate any number of responses they liked from the innovations which were specified in advance, with the option of identifying other innovations which were not included in the list. The main drivers of and barriers to the introduction of these innovations in the business were then identified. In both cases, respondents were able to indicate at most three alternatives from the list of drivers (or barriers) specified in advance with the option of identifying other drivers (or barriers) which were not included in the list.

3.2 Collection of data from consumers

Data were collected via an electronic survey conducted among Czech consumers aged 15-64 selected using the quota sampling method with quotas applied to age and gender of the respondent. The structure of the required quotas was determined on the basis of demographic data about the economically active population of the Czech Republic (Czech Statistical Office, 2021). Data were collected in the period March–June 2021, until the required size of the sample was achieved (200 respondents) in the required structure: 51.0% of male (7.5% aged 15–24, 10.5% aged 25–34, 13.0% aged 35–44, 11.5% aged 45–54, 8.5% aged 55–64) and 49.0% of female respondents (6.5% aged 15–24, 10.5% aged 25–34, 12.5% aged 35–44, 11.0% aged 45–54, 8.5% aged 55–64).

Attitudes towards six eco-attributes of packaging specified in advance were rated in the questionnaire survey using a five-point scale of importance (1 = very unimportant, 2 = unimportant, 3 = neutral, 4 = important, 5 = very important). The main problems with sorting packaging at home and problems associated with buying goods in packaging-free shops were subsequently identified. Respondents were able to specify at most three problems in each of the aforementioned areas. At the end of the questionnaire, the basic characteristics of the respondents were ascertained (gender, age, education, income), as well as eco-friendly aspects of their purchasing behaviour. The research sample consisted of 74.9% regular customers and 25.1% green customers (who repeatedly buy eco-friendly products).

3.3 Statistical data analysis

During data analysis, descriptive and inferential statistics methods were applied using the IBM SPSS Statistics 24 software. While evaluating the types of innovations implemented in businesses, content analysis of responses and analysis of multiple responses were used. This evaluation covered drivers of and barriers to innovation implementation in businesses, problems in sorting waste from packaging at home and issues associated with purchasing goods in packaging-free shops. The statistical significance of the differences in frequencies between regular and green customers was verified using Pearson's chi-squared test with a significance level of 5%.

The average was used to evaluate consumer attitudes towards the eco-attributes of packaging. The statistical significance of differences in the perceived importance of individual eco-attributes was verified using the Friedman test with a significance level of 5%. The statistical significance of differences between the attitudes of regular and green customers was verified using an ANOVA test with a significance level of 5%.

4. Results and discussion

4.1 Circular packaging innovations in SMEs

Primary research confirmed the conclusions of the previous research conducted by Mura et al. (2020) relating to the implementation of circular packaging innovations. These innovations are performed in SMEs. However, as opposed to previous research, this research identified the preferences of SMEs.

Table 1 contains the results of analysis of multiple responses to the type of innovations. SMEs preferred replacement of packaging materials used with biologically degradable materials (including reduction of the share of plastics in packaging) or 100% recycled materials. In the field of reuse type innovations, SMEs particularly emphasised options for packaging reuse by the consumer or the business (including repurposing for different uses). In the field of reduce type innovations, packaging redesign was preferred (e.g., changes in shape), which reduced the amount of material needed to pack the product.

Table 1 Circular packaging innovations implemented in SMEs over the past 5 years

Innovation	Responses		Percent of cases
	N	Percent	
Packaging from biodegradable materials	21	18%	35%
Packaging from 100% recycled materials	17	15%	28%
Reusable/refillable packaging	14	12%	23%
Returnable packaging	12	11%	20%
Packaging redesign	9	8%	15%
Filling method innovation	8	7%	13%
Packaging which is easier to recycle	8	7%	13%
Product innovation	6	5%	10%
Packaging-free sales	6	5%	10%
Others (no circular packaging innovation)	13	11%	22%
Total	114	100%	x

Source: Authors

The research also confirmed that drivers and barriers also exist in SMEs when implementing circular packaging innovations. However, it also revealed that some are significantly more important than others. Table 2 compares the importance of drivers based on the frequency with which they were mentioned by respondents in the survey.

Table 2 Importance of drivers for the introduction of packaging innovations in SMEs

Driver	Responses		Percent of cases
	N	Percent	
Consumer	30	25%	52%
Reduction of costs	26	21%	45%
Environmental certification	16	13%	28%
Legislative regulations	15	12%	26%
Vendors	14	11%	24%
Public and public organisations	11	9%	19%
Others (<5% of cases)	10	8%	17%
Total	122	100%	x

Source: Authors

The most important driver is the benefit for consumers (mentioned in 52% of cases). Together with cost reduction (45% of cases), these are the two most important drivers of circular packaging innovations identified in SMEs. The formulation of this research conclusion confirmed the previous conclusions drawn by Ma et al. (2020) relating not only to the customer as a driver of packaging innovations, but also to the importance of the customer relative to other drivers. Identification of another driver, i.e. cost reduction, confirms the previous findings by Gustavo Jr. et al. (2018), who state that cost reduction primarily concerns profit. This allows the conclusion that profit, as the fundamental aim of doing business, also represents the core driver for circular packaging innovations. From this point of view, circular packaging innovations can be seen as a means of generating profit, and for this reason, are likely to continue being adopted in the future.

Table 3 compares the importance of barriers based on the frequency with which they were mentioned by respondents in the survey. SMEs see the greatest barrier in concerns that customers will not accept the increase in price of innovated products (51% of cases). However, safety and hygiene standards, which are difficult to comply with for certain circular packaging innovations, can also be regarded as a major barrier (40 % of cases), as can a lack of investment capital to implement these innovations (37% of cases).

Table 3 Importance of barriers to the introduction of circular packaging innovations in SMEs

Barrier	Responses		Percent of cases
	N	Percent	
Increase in product price	29	22%	51%
Safety and hygiene standards	23	18%	40%
Lack of investment capital	21	16%	37%
Incompatibility of packaging with the product	19	15%	33%
Insufficient reverse logistics	14	11%	25%
Lack of know-how	9	7%	16%
Reduction of product functionality	9	7%	16%
Loss of product attractiveness	6	5%	11%
Total	130	100%	x

Source: Authors

This conclusion partially corresponds to the conclusion drawn by Mura et al. (2020), Ma et al. (2020) and Gustavo Jr. et al. (2018), i.e. that the main barriers to circular packaging innovations in SMEs are higher costs and lower revenue as a result of non-acceptance of innovations by the customer due to increased prices of innovated products and a lack of financial resources. As opposed to previous research (in particular by Gustavo Jr. et al., 2018), respondents in our survey are not overly concerned about the loss of product attractiveness (11% of cases).

4.2 Circular packaging innovations from the consumer perspective

Follow-up research among consumers made it possible to identify their preferences regarding selected circular packaging innovations and their attitudes towards changes in purchasing and consumer behaviour that are demanded by certain circular packaging innovations (sorting waste from packaging, returning used packaging and shopping in packaging-free shops).

Table 4 compares the perceived importance of selected eco-attributes of packaging which support the principles of the circular economy. The table also shows differences in the importance of attributes depending on how green the customer is, including the results of ANOVA tests used to verify the significance of the specified differences. Consumers regard the use of recyclable materials (total average of 3.73) and biologically degradable materials (total average of 3.67) during the production of packaging as the most important eco-attribute of the packaging that is decisive when they choose which FMCG to purchase. The least preferred alternative by consumers is the packaging-free sale of such goods (total average of 3.27).

Table 4 Importance of eco-attributes of packaging from the point of view of consumers

Eco-attribute	Average importance			ANOVA test	
	Total	Regular customers	Green customers	F	p
100% recycled materials	3.73	3.52	4.36	24.60	<0.001
Biodegradable materials	3.67	3.46	4.30	24.28	<0.001
Easy to recycle	3.65	3.43	4.30	25.84	<0.001
Returnable	3.60	3.35	4.34	35.70	<0.001
Refillable	3.41	3.27	3.84	10.08	0.002
Packaging-free	3.27	3.03	3.96	25.84	<0.001

Source: Authors

Customers are evidently inclined towards innovations, which do not restrict (or do not significantly restrict) their purchasing comfort. Change to the packaging material allows for standard, repeated purchasing at the same shop at the usual shopping time, so there is no need to change established shopping behaviour. However, alternatives involving innovation in reuse typically require changes in customer behaviour and have an impact on their comfort when shopping. Packaging-free sale, as the least preferred innovation alternative, has the greatest impact on comfort. This requires not only collection, washing and repeatedly taking packaging with you, but also often the need to shop in specialised shops. The customer has to make more complicated preparations and plans for their shopping and conduct the actual purchase under different conditions. This likely explains why this innovation alternative is assessed as the least important by customers.

A follow-up analysis of differences in consumer preferences confirmed the assumption that customer requirements for the environmentally friendly aspects of packaging are not entirely homogenous, but that differences exist depending on how green the customers are. According to the Friedman test, the importance of attributes perceived by all customers ($\chi^2 = 62.11$, $p < 0.001$), by regular customers ($\chi^2 = 47.94$, $p < 0.001$) and by green customers ($\chi^2 = 20.47$, $p = 0.001$) are significantly different. All packaging attributes are perceived by green customers as significantly more important (see the ANOVA test results in Table 4), although the priority of attributes does differ between regular and green customers.

Whereas regular customers clearly prefer packaging made from eco-friendly or 100% recycled material, green customers perceive these attributes as being of comparable importance to the use of returnable packaging or efforts to use recyclable packaging (i.e. packaging made from a single type of material, single-layer packaging, packaging without any undesirable additives, etc.). The least preferred attributes from the point of view of both groups of customers are attributes associated with the repeated use of packaging by consumers, i.e. their reuse at home (even for other purposes), or shopping in packaging-free shops.

When sorting waste from packaging, consumers encounter several problems. Table 5 compares problems based on the frequency of respondents who identified them in the survey. The table also shows differences in frequencies depending on how green the respondent is, including the results of chi-squared tests that verify the significance of the specified differences.

Table 5 Problems associated with sorting waste from packaging

Problem	Percent of cases			Chi-squared test	
	Total	Regular customers	Green customers	χ^2	p
Sorted packaging occupies a lot of space at home.	57%	55%	64%	0.191	0.662
Containers for sorting waste are crowded.	50%	48%	57%	0.207	0.649
Washing packaging is time-consuming.	43%	48%	29%	1.806	0.179
Washing packaging uses a lot of energy.	30%	26%	43%	1.116	0.291
Sorted packaging at home produces unpleasant odours.	27%	24%	36%	0.589	0.443
Handling sorted packaging is inconvenient.	18%	19%	14%	0.217	0.642
Sorted packaging has to be taken a long way to the recycling point.	18%	19%	14%	0.217	0.642

Source: Authors

It is clear from the results given in Table 5 that the differences ascertained in the perceived problems with sorting waste from packaging at home do not depend on how green the customer is (none of the ascertained differences are statistically significant). More than half of the consumers surveyed identify the fact that sorted packaging occupies a lot of space at home (57% of cases) as the main problem. They also see containers for sorted waste that are always full (50% of cases) and the time-consuming nature of washing used waste intended for recycling (43% of cases) as major problems.

An interesting possibility for prolonging the life cycle of primary packaging is its reuse by the consumer when purchasing FMCG in packaging-free shops. This is the reason why a lot of specialised shops have opened all over the world in which it is possible to buy a wide range of FMCG without packaging. Nevertheless, only 31% of respondents have so far taken advantage of this possibility in the Czech Republic, whereas two thirds of them do not regularly shop in packaging-free shops (less than once per month). Table 6 compares the main problems associated with buying goods in a packaging-free shop based on the frequency of respondents who indicated them in the survey. The table also shows differences in frequencies depending on how green the respondent is, including the results of chi-squared tests that verify the significance of the specified differences.

Table 6 Problems associated with buying goods in packaging-free shops

Problem	Percent of cases			Chi-squared test	
	Total	Regular customers	Green customers	χ^2	p
Not enough shops	46%	50%	41%	0.264	0.608
Need to take your own containers	38%	38%	38%	1.033	0.310
Higher price of goods	32%	29%	38%	3.037	0.081
Narrow range of goods	20%	19%	21%	0.726	0.394
Need to plan shopping	14%	10%	21%	3.697	0.055
Time-consuming nature of shopping	13%	12%	14%	0.592	0.442
Hygiene demands difficult to comply with	10%	12%	7%	0.066	0.797
Uncertainty regarding the composition and quality of the product	7%	7%	7%	0.118	0.731

Source: Authors

It is clear from the results specified in Table 6 that the main problems associated with buying goods in packaging-free shops include the following: an insufficient number of these shops (46% of cases), the need to take your own containers (38% of cases) and the higher price of goods in packaging-free shops (32% of cases). None of the differences in attitudes between regular and green customers which were ascertained are statistically significant. Nevertheless, the frequent mention of higher prices in shops and the need to plan your shopping in the case of green customers is borderline significant. This may be attributed to their greater experience with shopping in packaging-free shops (70% of customers who regularly shop in packaging-free shops are green customers).

4.3 Desirable directions for circular packaging innovation for FMCG products in SMEs

Research conducted in enterprises has shown that sustainable packaging innovations in SMEs respect all three basic principles of the circular economy (i.e. reduce, reuse and recycle), although businesses prefer change to the packaging material. However, they are not only introducing packaging made of biodegradable materials, as stated by Mura et al. (2020), they are also introducing packaging made of 100% recycled materials. This may relate to the fact that change to the packaging material requires a relatively small scope of innovation from the point of view of the business. It is interesting that reuse type innovations are the second most preferred direction, even though they are demanding for the business. Surprisingly, reduce type innovations, which are usually cost-effective for businesses, are the least preferred direction. This may be linked to the fact that these innovations also require innovation of the product or may endanger its full utilisation.

The research also confirmed that drivers and barriers also exist in SMEs when implementing circular packaging innovations, some of which are very important. The most important driver is the benefit for consumers. Together with cost reduction, these are the two most important drivers for circular packaging innovations ascertained in SMEs. An interesting finding is the fact that orders and regulations imposed by government institutions were identified as the least important driver for circular packaging innovations and SMEs (together with the improvement of image and pressure from various stakeholders). The finding that the personal responsibility of the managers concerned, who wish to act in an environmentally friendly manner, also serves as a driver can be regarded as a contribution to current knowledge. Even though it is not one of the decisive drivers, it points to the fact that long-term formal and informal education of future managers can significantly support broader implementation of these innovations.

Research into the existing barriers showed that SMEs really do face various barriers, while implementing circular packaging innovations, particularly in the economic and legislative fields. Important barriers include concerns that customers will not accept increased prices of innovated products, difficulties in complying with established safety and hygiene standards and a lack of capital. Another important finding is that SMEs find it difficult to comply with safety and hygiene requirements. Environmental education of customers and ensuring support for environmentally focused innovations could contribute towards breaking down these barriers.

To reduce the risk of innovations not being accepted by the customers, the results of our research focused on the importance of the environmental aspects of packaging as value components for the customer can also be utilised. Customers prefer replacement of plastic packaging with biologically degradable materials or materials made of 100% recycled materials. On the other hand, they attribute less importance to innovations in the reuse direction. This is most likely linked to their shopping convenience and their willingness to sacrifice it. However, research showed that customer requirements for the environmentally friendly aspects of packaging are not entirely homogenous, but that differences exist depending on how green the customers are. It can be stated that the environmentally friendly aspects of packaging when purchasing FMCG are more important for green customers. Nevertheless, these customers also care about their shopping comfort. This is indicated by the fact that packaging-free sale is the least important for this customer segment, too.

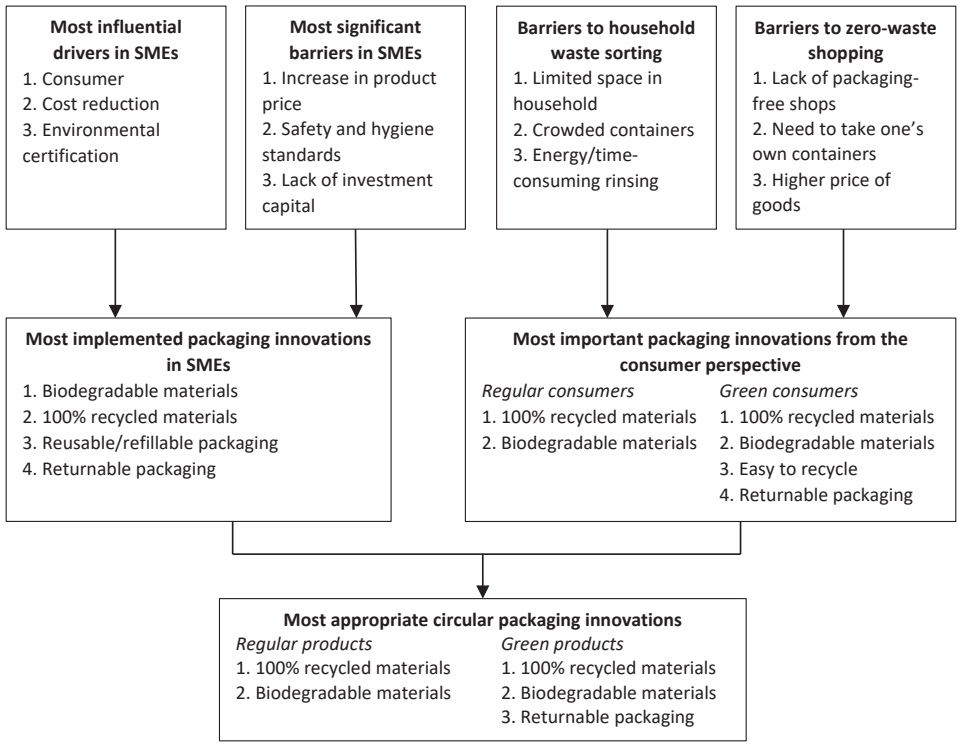
From the point of view of circular packaging innovation success, this means that innovations which do not require any fundamental changes in the shopping behaviour of customers will be accepted much better. If such innovations are at the same time more favourable from the point of view of the demands they impose also for the businesses which implement them, their chance of success is even greater. Changing the packaging material poses a relatively

small burden on both sides. Customers do not need to change their shopping behaviour and businesses do not need to establish new distribution paths, methods of sale and/or systems for return of packaging after its use. This is probably why both sides prefer replacement of plastic packaging with biodegradable materials or materials from 100% recycled material. However, the fact that customer preferences for environmentally friendly attributes and innovations performed by SMEs are in harmony certainly works in favour of the development of packaging innovations.

As far as the perspective for innovations in the reuse direction is concerned, these will probably be better accepted by green customers who buy environmentally friendly products. They are more willing to sacrifice their comfort while shopping in return for greater product value given by the environmentally friendly aspects. Nevertheless, they too, like other customers, experience several problems associated with sorting packaging waste. Customers have the biggest problems with storage of used packaging before it is returned, with the fact that recycling bins are always full and washing of packaging. To ensure better acceptance of innovations in this direction (reuse), these problems must be perceived as barriers and attention must be given to breaking them down. However, it is also important to organise take-back at the point of sale of the product, as research has shown that customers prefer returning packaging when they next go shopping (as this is more convenient for them). However, it would be advisable to abandon imposition of deposits on packaging as customers are not well inclined towards this. As far as the introduction of sale in packaging-free shops is concerned, the number of shops must be increased. To ensure convenience in shopping, it would be advisable for these locations to be close to (or part of) sales areas for other regular shopping.

By summarising the research results and the conclusions drawn, it is possible to identify the most appropriate circular packaging innovations in SMEs (see Figure 2).

Figure 2 Synthesis of research results and proposal of desirable directions for circular packaging innovation



Source: Authors

The innovations identified in Figure 2 can be considered not only the most appropriate, but at the same time, as ones which can be most easily adopted by SMEs with respect to the identified drivers (consumers, cost reduction) and barriers (increase in product price, safety and hygiene standards). A more significant promotion of packaging innovations in SMEs would without a doubt be helped by more in-depth environmental education, both on the side of business managers and on the side of customers. Mutual interest will be an important (or even the main) driver of these innovations. It is, however, important that circular packaging innovations do not have a fundamental impact on the customers' comfort, as this always reduces the change of their successful acceptance. However, it is at the same time necessary to ensure enough funds for these innovations. Because this may prove to be a problem in view of the size of SMEs, it would be advisable to implement greater state support for them. If circular packaging innovations in SMEs expand at a slow pace, enforcement via legislation is a possible option.

5. Conclusion

This study focused on identifying appropriate types of packaging innovations based on CE principles in relation to SMEs in the FMCG sector. It first examined the scope of adoption of each type of innovation in companies, the drivers of and barriers to these innovations, and then revealed the importance of individual consumer requirements for packaging and their attitudes towards changes in consumer behaviour relating to the use of circular packaging. Comparison of research results with the professional literature and a unique synthesis of business and consumer attitudes enabled us to identify the most appropriate types of innovation for SMEs. Replacing non-recyclable materials in packaging with 100% recyclable or biodegradable alternatives can be considered the most appropriate packaging innovation for all customers. It transpires that customer attitudes towards environmental protection must be taken into account when innovating packaging. It is also advisable for green customers to implement the use of returnable packaging.

The paper develops current knowledge in the field of packaging innovation on the basis of the CE in several directions. As opposed to previous studies concerned with different types of innovations without any link to their implementation rates (García-Arca et al., 2017; Beitzen-Heineke et al., 2017; Greenwood et al., 2021; Lekesiztürk & Oflaç, 2022; Cozzolino & De Giovanni, 2023; and others), this study quantifies individual types of innovations that have been implemented. In addition to that, it also develops the work of Gustavo Jr. et al. (2018), Ma et al. (2020), Mattia et al. (2021), Afif et al. (2022) and Palsson and Sandberg, (2022) by also indicating the relative importance of the different drivers and barriers on the side of businesses themselves. Also beneficial is the identification of the importance of individual customer requirements for sustainable packaging, which develops the work of Otto et al. 2021 and Koch et al., 2022. Identification of the most appropriate types of innovation also contributes to the development of knowledge in the field of sustainable management of SMEs. Research conducted in the Czech Republic contributes to revealing contextual differences (differences depending on the type of country)–a direction of research recommended by Palsson & Sandberg, 2022.

The results presented in the paper are also relevant for corporate practice. The findings enable managers, especially in SMEs, to understand customer requirements for sustainable packaging and partly also the reasons why some innovations are not very attractive to them. The proposal created for the most appropriate types of innovation offers a basis for innovation processes aimed at sustainable packaging in SMEs and can also become an inspiration for large enterprises.

Limitations of the research arise from its focus on only one selected sector of SMEs within the FMCG industry and its restriction to the territory of the Czech Republic. The conclusions drawn from the research are therefore valid for this sector and for groups of countries with similar environmental awareness, as well as economic and legislative environments comparable to those in the Czech Republic. Additionally, the relatively small sample size of 60 SMEs limits the generalisability of the results and introduces potential sampling bias.

Further research, particularly of a qualitative nature, could be conducted to advance knowledge in this area. Interviews or case studies could provide a deeper insight into the specific challenges faced by SMEs. In terms of future research directions, there is undoubtedly room for investigating the relationships between different drivers and barriers within

companies in the field of circular packaging innovations, as well as exploring strategies for overcoming these barriers or groups of barriers. Conducting similar research in large enterprises would allow for comparison and identification of differences with the results of this research. In order to uncover contextual differences, comparable research studies could also be carried out in other regions, including those similar in economic performance and environmental engagement, as well as in fundamentally different territories.

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