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# Role of Reverse Logistics in the Circular Economy: Perspective of End Consumer Behaviour

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**Abstract**

**Purpose of the article:** The current problem in the area of waste generation (as a close part of circular economy and reverse logistics) has been connected to an area of packages of both food and non-food products. On the customer's side, there is the biggest package amount of produced waste due to the different kinds of packages, from which some are backed up. The purpose of the paper is to get an answer if there is a connection between package handling and the age of the customer.
**Methodology/methods:** The paper targets the verification of customer behavior in association to package handling. The data was collected between August 2023 and January 2024, *i.e.* for 20 weeks. The questionnaire was distributed to a total of 2,000 end customers who were selected according to their age (720 returned questionnaires, the return rate was 36.00%).
**Scientific aim:** The main objective of the paper is to define the potential relationship between the generating of end-consumers and package handling (both for food and non-food products). In order to obtain relevant answers, a questionnaire survey was conducted, from which only 2 core questions were taken.
**Findings:** The main result of the paper is specification dependence between the handling of the packaging for the products purchased. At the same time, there is a provided correspondence map, which shows connections of individual customer groups and handling activities. Per contra, there is no statistical confirmation of dependence between package handling for food products and the age of the consumer.
**Conclusions:** The concept of circular economy is currently being developed according to the description and requirements of the European Union with a focus on a comprehensive solution. The value of this paper is in the description of the linkage between customer/consumer behaviour within packages of the products to set up the plan for waste production prevention and its management.

**Keywords:** circular economy, reverse logistics, customers' behaviour, waste management, dependence

**JEL Classification:** L81, O14, Q56

## Introduction

The development of commercial activities and the availability of products that support a consumer society is a significant challenge for households, public administrations, and businesses. It is precisely the consumerist lifestyle that promotes the generation of waste, which has an impact on the environment not only in the local environment but also especially in the global environment. As a result of the increase in the availability of technology to the general public (lay and professional), as well as adequate information, demands for eco-friendly activities are being created, having impacts in the economic and social spheres. As a result, there is a wider use of reverse logistics in corporate activities (Panigrahi *et al.*, 2018; Hasan *et al.*, 2019).

It is at the "user" level that some reserves can be found in reverse logistics, creating not only an area of opportunity but also an area of potential risk. A great potential can be seen especially at the household level, where there is usually a very low level of reused waste or no longer useful products. Households are offered the opportunity to use products with a link to zero-waste production, but this is usually only a greenwashing marketing ploy (Neumeyer, Ashton, Dentchev, 2020; Kemenyova, 2023). Due to this approach, and also due to lower customer awareness, it is still possible to identify waste generation as a strong negative consequence of human development, with an emphasis on landfilling and incineration.

The application of used materials and products in the form of secondary raw materials offers all actors a completely new range of opportunities to promote their creativity and innovation (*e.g.* the use of alternative materials for building construction). At the same time, several "challenges" can be identified that need to be addressed. As of 2018, 24 types of waste and selected recyclates were banned from being imported into China, mainly plastics, paper, and textiles (CT24, 2017). In the case of starting to process own waste instead of exporting it, one can perceive a departure from the linear economy (characterized by consumption behaviour) while entering the recycling economy (with the application of reverse logistics) and the subsequent transition to the circular economy. From a comprehensive perspective on the economic environment of the country and the effects of various influences of suppliers of basic raw materials, it is more profitable and sustainable in the end to reduce the production of waste or to have adequate in-house capabilities to process this waste (Petr, 2018).

According to the directive of the European Commission on rules, *i.e.* Directive 2008/98/EC (2016a), there are defined steps for systems each European national must employ, how it is necessary to work with generated waste in association to the customers/households and their consumer's behaviour. The core description of the directive provides procedures for achieving a state where waste is reused as a production raw material. Also, the directive bestows waste hierarchy structure on how it is recommended to work with "waste production" with an emphasis on prevention. EU Member States have modified national descriptions on the way to waste prevention at all possible levels (Mahmud et al., 2023; Burgess *et al.*, 2021). These descriptions (defined in national plans and strategies) support the positive results of waste prevention, which have been presented to a wide audience through a better level of information and overall awareness increase. The application of national rules (in association to the EU directive) helps to define the most relevant practices and measure the quantity of waste that is "not produced" on the household side. The European Commission (EC, 2016b) has thus specified the most relevant criteria against which the results achieved will be assessed:

- Targeted – individual practices are strongly focused on waste prevention, which is unique from other established corporate waste management strategies and set environmental goals.
- Innovative-applied practices use specific, original, or otherwise unique techniques for prevention, thereby enhancing their competitiveness.
- Replicable – the practices used are easy to imitate and reproduce, making them relevant for application in all European regions and other parts of the world.
- Representative – the practices are drawn from a diverse background with strong influence from the country, region, and local government concerned; their focus is on different areas and waste streams.
- Effective – all practices have clearly defined objectives and measurable outcomes.

There are practices (landfilling and incineration) that place a disproportionate burden on the environment, resulting in a significant reduction in quality in all areas of human life. To be able to minimize these impacts, the principles of circularity can be used, which, among other things, reflects the requirements of the European Commission in the "Green Deal" document to reduce waste generation and further treatment (European Commission, 2020).

The strategic framework of the Ministry of Environment (2021), which was developed in the context of supply shortages during the COVID pandemic and the current security situation in Ukraine, lists among the main objectives the long-term use of all input raw materials and products as a consequence of improving waste management, which is expected to improve the competitiveness of Czech companies and also reduce fossil fuels used in production and distribution processes.

In general, the process of waste prevention is focused on a set of waste, including old products, packages, and scrap. Unfortunately, the biggest amount of almost every household is in the area of food. An assessment of the quantification of food waste generated at each level of the food supply chain is considered an important stage in tackling the challenges associated with food waste management. The absence of standard methodology leads to the involvement of several approaches that are significantly different from one another and is also a major barrier to accurate quantification of food waste, specifically at the household level (Haldar *et al.*, 2022; Xue *et al.*, 2017; van Herpen, van der Lans, 2019). Specific concepts for food waste prevention programmes are based on comprehensive prevention programmes for the reuse of generated waste. Separate prevention programmes for food waste are not defined in the Czech Republic. However, it is possible to consider the general conditions in the food industry where the volume of wasted food is reduced, and the maximum possible amount is used. There is a number of ways to reduce food waste, depending on who generates the food waste (food producers – retailers – households).

According to the previous description, the research questions have been stated as follows:

- How do customers/consumers use reverse logistics services on the sellers' side?
- How do customers/consumers behave in relation to the packaging used for products and foods?

Based on the research questions, two were defined two hypotheses, which reflect the connection between reverse logistics activities (as a core part of the circular economy), and end-customers' behaviours:

- H1: The package handling for the products purchased is not dependent on the age of the consumer.
- H2: The package handling for food products is not dependent on the age of the consumer.

## 1. Theoretical background

### 1.1 Description of reverse logistics

Reverse logistics can be seen as an approach that allows the return of used packaging, old products, and other waste items that could be used for further production activities. The problem is then the available processing capacity for further suitable use (recyclate production). Elements of reverse logistics can be considered as an integral part of the company logistics and also develop appropriate strategies for it, taking into account the requirements of the material and waste management in the company (Mallick *et al.*, 2023; Klapalova, 2013; Dowlatshahi, 2010, 2012). In its context, it is necessary to focus on several key areas such as planning, implementation, and control of efficiency and cost-effectiveness of material flows, storage phase, and finished product flows including the corresponding information flows from the point of consumption to the point of production. Owing to the interconnectedness of these areas and activities, a certain synergy effect is achieved in the achievement of backward flows, which, among other things, meet customer requirements, increase customer satisfaction, and strengthen customer loyalty. This state of affairs will subsequently lead to the generation of a new source of revenue and at the same time promote the competitive position of the company (Soto Zuluaga, Thiell, Colomé Perales, 2017; Starostka-Patyk, 2019).

The specific areas of focus for reverse logistics are based on the requirements of the industry and region in which the company operates. A precise overview of the reverse logistics activities can be given in the form of the main areas that can be considered in a company. According to Abdullah, Yaakub (2014), there are eight of these main areas:

1. Product returns (return of unsuitable products by the customer versus refund);
2. Disposition (how to dispose of the old product);
3. Green production (minimizing environmental impacts during production);
4. Remanufacturing (returning a product to the market after assessing the relevant quality level);
5. Recycling (obtaining the maximum amount of usable material that can be used for further production);
6. Product remanufacturing (the recovered product is analyzed and damaged or expired components are replaced by new ones);
7. Substitution recovery (sale to a retailer or low-income entity at a discount);
8. Landfill and incineration (controlled waste disposal).

The appropriate procedure for defining reverse logistics activities is perceived to be problematic due to the perceptions of individual authors. All available classifications clash in the clear division of the activities of the areas that are implemented in enterprises (possibility of duplications and overlaps).

### 1.2 Purpose of circular economy

The concept of circular economy is understood as a kind of analogy of industrial and consumer behaviour to the natural environment, where all objects have their meaning and use. The very essence of the concept of circular economy is then the focus on the maximum possible prevention of waste generation, the volume of which in an ideal situation is reduced to zero, *i.e.* the absence of waste (Jonášová *et al.*, 2022). Potential waste generation is then replaced by reuse. Material flows thus create a closed cycle of recovery and recycling, until the maximum level of degradation of the material in question is reached. A typical example of short material recovery in recycling is paper, which can go through up to seven recycling cycles. Glass, on the other hand, can be recycled almost indefinitely. The use of renewable energy sources is then considered for the processing of these recycling cycles, thus

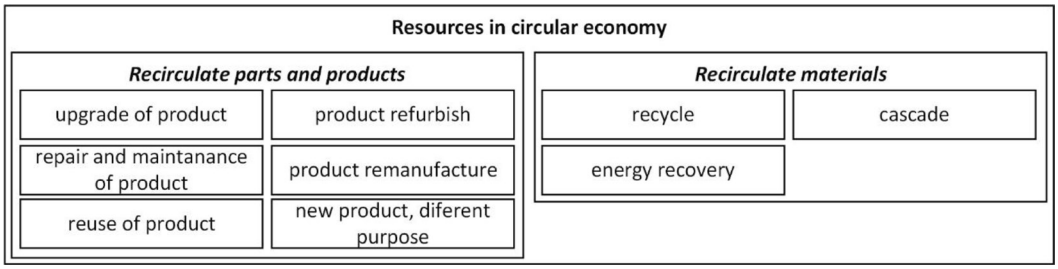


*Figure 1. Relevant processing areas in the circular economy. Source: own work according to Mallikc et al., 2023.*

also achieving the long-term sustainability of this approach with a minimal impact on local ecosystems. A state with minimal waste production can be achieved through the quality production of desirable products, their subsequent sharing with each other after the "end of life", and also the possibility of repair. This will lead to an overall reduction in the products produced while maintaining a comprehensive level of quality of life (Kirchherr, Reike, Hekkert, 2017; Geissdoerfer *et al.*, 2018). A key requirement is therefore to extend the life cycle of a product "regardless" of its original purpose through reuse, recycling, and refurbishment of the materials used in production, distribution, and also in consumption.

The individual inputs to the circular economy are then based on a reverse logistics approach, whereby separate groups of recirculation have to be worked with in their possible renewal, according to Mallick *et al.* (2023). In their concept, input resources are distinguished according to their possible classification in terms of the production cycle (material and product as well as work-in-progress) and their possible recirculation. This division can then be seen as adequate resources (see Figure 1).

### 1.3 Linkages between reverse logistics and circular economy

Reverse logistics describes the steps of how the generated waste and end-of-life products can be optimally managed. The concept itself cannot be separated from forward logistics as it is an integral part of it. However, individual logistics activities may have different weight in terms of perception on the part of the company. However, within the circular economy, these activities help to close the whole system into a logically coherent whole, and there is a complementarity between them – getting used material back into the production cycle (Ding *et al.*, 2023).

The current behaviour of consumers and manufacturing companies is linked to an approach where products are produced, used, and then discarded as waste (linear economy).

This trend does not take environmental requirements into account, as it is based on the assumption of sufficient raw materials. As soon as a company accepts the relevance of environmental requirements (*e.g.* through the price of emission allowances), pressure starts to build up on the level of efficiency and effectiveness of the processes and technologies used, as well as on the maximum possible use of all relevant resources while maintaining the quality level, *i.e.* including the use of already used materials and products. In this case, companies start to implement reverse logistics approaches, which usually result in the recycling and repair of products (recycling economy). However, a certain amount of waste is still generated and is not processed in any way. It is only when a company enters the circular economy that the maximization of efforts to minimize

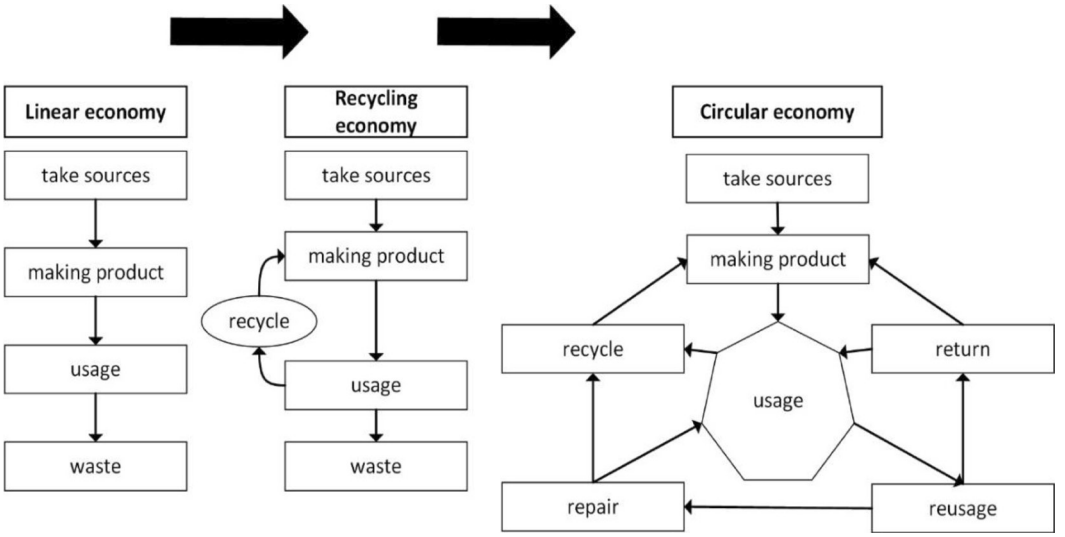


*Figure 2. Evolution of the circular economy concept. Source: own work according to Lorenz, 2019.*

waste production can be perceived (Neves, Marques, 2022). A prerequisite for these transitions is the subsequent "staying power" in the new environment (see Figure 2).

### 1.4 Perception of consumers

In the case of the perception of these steps by consumers (on the household side), changes are occurring in sorting potentially wasteful items and products, with the younger generation slowly adopting an ecological perception or a certain self-awareness based on the financial valuation of municipal waste collection fees. Thus, households generally separate waste items into six main groups, namely municipal waste, paper, plastic, glass, metal, and bio-waste (Crome *et al.*, 2023). Strong incentive factors can then be perceived within the Czech environment, where locally local governments provide discounts per payer for waste collection. This behavioural model can be seen as beneficial in the case of "self-awareness" of individuals in the household and taking into account the amount of fees for the household in question. The amount of these fees is currently defined by a decree at the municipal level and is linked to the possibility of collecting the containers regardless of the volume of waste collected, *i.e.* the fee is paid, and the household does not have to hand over anything for collection. The anticipated trend in waste collection can be seen in the use of new technologies in the form of RFID chips, QR or EAN codes to register the collection container and at the same time weigh it on the collection vehicle (Karásek, 2020). In this case, households would not have to pay "flat" fees but would pay for the actual waste collected.

This approach cannot be applied across the board, as different companies operate in each region of the Czech Republic and the importance of waste and circular economy is perceived differently. In any case, most households can currently be positioned between the linear and recycling economies. Households can be considered to meet the criteria of the circular economy in the case of durable products (*e.g.* automobiles or residential buildings) or their location falls within large settlements operating with the smart city concept (Lochovská, 2019).

The food industry could be considered as a crucial field for every national economy. According to Visschers *et al.* (2016), the typical consumer in Europe throws out almost

115 kg per year, especially in Western countries. Households produce more food waste in comparison to restaurants (Kummu *et al.*, 2012). In the case of large families, food-waste production is more extensive than in small families. This situation was proved by many researchers, who focused on food waste such as Withanage *et al.* (2021), Thyberg, Tonjes (2016), Astill *et al.* (2019), Secondi *et al.* (2015). These researchers defined the potential connection of customer food behaviour with the age of a person. The older preparing person generates less waste; on the contrary, older persons, who purchase food, usually buy large-size packages that lead to wastage. As a kind of prevention of food waste, it is important to arrange the food supply chain in the correct manner to prevent early purchased food. At the same time, there could be a key impact of marketing communication tools employed by sellers, which affects the thinking of households (Hebrok, Boks, 2017; Mondéjar-Jimenéz, Ferrari, Secondi, 2016). As the optimization process of waste generation, it is possible to apply the concept of reverse logistics in the specification of the food industry. The base for the optimization consists in the phase specification of consumption. Moraes *et al.* (2014) defined two phases of consumption. It is important to the after-sale situation as a close connection to planning, control, and disposition of purchased products without their usage and sending back to the supply chain.

## 2. Methodology of the paper

The main objective of the paper is to define the potential relationship between the generating of the end-consumers and package handling, and package handling for food products (definitions of two hypotheses). In order to obtain relevant answers, a questionnaire survey was conducted. It targeted the verification of customer behaviour in association to point-of-sale activities and activities of reverse logistics. The data collection was carried out between August 2023 and January 2024, *i.e.* for 20 weeks. The most effective period for the questionnaire survey was the time from the eighth to the seventeenth week.

The questionnaire was distributed to a total of 2,000 end customers who were selected according to their age. The number of returned questionnaires was then 720, which represents a return rate of 36.00%. Of this number of respondents in the end-customer group, 152 individuals were over the age of 60 years, 110 individuals in the age group of 50–59 years, 168 respondents in the age group of 40–49 years, 154 respondents in the age group of 30–39 years, and 136 respondents in the age group of 20–29 years. The return rate of questionnaires from respondents was checked to see if the set of returned questionnaires could be considered representative of the established sample and baseline (Table 1). For the data processing,

*Table 1. Comparison of the structure of the number of respondents and the theoretical frequency of the survey.*

| | **Addressed sample** | | **Returned sample** | |
|---|---|---|---|---|
| | ***absolute*** | ***relative*** | ***absolute*** | ***relative*** |
| **20–29** | 283 | 14.14 % | 136 | 18.90 % |
| **30–39** | 376 | 18.80 % | 154 | 21.40 % |
| **40–49** | 388 | 19.38 % | 168 | 23.30 % |
| **50–59** | 307 | 15.35 % | 110 | 15.30 % |
| **60+** | 646 | 32.32 % | 152 | 21.10 % |
| **Total** | **2000** | **100.00 %** | **720** | **100.00 %** |

*Source: own work.*

there was employed statistical software IBM SPSS Statistics 29. On the defined hypothesis, the Pearson $\chi^2$ test for independence was applied, providing a potential relationship between individual variables.

## 3. Results

To confirm the defined hypotheses, three questions in the questionnaire were used to construct a pivot table with frequencies, namely (see Table 2):

- Age of respondents.
- Package handling.
- Package handling for food products.

For the application of the dependence test, there is necessary to provide pivot tables, which are used as basement for the calcualtions. The values of individual frequencies for package handling and age of respondents are displayed in Table 2.

To test the above assumption, a sample was used. Pearson's $\chi 2$ test of independence from tests for two nominal variables was selected. As there is the testing of independence of two nominal variables, the formulation of statistical hypotheses was used, which are formulated in two lines:

- $H1_0$: The package handling for the products purchased is not dependent on the age of the consumer.
- $H1_1$: The package handling for purchased products is dependent on the age of the consumer.
- $H2_0$: The package handling for food products is not dependent on the age of the consumer.
- $H2_1$: The package handling for food products is dependent on the age of the consumer.

Assuming a 5% significance level, the alternative hypothesis $H1_1$ is rejected in favour of the null hypothesis $H1_0$. **Within the obtained results by application of the Pearson $\chi^2$ test and its minimum value from which the null hypothesis is rejected in favour of the alternative hypothesis.** If the relationship holds: (1) $\alpha' \leq \alpha$; $H_0$ is rejected; (2) $\alpha' > \alpha$; $H_0$ is accepted, then the null hypothesis can be rejected and the alternative hypothesis accepted:

- H1: There is a defined dependence between the handling of the packaging for

*Table 2. Pivot table on the relationship between the age of end consumers and their behavior with package handling/package handling for food products.*

| | | 20–29 | 30–39 | 40–49 | 50–59 | 60+ | Total |
|---|---|---|---|---|---|---|---|
| **Package handling** | *Recycling* | 45 | 67 | 77 | 55 | 55 | **299** |
| | *Municipal waste* | 11 | 6 | 4 | 3 | 1 | **25** |
| | *Collection point – own bins* | 29 | 28 | 22 | 19 | 35 | **133** |
| | *Collection point – public bins* | 50 | 51 | 61 | 31 | 61 | **254** |
| | *Other* | 1 | 2 | 4 | 2 | 0 | **9** |
| **Total** | | **136** | **154** | **168** | **110** | **152** | **720** |
| **Package handling for food products** | *Recycling* | 5 | 11 | 14 | 10 | 18 | **58** |
| | *Self-help disposal* | 88 | 104 | 100 | 58 | 97 | **447** |
| | *Handed over to the seller* | 14 | 12 | 11 | 9 | 11 | **57** |
| | *Municipal waste* | 26 | 26 | 39 | 32 | 25 | **148** |
| | *Other* | 3 | 1 | 4 | 1 | 1 | 10 |
| **Total** | | **136** | **154** | **168** | **110** | **152** | **720** |

*Source: own work.*

*Table 3. Descriptive statistics of chosen ways in connection to waste disposal.*

| | Mean | Median | Std. deviation |
|---|---|---|---|
| **Complaints for a purchased product** | 7.21 | 8 | 2.932 |
| **Replacement of a purchased product** | 7.47 | 8 | 2.419 |
| **Take-back of packaging – collection point (bins)** | 4.84 | 5 | 2.879 |
| **Take-back of packaging – collection yard** | 2.95 | 2 | 2.629 |
| **Municipal waste** | 7.69 | 8 | 2.507 |

*Source: own work.*

the purchased products and the age of the consumer (significance is 0.014, contingency coefficient is 0.203). The alternative hypothesis $H1_0$ is rejected and $H1_1$ is accepted.

- H2: There does not exist dependence between package handling for food products is not dependent on the age of the consumer (significance is 0.198, contingency coefficient is 0.166). The alternative hypothesis $H2_0$ is accepted.

Based on the observed values of these tests, it can be concluded that there is a correlation between the age of the consumer and the consumer's handling of food packaging. Statistical significance is found to be 0.014, thus accepting the alternative hypothesis $H1_1$. In the case of the handling of food after the expiry date, no statistical dependence was found (significance is 0.198), and the null hypothesis $H2_0$ is accepted. To determine the intensity of the dependence found, it is possible to express this intensity through Pearson's contingency coefficient, whose value can be in the interval <0;1>. If the observed value of the contingency coefficient is within 0.30, this strength can be assessed as low to moderate. In the case of a value between 0.30 and 0.6, the given strength is moderately strong. Above a value of 0.7, the strength of the dependency is very strong; above a value of 0.9, the strength can be described as almost perfect. Considering the coefficient for the observed dependence, the intensity can be considered low (the value is 0.205).

The biggest priority for end-customers when buying a new product is whether they can deal with the possibility of exchanging or returning the purchased product. Although this obligation (to exchange and return the purchased product) stems from legislative norms, the actual availability, and friendliness of retailers are usually opposed (see Table 3). The weight of these options is 7.21 for the return of the purchased product and 7.47 for the replacement of the purchased product. In the case of packaging collection, the available collection points – bins – are used according to the legislation. In principle, according to the Waste Act, every retailer is obliged to collect packaging from the products it sells, but in the case of food packaging, this collection is not organized in any way – the exception is the take-back of backed-up packaging. The weight of this activity is on the customer side at 4.84. In contrast to the collection of packaging via bins, it is also possible to use collection yards. However, their utilization rate is very low (weight of 2.95). In many ways, packaging is being dumped in the municipal waste itself. The recovery weight of municipal waste is 7.69.

## 4. Discussion

The numerical expression of the relationship between two variables in the form of the observed dependence and its intensity (in the form of the contingency coefficient) is adequate. However, for a more appropriate repre-

*Table 4. Results of correspondence analysis of customer generation and packaging returns.*

| Dimension | Singular value | Inertia | $\chi^2$ | Significance | Contributions of points to inertia | | Singular value configuration | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Calculated for | Cumulative | Std. deviation | Correlation |
| **1** | 0.153 | 0.024 | | | 0.547 | 0.547 | 0.039 | 0.232 |
| **2** | 0.126 | 0.016 | | | 0.370 | 0.918 | 0.026 | |
| **3** | 0.059 | 0.004 | | | 0.082 | 1.000 | | |
| **4** | 0.004 | 0.000 | | | 0.000 | 1.000 | | |
| **Total** | | **0.044** | **30.965** | **0.014** | **1.000** | **1.000** | | |

*Source: own work.*

sentation of these relationships, contingency analysis can be used for a suitable graphical representation. To find adequate coordinates, row and column scores are compared based on the values of the variables used. Symmetric normalization was used in exploring the relationships. The values obtained, used to create the corresponding graph, are presented in Table 4 (generation and care of shelf-life food products).

From these values, the coordinates of each variant are determined, which are valid for the respective variable. The coordinates thus determined were then plotted on the corresponding graph. In the case of the relationship between customer generation and aftercare of packages (see Figure 3), three groups of relationships were identified, namely:

In the case of customers aged 20–29 years, their behaviour cannot be clearly expressed,

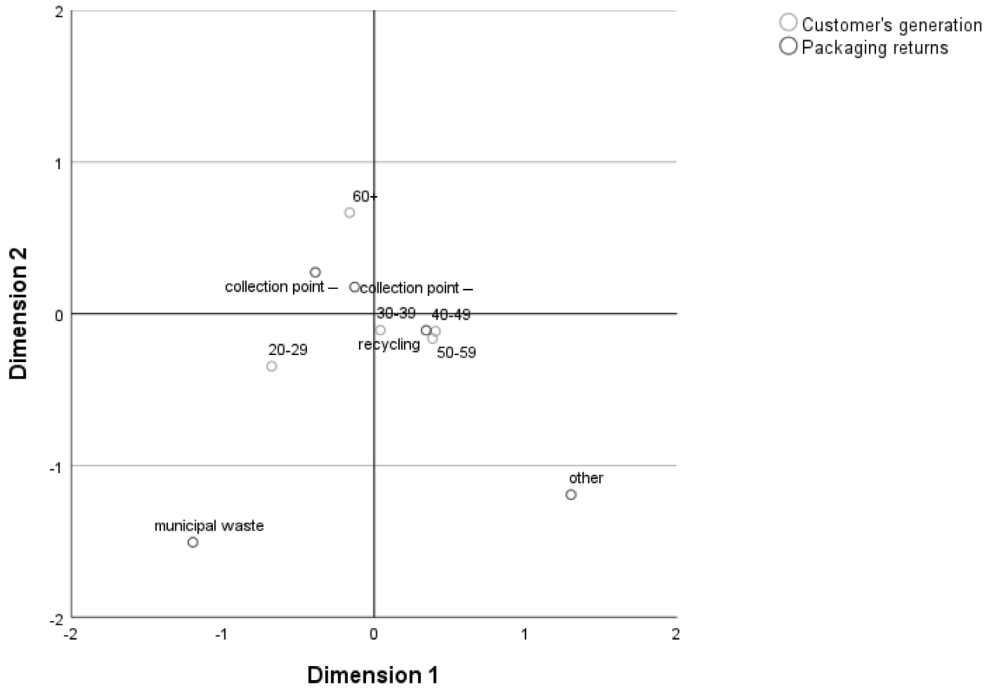


*Figure 3. The relationship between customer generation and package handling. Source: own work.*

which is usually due to work experience and they are still "finding their feet" in terms of purchasing behaviour and food handling;

Customers aged 30–39 years are generally more likely to pass on food to individuals in need as opposed to putting food away for recycling;

Ahoppers aged 40–49 and 50–59 years are in the prime of their active lives and their approach is often very pragmatic, given their awareness of the economic importance of expired food, these shoppers are considered to be one of the typical groups of consumers who have a certain environmental mindset and do not dispose of expired food in the regular municipal waste stream;

The 60+ generation of shoppers generally buy food on an as-needed basis without building up a significant inventory; however, through long-term education, they have acquired some recycling habits and are looking for possible disposal sites.

## 5. Conclusion

There were defined two hypotheses, which reflect the association between reverse logistics activities (as a core part of the circular economy), and end-customers behaviours. According to the obtained results, it is possible to accept hypothesis H1, that there is a connection between the handling of the packaging for the products purchased and the age of the consumer. The value of gained significance is 0.014 and its power by contingency coefficient is 0.203. The hypothesis H2 about dependence is not confirmed, because of the high value of significance (0.198). Also, there was a defined correspondence map of connections between customer's generation and returns of product packages for next processing.

The Czech Republic has its own strategic framework how to solve the waste problem. The strategic framework for a circular economy is currently being developed (under the auspices of the Ministry of the Environment of the Czech Republic) based on the requirements of the European Union with a focus on a comprehensive solution to the issue of the circular economy. The rationale for a comprehensive circular economy solution is the requirement to maintain the value of products and raw materials over a longer time horizon and to reintegrate them into the production process. So far, the waste issue has been viewed in terms of the volume of waste generated and the possible ways of its disposal. According to the strategic framework, these are only one-off solutions without systemic change. Through the acceptance and implementation of the essence of circular economy into the Czech business environment, the competitiveness of the whole economy is expected to be strengthened against the impacts of all environmental influences on the current and future environment (*e.g.* the consequences of the Covid-19 pandemic, pressure to reduce the carbon footprint) and the efficient use of production raw materials and resources as a path to sustainable development (Ministry of the Environment of the Czech Republic, 2021).

Achieving performance and accountability in the circular economy can then be supported through the ISO standards system. In basic terms, the ISO 14000 series of environmental standards can be used. The principles of this series can be considered as the core of the new ISO 59000 series, which will be linked to the circular economy and will then allow relevant measurement and evaluation of individual processes systemically (Global Factor, 2023).

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