

# Capacity Expansion for Sustainable Development in Family Businesses – Recyclable Packaging Materials in Food Industry

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Modern society requires that the food industry reconsider packaging and evolve towards sustainable alternatives. The paper's aim is to present the special endogenous factors characteristic of SME (Small and medium-sized enterprises) family business decision-making in relation to capacity expansion. The efforts of ten SME family businesses in the Hungarian food industry related to packaging materials are presented through a case study, in-depth interviews, and cost analysis. The results show that all participants in the food chain realized that making packaging materials recyclable is essential for sustainable development. To this end, packaging material manufacturers have started to develop and now offer many alternatives of environmentally friendly and recyclable packaging materials for food industry companies. It is an important aspect for food industry companies that these environmentally friendly packaging materials have the same freshness-keeping capabilities as the previous ones. In many cases, the new environmentally friendly packaging materials require the purchase of new machines, and the new machines require the training of the workers. It can be concluded that there is a close connection between recyclable packaging and capacity expansion: the use of environmentally friendly recyclable packaging materials becomes a process of capacity expansion in the case of SME family businesses in the Hungarian food industry as well.

## 1. Introduction

In Hungary, selective waste collection began in the 1990s. According to KSH data (Central Statistics Office Hungary, 2021), recycling one ton of plastic packaging means saving 500 kg of CO<sub>2</sub>. Until 2018, the selectively collected waste was collected, compressed, and then sold to China, not only in Hungary but also by most of the waste management companies in the EU. It was then that China decided not to buy up the world's garbage anymore – the reasons for this are not discussed in this article. On the 16th of January 2018, the EU reacted with the EU Plastic strategy to the import ban of China. The EU Plastic Strategy is a strategy paper that is not a legal requirement but called on the member states, based on which numerous initiatives were launched (Grinberga-Zalite and Zvirbule, 2022).

This paper examines decision-making related to the capacity expansion of environmentally friendly alternatives to primary packaging films in the food industry – which come into direct contact with food – in selected SME family businesses. The research was conducted among domestic SME family businesses. The novelty of this article comes from the fact that in the case of a specific meat industry SME family business, alternatives to the foils they currently use are presented by preparing a cost analysis, calculated with the EPR (extended producer responsibility) fee payment obligation that comes into force in our country from 01.07.2023 (National Legal Library Hungary, 2023). The purpose of the EU Plastic Strategy directive (Peca, 2018) is to establish circular waste management, involving manufacturers in the entire process when purchasing packaging materials.

Dangelico et al. (2019) found that family and non-family businesses differ in their attitude toward green innovation, employer branding concept, and the concept of labor migration SME family businesses are influenced by several unique factors (Bite and Konczos-Szombathelyi, 2020). Researchers investigated

Industry 4.0 processes in SME family businesses regarding packaging materials, which revealed that the ethical attitude of SME family businesses determines CO<sub>2</sub> emissions and waste recycling, and significant social effects can be observed (Kazancoglu et al., 2021). The existing value networks can slow down the transition during the transition to recyclable packaging materials, so seemingly simple transitions - between traditional and recyclable packaging materials - are also complicated by additional actors in the value chain (Keränen et al., 2021). According to Giacomarra et al. (2019), there is a need to increase knowledge transfer between the food packaging industry and food manufacturers so that food producers using packaging are aware of the new opportunities.

One of the most important aspects for manufacturers is how consumers perceive the change, which was investigated in their research by Utrilla et al. (2020), the result of which is that consumers are open to recyclable plastic packaging, but this openness is highly dependent on their age. Customers are open to biopolymer packaging, but their production is expensive, and their use is limited (Teixeira-Costa and Andrade, 2021). While part of the food industry is trying to get rid of plastics, in other areas, they are trying to switch from glass to plastic as a packaging material. Csiba-Herczeg et al. (2023) show in their case study that the CO<sub>2</sub> emissions of wineries can be reduced by using PET bottles. From the manufacturer's point of view, the numbers are convincing, but customer behavior has not yet been researched. In addition to the steps taken to reduce the generated waste, the food industry also tries to generate valuable products from waste and by-products (Catalano et al., 2021). After processing the literature, the research gap is what factors influence the decision of SME family businesses in case of capacity expansion for sustainable development. The target of the article is to present the efforts of SME family businesses in the food industry for sustainable development. Specifically, this paper presents factors affecting their decision concerning capacity expansion and recyclable packaging. For this, the answers of a focus group were used to identify the endogenous factors relevant for the owners by recording their response to significant factors, such as the cost of the packaging and the perceived value of society. Determining these factors will help to understand the dynamics of SME family businesses and facilitate their transition towards sustainable development.

## 2. Methods

The research procedure was constructed by the authors according to the flowchart below.

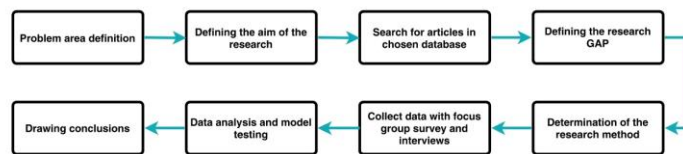


Figure 1: Flowchart of the research procedure

After identifying the problem and defining the research goal, the authors collected the relevant literature by resorting to Google Scholar. Subsequently, the research gap, the method, and the data collection methods were determined. As part of the method, in-depth interviews were conducted with representatives of two Hungarian packaging material manufacturers. A focus group survey was conducted with 10 SME family businesses in the Hungarian food industry. The managers of the interviewed SME family businesses were selected from the authors' network of contacts, and then using the snowball effect, they asked for further recommendations.

After providing some demographic data in the focus group survey, the EU Plastic Strategy and the fee items of the EPR system were presented to the participants. After that, they answered questions about capacity expansion due to packaging material. The questions were compiled based on Dangelico et al. (2019) interview questions.

In the case study, a cost analysis was performed on the basis of data received from a small meat industry SME family business and price calculations received from the Foil producer company, as well as on the basis of the relevant fee items of the EPR regulation. The three types of packaging materials, conventional, thinned, and monofoil, were selected by Shaikh et al. (2021). This study does not deal with biopackaging, as their sealing and quality preservation properties cannot be compared with traditional foils and are much more expensive. (Kumari et al., 2022).

The three types of calculation are as follows (based on the company's foil consumption in 2022):

**Calculation (1)** Calculation of the net packaging material cost of the current situation with EPR fee

**Calculation (2)** Calculation of the net packaging material cost of the thinned foil, with the same usability in the food industry with an EPR fee

**Calculation (3)** Calculation of the net packaging material cost of the recyclable mono polypropylene foil, with the same usability in the food industry with an EPR fee

Calculation (1) Calculation of the net packaging material cost of the current situation with EPR fee

$$C_{pa/pe} = (P_{pa/pe} \times Q_{2022}) + (W_{pa/pe} \times EPR_{pa/pe} \times Q_{2022}) + P_{nm} \quad (1)$$

Where:

pa/pe= material of foil (Polyethylene/polyamide)

$C_{pa/pe}$  = cost of pa/pe foil €/y

$P_{pa/pe}$  = unit price of pa/pe €/m

$W_{pa/pe}$  = specific weight of pa/pe kg/m

$EPR_{pa/pe}$  = fee payable €/kg

$Q_{2022}$  = quantity of foil used in 2022 m/y

$P_{nm}$  = price of a new machine (if it is necessary) Annualized cost = Total cost / Payout period €/y

Calculation (2) Calculation of the net packaging material cost of the recyclable mono polypropylene foil, with the same usability in the food industry with an EPR fee

$$C_{th} = (P_{th} \times Q_{2022}) + (W_{th} \times EPR_{th} \times Q_{2022}) + P_{nm} \quad (2)$$

Where:

th = thin foil, which is the same material as pa/pe but thinner

$C_{th}$  = cost per year €/y

$P_{th}$  = unit price of 1m of thin foil €/m

$W_{th}$  = specific weight kg of 1m of thin foil kg/m

$EPR_{th}$  = fee payable/kg of thin foil €/kg

$W_{2022}$  = weight of foil used in 2022 m/y

$P_{nm}$  = price of a new machine (if it is necessary) Annualized cost = Total cost / Payout period €/y

Calculation (3) Calculation of the net packaging material cost of the recyclable mono polypropylene foil, with the same usability in the food industry with an EPR fee

$$C_{pp} = (P_{pp} \times Q_{2022}) + (W_{pp} \times EPR_{pp} \times Q_{2022}) + P_{nm} \quad (3)$$

Where:

pp = recyclable mono polypropylene foil

$C_{pp}$  = cost per year €/y

$P_{pp}$  = unit price of 1m of pp foil €/m

$W_{pp}$  = specific weight kg of 1m of pp kg/m

$EPR_{pp}$  = fee payable/kg of pp foil €/kg

$W_{2022}$  = weight of foil used in 2022 m/y

$P_{nm}$  = price of a new machine (if it is necessary) Annualized cost = Total cost / Payout period €/y

The authors divided the purchase price of the new machine over ten years and used the resulting amount in the cost calculation. The obtained values were arranged in a table and evaluated with the managers of the SME family business, and then they were given the task of choosing between the options. Other costs, such as machine maintenance, energy, and depreciation, were not taken into account during the analysis, as the purpose of the calculation is not a full-scale financial analysis but only the research of factors and processes related to capacity expansion decisions.

In a previous contribution, the authors conducted a complete systematic literature review regarding the internal factors influencing the capacity expansion of SME family businesses (Nemes and Konczos-Szombathelyi, 2023). As a result, a new model was created (Figure 2), which was tested during this research. The model presents the special endogenous factors characteristic of SME family businesses, which influence the decision-making related to capacity expansion. The decision can be "yes" or "no" or the postponement of capacity expansion due to the influence of these factors.

### 3. Result and discussion

In an in-depth expert interview, representatives of two packaging material companies answered the following questions:

1. What packaging materials do you deal with?
2. Which market participants typically buy packaging material from you?
3. What options do food manufacturers have in terms of environmentally friendly packaging materials?
4. What are your experiences regarding the choice of packaging material for SME family businesses? On what basis do they decide?
5. How could the use rate of environmentally friendly packaging materials be improved?

Based on the experiences of in-depth interviews with representatives of the international packaging material manufacturers, the data concerning the three types of foil of interest served as the basis for the calculations. They provided a comprehensive picture of the international trends in the use of recyclable film and domestic use, according to which none of their partners currently use recyclable film. Hungary's largest meat producer in Szeged is planning to introduce it. The reason for this is that multinational food chains are expected to accept products delivered exclusively in recyclable plastic from the year 2025.

Managers of ten food industry SME family businesses took part in the focus group survey, including meat and dairy producers, bakery operators, and those dealing with frozen goods. The representatives of the companies are all family managers. The first question asked them to introduce their business briefly, and then they answered the following questions:

2. How do you reduce emissions from production?
3. What steps are you taking for sustainable development?
4. Do you currently use recyclable packaging materials? If so, what? If not, why not?
5. When do you plan to introduce the use of monofoils?
6. For what reasons would you introduce it?
7. What kind of capacity expansion would you need for this?
- 8./a How do you make decisions about capacity expansion?
- 8./b Will the different managers of the company be involved?
- 8./c Are family members involved?
- 8./d. Possibly several generations?

The results of the focus group survey reflect that the environmental impact of their operations is particularly important for SME family businesses, and their goal, in addition to profit-oriented operations, is to provide a livable environment for their descendants. All of the ten interviewed enterprises, Hungarian SME family businesses, and food manufacturing companies are differentiated in terms of their scope of activity, including meat, dairy, and bakery businesses, and deal with a mixture of chilled and frozen goods. According to them, they are taking steps to reduce their carbon footprint without claiming to be complete: selective waste collection, purchasing electric cars, and installing a solar panel system. Among their indicators related to capacity expansion are customer demands, replacement of aging machinery, and research and development projects proposed by new generations. They are open to the use of recyclable packaging materials but remarked that the acquisition of new machines depends on financing opportunities.

The questions of the focus group interview covered the SME family businesses' recyclable packaging materials, which are endogenous factors influencing the necessary capacity expansion decision-making. Based on the answers to the question, three areas stand out that influence decision-making: the preservation of SEW (socio-emotional wealth), heterogeneous TMT (top management team), and cooperation between generations. The preservation of socio-emotional wealth is important for SME family businesses. It turns out that environmentally friendly technologies, such as recyclable packaging materials, are also considered in order to have a positive effect on the recognition of the family.

From the questions about who participates in decision-making, it became clear that the interviewed SME family businesses involve non-family managers from different areas and, in justified cases, external experts in decisions with capacity expansion, which means that the heterogeneous structure of the top management team has an impact on decision-making. By heterogeneous top management team, the authors mean that the composition of company managers includes a mixture of family members, non-family members, and external experts.

Capacity expansion decisions related to recyclable packaging materials are influenced by the cooperation of generations. This can be seen from the fact that predecessors and successors cooperate in new technologies and sustainable development in all of the interviewed SME family businesses.

Based on the results of the in-depth interviews and focus group survey, the model developed by Nemes and Konczos-Szombathelyi (2023), which was tested in this work, can be applied to factors influencing the

decision-making regarding capacity expansion in small and medium-sized SME family businesses as shown in Figure 2.

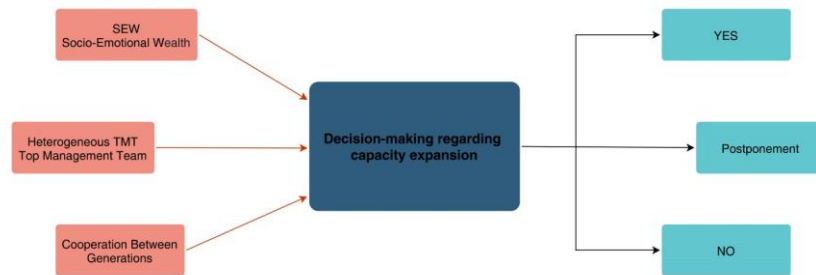


Figure 2: Model of decision-making regarding capacity expansion in small and medium-sized family businesses

Finally, the specific calculation based on the formulas was completed for one of the ten family businesses in the focus group. The company produces meat products in a village in western Hungary, which it sells nationwide in convenience store chains and multinational food chains. In the interview four representatives of the company were interviewed. The two founders and the two successors participated in the data analysis. The packaging material cost calculation was prepared as follows: the first is the currently used traditional pa/pe, i.e., polyethylene/polyamide foil (1), the second option is a foil with a thinner layer thickness made by adding chemical substances (2) and the third is pp, i.e., monofoil, which can be recycled (3) (Table1).

Table 1: Foil cost calculation

Name and number of the cost	Cost in EUR/y
$C_{pa/pe}$ (1)	16,840
$C_{th}$ (2)	21,414
$C_{pp}$ (3)	36,191

In the calculation, in the case of pp film, the purchase of a new packaging machine is necessary. In other cases, the manufacturer's current machine is suitable. Based on the data received, the two managers of the family business deliberated at length. The good reputation of the family is important to them. They try to be innovative and are among the first to introduce new things. They are aware that if they want to import their products, the use of recyclable packaging can be a competitive advantage. Calculation (1) is the most favorable from the point of view of costs, but it is not sustainable in the long term since multinational food chains will only purchase meat products packaged in monofoil from the year 2025, so the owners are open to alternative solutions. Calculation (2) is the thinned foil. Due to their lighter weight, these represent a lower environmental burden, and the EPR fee per kilo is also lower overall. However, the price per meter of the thinned foil is so much higher than that of the traditional one that the cost per annual use would be higher. This version was discarded as it is more expensive and does not meet the expectations of multinational chains. Calculation (3) with the recyclable monofoil also means the purchase of a new machine. Recyclable sheeting has the highest kg/m weight of the three and the highest price, making it the most expensive option. The participants in the interview agreed that, despite everything, this would be the solution in the long run, as the recycling of plastic waste and the maintenance of contracts with multinational food chains are important to them. The interviewees decided to postpone this capacity expansion. They will make the final decision later, with the help of external experts and the top management team. The case study made after learning about the cost calculation supports the factors influencing the decision of SME family businesses (Figure 2).

#### 4. Conclusions

Through a case study, the research presented the decision-making of SME family businesses regarding capacity expansion in relation to recyclable packaging materials. The screening of the literature did not find similar research, so it was identified as research gap. The transition to recyclable packaging materials can result in higher plastic recycling rates and lower CO<sub>2</sub> emission values, but it is up to consumers whether they really collect waste selectively since plastic thrown in the municipal waste bin is not recycled. In addition to all

this, the openness of SME food industry family businesses and their decision-making methods, which are not exclusively based on financing, enable such capacity expansion efforts. The three factors identified above, SEW, heterogeneous TMT, and the cooperation of generations, are not enough to make decisions supporting sustainable development. The significance of the results is that the model previously set up by the author was verified by the focus group interview and the case study. The limitation of the article is that, due to its scope, it is not possible to compare the results with benchmarks. This could be a further research goal.

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