

# What Internal Factors Influence the Capacity Expansion Decisions of Family Businesses Regarding the Recycling of Animal Waste? - Model Testing Research from the Meat Industry

Kinga Nemes\*, Márta Konczosné Szombathelyi, Péter Kovács

Széchenyi István University Győr, Hungary Egyetem tér 1

nemes.kinga@sze.hu

A significant amount of animal waste is generated in the meat industry, and this is no different in the case of family businesses in the meat industry, be it slaughterhouses, meat processors or poultry farms. Animal waste is not always waste. Some parts of it can be recycled. In the course of their research, the authors tested their previously developed model with an online survey of 45 family businesses in the meat industry and with in-depth interviews analysed with the help of artificial intelligence. The aim of the research is to assess which internal factors influence the decision of family businesses in the meat industry to expand the capacity required for the recycling of animal waste. The research verified the model and provided useful, practical examples for the utilisation of animal waste.

## 1. Introduction

The concept of family businesses is diverse. There is no single widely accepted academic concept. In the context of this research, SMEs with the following characteristics were defined as family businesses:

- **Ownership:** A significant part of the business's ownership (usually at least 50 %) is owned by one or more family members and is in your hands. This means that the family members involved in the business directly or indirectly influence the company's decisions and strategy (Schulze et al., 2024).
- **Management:** Family members are also involved in the management or administration of the company (Chan and Enticott, 2023). This may include company managers, directors, or other key positions.
- **Continuity between generations:** In the case of family businesses, an important factor is that the founding generation usually intends to pass the business on to the next generation (children, grandchildren), thus ensuring the continued presence of the family in the company.
- **Long-term commitment:** Family businesses typically think from a long-term perspective and measure the success of the business and the well-being of the family, not only in terms of short-term profit (Woodfield et al., 2023).

Overall, family businesses are economic units in which family members own a significant share of ownership, actively participate in the management of the company, and strive for long-term continuity through intergenerational transmission (De Jong et al., 2024).

**Decision-Making Processes in Family-Owned Businesses:** The literature highlights the complex nature of decision-making in family-owned enterprises, characterised by a blend of familial dynamics, long-term orientation, and socio-emotional wealth preservation (Haque et al., 2024). Family businesses often prioritise non-economic goals alongside financial objectives, influencing strategic choices and organisational behaviour (Tien et al., 2024).

**Sustainable Practices in the Food Industry:** With increasing environmental concerns and regulatory pressures, sustainability has emerged as a critical consideration for businesses in the food industry (Bergonzini, 2024). Effective waste management, including the handling of animal waste, is essential for minimising environmental impact and ensuring compliance with regulations (Haile and Headey, 2023).

Capacity expansion is an economic, business or industrial process in which a company or organisation increases its production or service capacity in order to meet increasing demand, improve productivity or gain a competitive advantage (Headey et al., 2024). Capacity expansion can be implemented in different ways:

- **Physical Expansion:** Acquisition and installation of new production lines, machinery, equipment or facilities. For example, a manufacturing plant sets up a new production line or a service company opens a new site.
- **Technological development:** Introduction of modern, more efficient technologies and automated systems that enable faster and more cost-effective production (Aragie et al., 2023).
- **Increase human resources:** Hiring new employees, training and developing existing employees to improve productivity and capacity (Bite and Konczos-Szombathelyi, 2020).
- **Logistics and supply chain development:** Expanding sources of raw materials, increasing storage capacity, and improving the efficiency of distribution networks (Chrisman et al., 2004).
- **Market expansion:** Conquering new markets and introducing new products or services that increase the company's sales capacity and market (Robling et al., 2023).

The purpose of capacity expansion is to enable the company to produce faster and in larger volumes, better serve customers, and respond to market changes (Asare et al., 2024). In the long term, this can contribute to the company's growth, improving its competitiveness and increasing its market share (Blake et al., 2023).

**Challenges and Opportunities in Capacity Expansion:** Capacity expansion decisions in family-owned food businesses are influenced by various internal and external factors, including market demand, financial resources, and organisational capabilities (Rachmawati et al., 2023). Balancing growth objectives with ability goals presents both challenges and opportunities for family enterprises (Dinh et al. 2024).

**Integration of Environmental Considerations:** While economic factors traditionally dominate decision-making in business, there is a growing recognition of the importance of environmental sustainability (Hautala and Heino, 2023). Family-owned food businesses are increasingly incorporating environmental considerations, such as waste management practices, into their strategic decision-making processes (Dóry, 2023).

This article examines the internal factors that influence decisions to increase capacity expansion related to the sustainable processing of animal by-products in the case of SME family businesses in the meat industry. The research was carried out with the involvement of 45 family businesses in the Hungarian meat industry. The novelty of the article comes from the fact that it assesses the internal factors influencing capacity expansion decisions related to the sustainable management of animal by-products on a sample of 45 domestic meat industry family businesses. The aim of the authors is to test the model they set up earlier. 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 meat industry in order to utilise animal by-products.

## 2. Methods

The authors carried out the research procedure according to the following steps. After setting up the research design, they started a search for keywords in the database and then analysed the papers found with the help of a systematic literature review on the basis of which they set up the research GAP, which for the sustainable development of animal waste refers to capacity expansion activities. Afterwards, research was conducted using an online questionnaire and an in-depth interview to validate the model previously set up by the authors. They will be presented in the following.

Based on the literature, the authors defined the concepts of family businesses, animal by-products and capacity expansion. After that, they discussed the importance of internal factors that influence the decision in the case of capacity expansion decisions related to the management of animal by-products in family businesses. Finally, after reviewing the literature, the research GAP was determined.

For the literature review, the Scopus database was used, and a search was started with the following keywords: family business, food industry, animal waste decision-making capacity expansion. This yielded 2,158 results. The results were narrowed down to the most recent articles for the years 2023-2025, results in English, open access, social sciences and business, and management subject area, as well as exclusively for papers from Q1-rated journals. The 25 results obtained in this way were processed.

Animal by-products (ABPs) in the meat industry are substances that are produced during the slaughtering and processing of animals but are not intended for direct human consumption (López-Cabarcos et al., 2024). These by-products can be classified into different categories depending on the further uses or treatments they can be put to (Hörger and Ward, 2023).

According to European Union regulations (Sheikh et al., 2023), animal by-products can be divided into three main categories:

- Category 1: These are the most dangerous by-products, which include: Carcasses or parts of animals that have suffered from infectious diseases.
  - Category 2: These substances are moderately dangerous, for example: Animal manure.
- Animal by-products that are not suitable for human consumption but do not belong to category 1.

- Category 3: These are the least dangerous by-products and can often be further processed to produce animal feed or technical products. These include, for example:

The meat was intended for human consumption and was not used for some reason. Meat industry by-products, such as skin, horns, and blood, have not been contaminated with infectious substances.

In Hungary, the part of the generated ABP that the companies themselves are no longer able to utilise, i.e. waste, can only be managed by Atev Zrt. This means that Atev Zrt or its contracted partner collects the waste of animal origin from the company's premises and takes it for destruction. Destruction means burning, which produces thermal energy. However, businesses try to use ABP in some way in order to gain additional income and produce as little waste as possible - the cost of its removal is borne by them. For example, ABP can be used to make household items, clothing fillers and pet food (Hall, 2024). Overall, ABP can be used almost without any residue, except for illegal, unlicensed meat plants and black slaughterhouses that mix ABP with municipal waste. This study does not deal with this area.

The handling and processing of animal by-products is strictly regulated to prevent health risks and environmental problems. These materials can be used in a variety of industries, such as biodiesel, fertiliser, animal feed, and cosmetic and pharmaceutical products (Arnould and Helkkula, 2024).

According to data from the Nébih (National Food Safety Office), in 2023, there will be more than 2,500 licensed food plants in Hungary, roughly one-third of which are meat plants, that is, nearly 900 smaller and larger meat plants (Garnett et al., 2023). In the European Union, as in Hungary, 70 % of SMEs (Small and Medium Enterprises) are family businesses. If these data are compared, the number of domestic family-run meat plants can be put at around 630.

### 3. Result and discussion

The online questionnaire was sent out as part of a general capacity expansion decision-making survey by Mapi (Hungarians on the Market) and Vosz (National Association of Entrepreneurs), as well as the Győr Moson Sopron County Chamber of Commerce and Industry VII. No. Plato group's database shows that these three organisations have a total of nearly half a thousand members. The entire questionnaire was completed by over 200 decision-makers, with the section specifically focused on meat plants, addressing capacity expansion decisions concerning animal by-products, being filled out by 45 family businesses. According to the decision-making model, the questions were organised around three internal factors: socio-emotional wealth (SEW), heterogeneous top management teams (HET), and intergenerational cooperation (GEN). Additionally, they explored the potential outcomes of decisions regarding capacity expansion. The questions of the online questionnaire were selected on the basis of questions from previous research questionnaires (Krankovics et al., 2023).

The 45 food industry companies that filled out the online questionnaire were founded between 1949 and 2021. Most of them were founded in 2010. In terms of the number of employees, they are between 15 and 50 employees. 85 % of company owners are members of one or more families, and decision-making is always in the hands of families. 62 % of them had a capacity expansion within ten years, the remaining 38 % more than ten years ago.

The analysis of the online questionnaire yielded the following results, grouped according to the internal factors identified in the model. The questionnaire questions were on a Likert scale ranging from 1 to 7 (1 being not typical at all and 7 being very typical) and yes/no type in the following topic. The colour blocks shown in the figure show how much the individual interviewees answered these questions and how the responses were distributed. The limitation of the article is that it does not allow for the listing of all of them, but the relevant topics and some examples are presented.

This diagram (Figure 1a) quantifies the responses to the SEW (Socioemotional Wealth) questions among each interviewee. The questions taken into account during the analysis covered the topics of family control and influence, emotional and social attachment, and dynamic family relationships. By Q1-15, the majority of respondents (over 60 %) were influenced by SEW in their capacity expansion decisions. Q16 was a yes/no question: Does the family's emotional commitment matter in decision-making about capacity building? here, 69.2 % of respondents answered yes.

Heterogeneous top management team (HET) questions from Q1-8 with yes/no questions examined whether the following are involved in the decision: owners, executive, managers, external consultants, predecessors, successors, family members, non-family members managers, 80% of the respondents participate in the decision. Until Q9-16, we examined the relationships between the various decision tools and the team involved

in the decision using scaled questions. Based on Figure 1b, it can be concluded that HET has an impact on decision-making. Co-operation between generations examined the participation of different generations in decision-making using scale questions from Q1-7 (Figure 1c), highlighting the role and attitudes of different generations.

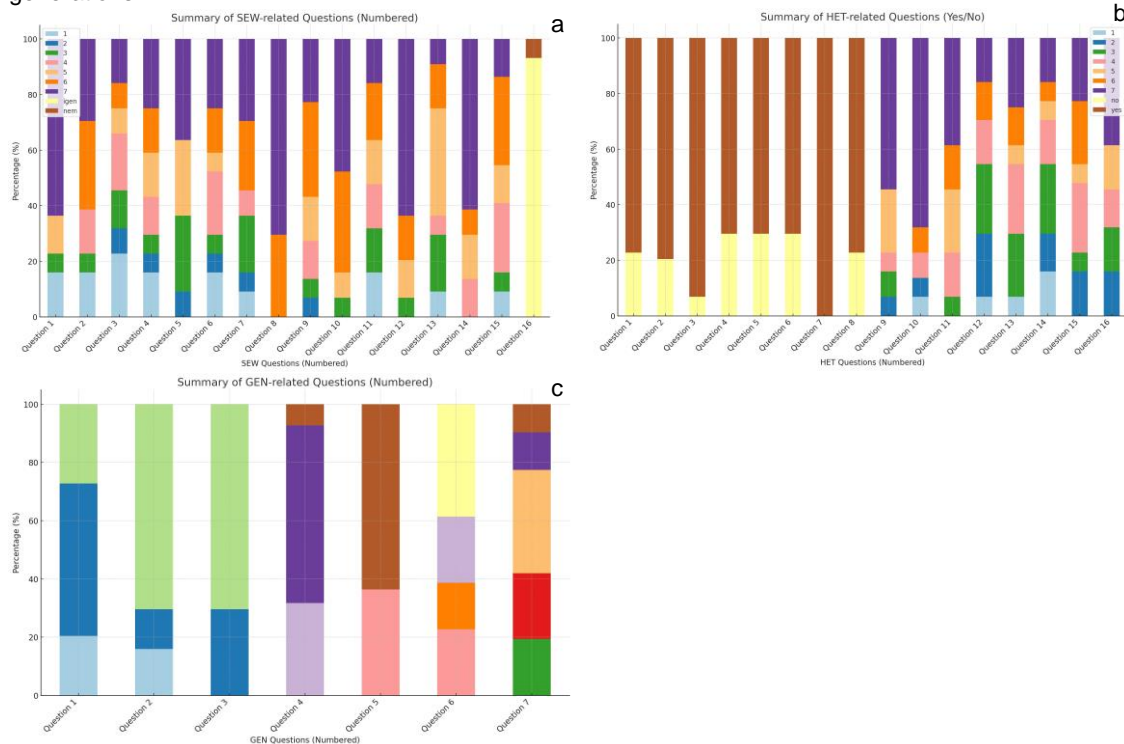


Figure 1: Graphic display of the results of the online questionnaire

In the in-depth interview, the representative of the 5 selected family businesses answered the following questions:

1. Briefly introduce your company.
2. What category of animal by-products do you produce?
3. How do you treat these animal by-products?
4. Did you need capacity expansion in order to manage ABP?
- 5/a. How do you make decisions about capacity expansion?
- 5/b. Will the different managers of the company be involved?
- 5/c. Are family members involved?
- 5/d. Possibly several generations?
6. Why do you consider it important to treat ABP?

Based on the responses to the in-depth interview a significant part of the enterprises considered it necessary to expand the capacity in order to sustainably manage animal by-products. During decision-making, family members and several generations are actively involved, and the role of state support is also important. ABP treatment is critical not only from an environmental point of view but also brings economic benefits and contributes to the long-term sustainability of businesses.

At one of the food industry companies, a large amount of animal hair is produced as a by-product. Cut hair is light but requires a lot of space to store. For years, they struggled with the problem of storing fur until it was shipped. In this family business, the successor was also involved in the management of the company, and a compression packaging machine was purchased based on his idea. With the help of this, the accumulated hair is compacted in small tufts, so its storage takes up ten times as much space, so its storage capacity has increased tenfold. Environmental protection and sustainable development are important to all respondents in order to ensure that their family business can survive for a long time, thus providing a livelihood for the family, which is why the management of animal by-products is important. This confirms the importance of socio-emotional wealth (SEW) and its ability to influence decisions.

Based on the results of the online survey and the in-depth interviews, 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 SME family businesses (Figure 2). The model supports SME family businesses' decision-making related to capacity expansion in such a way that it shows a comprehensive picture of the internal factors that influence the decision, but the decision-makers do not necessarily use it consciously.

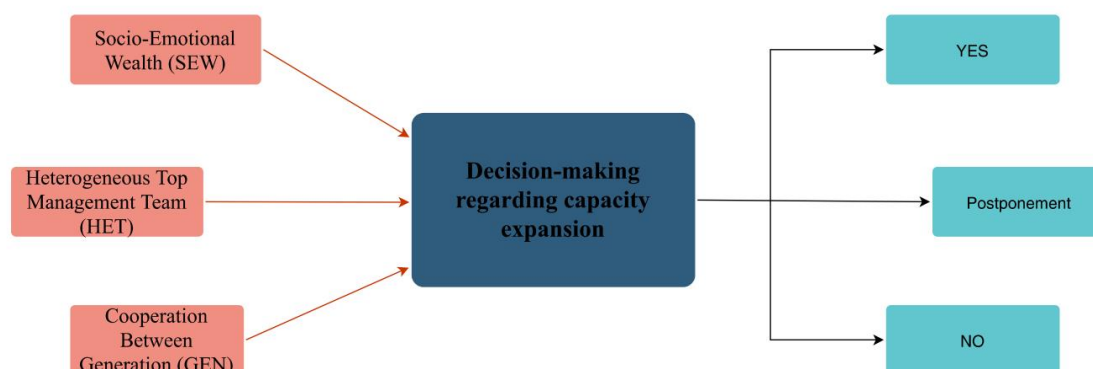


Figure 2: Model of decision-making regarding capacity expansion in SME family businesses

#### 4. Conclusions

Through a non-representative online survey and in-depth interviews, the research presented the internal factors influencing capacity expansion decisions related to ABP management of family businesses and the possible decision outcomes. The processing of the literature did not find similar research, so it was identified as GAP. Waste management, which includes ABP, is extremely important for sustainable development. The three factors identified above, SEW, HET, and GEN, are not sufficient to support decisions for sustainable development. The importance of the results lies in the fact that the model previously set up by the author was confirmed by the online questionnaire and the in-depth interviews.

This study did not examine the external factors affecting decisions related to capacity expansion, such as the economy, resources, legislation and benchmarks.

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