WP T2 – INNOVATION ON TEXTILE WASTE MANAGEMENT

ACTIVITY A.T2.3 PILOT CASES

D.T2.3.2 PILOT CASES

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ENTeR - Expert Network on Textile Recycling

ENTeR works in five central European countries that are involved in the textile business, to promote innovative solutions for waste management that will result in a circular economy approach to making textiles.

The project will help to accelerate collaboration among the involved textile territories, promoting a joint offer of innovative services by the main local research centres and business associations ("virtual centre"), involving also public stakeholders in defining a strategic agenda and related action plan, in order to link and drive the circular economy consideration and strategic actions.

The approach of the proposal and the cooperation between the partners is oriented to the management and optimization of waste, in a Life Cycle Design (or Ecodesign) perspective.

CONTENT

1. Pilot case aim and scope

In the context of the ENTeR project, interviews were carried out among textile companies during the field work phase. During the questionnaire interviews, the companies surveyed responded to the current state of treatment of textile waste.

In the Western Transdanubian Region, 14 companies were contacted. Following the evaluation of the interviews, Bio-Textima Kft. was selected, with the aim of carrying out a feasibility study on the impact of the development in the company on the amount of waste generated.

Bio-Textima Kft. intends to consciously expand its corporate profile and opted for diversification as a growth strategy. All this means that you want to appear in a new market with new products.

In the summer of 2019, the study proposes the complexity of the investment, which describes the details of the development, its financial impact and its impact on the waste management of the Ltd.

1.1. Executive Summary

The financial analysis of the feasibility study is that this proposes a complex investment, which can be shown on the basis of financial calculations that will have a positive long-term impact on the turnover, profitability and sustainability of Bio-Textima Kft.

The study found that as an additional result, as well as efficiency gains, the amount of production waste produced would also decrease.

This deliverable describes the objectives of the pilot case, starting from problems and needs expressed by the company.

2. Introduction

2.1. Presentation of Bio-Textima Kft.

Bio-Textima Kft. was founded in 1994, the company is still a family business. Its headquarters are located in Bősárkány, where there are currently 54 full-time employees. The founding owner has a degree in textile engineering, and before the 1990s he worked in the textile industry as the head of the factory, when he started an independent business. During their first work, medical cushions were made from meadow hay in a manufacturing manner. After the successes, they began to develop biomattresses and then manufacture them. At the time of the foundation, the owner of the company set out to produce products that meet the Western European standards at the time and provide health to Hungarian customers. Their

products are customised for their customers based on the weight, age, sleep habits, spinal problems and other characteristics of the user.

The first major innovation of the company was the double-line barbeque, which was also patented. The development is a great success among customers. The company developed dynamically, its product range broadened, and soon wool products were sold.

The company continuously developed its infrastructure and assets, and the number of employees increased in parallel with the turnover.

Bio-Textima Kft. is a permanent participant and exhibitor of domestic and international fairs and exhibitions in the region. They participated several times at the Budapest International Fairs (BNV), where they attracted the attention of resellers as exhibitors, resulting in a significant increase in their market share. Winning the BNV Grand Prix, which was awarded to Bio-flex double-line barbeques and the Bio-Lux System product line, is a real breakthrough in the company's life.

The development of Bio-Textima Kft. was carried out in collaboration with Semmelweis University, the Hungarian Society of Gerinc Medicine and Petz Aladár County Education Hospital. Their jointly developed products have successfully found their place on the market, their blankets and mattresses have endured the test of use: the blankets do not cause allergic reactions, their mattresses are excellent for relief of waist and back pain.

In the 2000s, they again won the BNV Grand Prix and the Hungarian Product Grand Prix. By adapting to health trends, medical research is used to develop the Bio-Rex physiotherapy bed system to detect harmful radiation.

As a result of the continuous developments, the Natura sofa family was placed on the market in 2005, the special feature of which is that it was made with a special backbone tracking and support system, which also won the BNV Grand Prix.

One of the biggest innovations of the last decade was the development of the WitalWOOD woodcook mattress family, and the product also won the IMM Cologne award for innovation in Germany.

Many products of Bio-Textima Kft. are licensed by the Device Certification and Hospital Technology Directorate (EMKI), and their Bioner products have been designated as medical aids. In its product philosophy, the company considers preserving uniqueness in both domestic and foreign markets as a priority, and its mission includes the creation and dissemination of healthy sleep culture, as well as a commitment to economical and environmentally friendly production, focusing on efficient production and providing maximum service to customers' needs. Their products are patented not only in the EU, but already in the US.

The company has a wide range of brand portfolios, including mattresses, pillows, bed systems, complex bedroom furniture and accessories. In its product range, the company also places great emphasis on the comfort of newborns with special mattresses, subspreads and a separate set for children. The quality is backed by a wide range of anatomical and ergonomic knowledge, so many specialities were added to their offer.

2.1.1. Business and product families of the company

The products of Bio-Textima Kft. can be divided into different categories:

1. Mattresses
    - START mattresses, SUPRIO mattresses, Premio mattresses, TALALAY TOP mattresses
    - Memory mattresses
    - Anatomical foammattresses
    - Antistress vacuum mattresses

2. Leaf inserts
3. Magnetic mattresses
4. Furniture
5. Anti-allergenic products
6. Other products
    - Panthers
    - Decoding blankets
    - Matrachuts
    - Bioner textile copper
    - Add-ons

2.1.2. Previous developments of Bio-Textima Kft.

Bio-Textima Kft. From its foundation in 1994, it operated in a plant near the owner's family home for 10 years. The company grew out of the workshop at the time, and the owners purchased an industrial area in Bősárkány. In 2004, the company will build its 3000 sqm production hall in Bősárkány using the modern technology facilities at the time.

Due to the large increase in 2010, a 700-square-metre warehouse was added to the existing plant hall. In terms of equipment, many processes are mechanised, but the rate of live work remains the highest.

2.1.3. Major developments over the past 12 years

Name of development	Value of Development	Time of development

	(million HUF)	
Introduction of flexible, family-friendly employment methods at Bio-Textima Kft.	13,5	2017-2018
The release of Bio-Textima Kft. on the American market	14,9	2013-2014
Site development at Bio-Textima Kft.	87	2010-2011
Equipment procurement for the development of technology through the introduction of a quality management system and system certification at Bio-Textima Kft.	22,2	2009-2010
Introduction of an integrated corporate governance system Bio-Textima Kft.	8,3	2007-2008

Since 2008, Bio-Textima Ltd. has not only focused on infrastructure development. He paid special attention to marketing, employment and technological developments. It has introduced an integrated corporate governance system for more than 10 years.

Further developments in the company's life are essential for moving forward.

As a result of further development, the expansion of the site is planned. As a result of storage loading, there are major problems in ordering additional raw materials and storage of finished products.

Further technological development is required to replace manual work.

The corporate governance system, which was slowly becoming obsolete, was also ripe for the exchange.

2.1.4. Placement of development in the strategy of Bio-Textima Kft.

The company's mission is:

"The objective of Bio-Textima Kft. is to continuously be able to serve its customers in accordance with the requirements and requirements of the company at high technical, reliability and quality standards, thereby ensuring the good market position of the Company."

The development presented in this study fits the objectives and measures set out in the Company's Strategic Plan.

Bio-Textima Kft. intends to consciously expand its corporate profile in the future and chose diversification as a growth strategy. All this means that you want to appear in a new market with new products. The sales strategy has been renewed, new markets have been positioned,

and sales professionals from the industry with a significant history have been expanded. The commercial part will be reinforced by the involvement of new retailers and the creation of an independent network of foreign agents. The company was able to sign with several new sleep culture chains, and the hotel market was launched as a new sales area.

The first steps to implement these plans were to appear in Germany, Switzerland, Italy and Austria. In these markets, it quickly became clear that people are susceptible to the new product, find it interesting, and have also attracted the interest of mattress companies.

Until now, Bio-Textima Kft. has been thinking mostly about serving the domestic market, but the development of a new product and the need to place a new product on the market have led to the idea that it should also appear in new market segments. This strategy has proved successful. In 2018, sales revenues of nearly HUF 400 million were generated from exports, which exceeded 40 % of the turnover.

Even after a relatively short period of time, we can predict, based on experience so far, and aim to further increase exports in these countries in the coming years.

Another objective is to draw up a longer-term 5-year plan for the quantities exported, based on the information obtained next year.

Labour targets need to be carefully formulated, because one of the most expensive factors is the workforce, and it is likely that it will continue to do so in the future.

2.2. Background to the investment

2.2.1. Waste treatment in the textile industry

The development of waste policies towards a circular economy will significantly transform the waste management sector: the size of the business is increasing and the boundaries of the various supply chains are widening. This process stimulates innovation and creates new markets.

For textiles, the general system works mainly in a linear way: large quantities of non-renewable resources are exploited for the production of clothing, technical textiles and furniture, followed by the products primarily being shipped to landfill sites or burned at the end of their life.

Used textiles are collected in many different ways. Textile waste as a raw material for textile recycling must be separated for manufacturing waste and used textiles. Thus, collection and subsequent sorting and recycling are also carried out differently.

Industrial and manufacturing textile wastes

Analysis of textile manufacturing waste

The main types of textile waste are: textile fibres waste (including dust and filament), yarn residues, textile materials, textile materials, trimmings, cutting waste, defective products and other non-textile wastes such as paper, paperboard, film, wood, etc. The composition of textile waste material may comprise virtually all types of known natural and synthetic textile fibres.

Waste management and recycling

The most advantageous option is to recycle waste materials by recycling it into the production process in order to save raw material. Waste materials from defective production are sometimes used as machine rags. The traditional method of recycling textile waste is the use of tearing and cutting processes for the recovery of textile fibres. The resulting material is mainly used for the manufacture of fibrous nonwoven materials (needed or sewn-wrapped) or for the production of towel cloths, fillers, insulation materials, geotextiles, tapestry and textiles used in the automotive industry, which means secondary use of waste. Other options used by businesses are physical or chemical recycling. Physical recycling can be done for thermoplastic materials when the waste is regranulated and can be used as a raw material again. Chemical processes such as depolymerisation or re-polymerisation are used to recycle non-mixed synthetic textile waste. The disadvantage of both recycling methods is the high cost of time, energy and costs.

If neither reuse, recycling nor functional disposal (secondary use of textile products for other applications, such as paper machines as filament geotextiles) are possible, textile waste will be placed between industrial waste or residual waste (cutting waste). Subsequently, thermal/energy recovery will be carried out in public incineration plants or, where possible, at the manufacturing undertaking. Finally, the waste is shipped to landfill sites.

Collection of waste with the use of undertakings involved in disposal

In some EU Member States, local waste disposal companies provide waste storage containers for the disposal of textile waste and non-textile materials (such as paper, paperboard...).Different types of waste are collected selectively. Expenditure may be incurred in connection with the rental and collection/empty of containers. These companies primarily perform machine recycling and reuse the recovered materials in the above-described manner. In order to achieve savings, it is important for textile companies that the distance between businesses should not be too large. Textile waste is collected on demand. In order to reduce the space required, textile waste is pressed into bales. Other types of waste, such as paper, cardboard, film and packaging, are regularly collected when collecting communal waste.

Many businesses have problems with the storage of textile waste in the absence of adequate storage space. Sometimes disposal companies expect selected textile waste bales by colour. This creates even more problems in storage and increases the time needed to collect waste.

Businesses are more advantageous when disposal companies take over large quantities of textile waste that is not selected by colour.

It is necessary to ensure a better separation of this waste stream so that it can be diverted towards further recycling.

Because of factors such as the complexity of waste streams, the volatility of material prices, rapid changes in the business environment, lack of information on the availability and properties of waste streams, it is often very challenging to estimate whether the recycling and reuse of waste materials is economically viable and sustainable. In order to optimise processes, the possibility of integrating different waste streams should also be taken into account. Understanding synergies between sectors and value chains makes it possible to develop an industrial symbiosis concept, which provides a great opportunity to create approaches that allow many industries to benefit simultaneously from the sequential distribution of material flows.

One of the greatest challenges in estimating the economic viability and sustainability of the various waste streams and identifying the potential of waste streams is the availability of current basic data. In addition, supply and demand do not meet due to a lack of communication between waste producers and potential users. This highlights the need for better tools for collecting, managing and transfering information.

2.3. Legislative and policy context

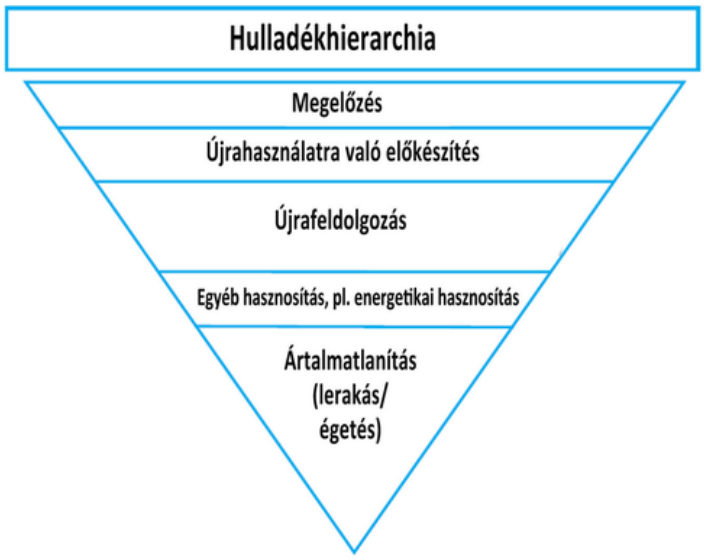
The central issue of waste policy is the prevention and recycling of waste. This is how natural resources can be preserved. The medium-term plan is to recycle all communal waste in an environmentally friendly manner. This requires not only technical, social and political framework conditions, but also calls for legal decisions. Waste legislation is characterised by the existence of a number of European acts. While regulations should be applied directly in each Member State, directives should be integrated into national law.

Major European Union legislation

The European Waste Framework Directive (Directive 2008/98/EC) is one of the central directives in the field of waste management. It defines the basic technical terms for waste and defines, among other things, the five-stage waste hierarchy. It lays down a general framework for waste management requirements and provides for basic waste management definitions for the EU.The European Waste Framework Directive sets out that the primary objective of all waste policy is to minimise the harmful impact of waste on human health and the environment. Specific relevant regulations are included in the Regulation on end-of-life vehicles, the Elements and accumulators Act and the Waste Electric and Electronic Equipment Act.

Directive2008/98/EC lays down basic concepts and definitions relating to waste management, including the definition of waste, recycling and recovery. It explains when waste ceases to be waste and when it becomes a secondary raw material (requirements for cessation of the so-

called waste status) and how waste and by-products can be distinguished from each other. The Directive sets out some basic principles for waste management: it provides that risks to human health and damage to nature, in particular to endanger water, air, soil, plants and animals, are prohibited in the treatment of waste, or to cause harm to noise and smell, or to treat waste in such a way that it does not adversely affect the countryside or places of particular interest. The waste legislation and regulation of EU Member States are also prioritised in the following waste management hierarchy:



The Directive introduces the "polluter pays" principle and the "producer's extended responsibility" and includes provisions on hazardous waste and waste oils (the old Directive on hazardous waste and waste oils was repealed on 12 December 2010) and provides for two new recycling and recovery targets by 2020: 50 % preparation for the reuse and recycling of certain household waste materials and similar waste and 70 % for the reuse, recycling and other types of regeneration of construction and demolition waste. The Directive requires Member States to apply waste management plans and waste prevention programmes.

More important domestic legislation

Laws

- Act CLXXXV of 2012 on Waste

Government Decrees

- 440/2012 (GR.29.) Council Regulation on registration and reporting obligations in relation to waste
- 442/2012 (GR.29.) Council Regulation on packaging and waste management activities related to packaging waste.

Although the recycling rate for communal waste and packaging waste needs to be increased in the future, they will be standardised across Europe. Separate collection of valuable materials such as bio-waste and second-hand textiles should also be better ensured. However, there are no specific targets for waste prevention and re-use. Ecodesign specifications and economic management tools for the economic use of resources are also not available. Despite its shortcomings, the circular economic package must be interpreted as a strong call for all EU Member States to prevent waste and protect resources. The package sets new binding targets and deadlines for increased recycling and reduction of landfills. It was also agreed that textiles should be collected separately throughout the EU from 2024.

Regulatory/legislative steps are needed, but recycling needs to be supported by innovative waste collection solutions and the development of reuse and recycling systems to make recycling and reuse more efficient, easier and more transparent for consumers, industry and recycling businesses.

2.4. Determination of the objectives of the pilot case

2.4.1. Types of waste generated at the headquarters of Bio-Textima Kft.

- Municipal solid waste:
  - Municipal waste: household waste produced regularly during the day-to-day operation of the undertaking, transported in the framework of a public service and not considered as hazardous waste.
- Solid waste from production:
  - Miscellaneous textile waste (pamut, flax, viscose, polyester, tb)
  - other non-textile waste (latex, mix latex, latexed coconut, PU foam, etc.)
  - foil
  - other (paper, wood, pallets, etc.)

- In some cases, occasional, non-hazardous waste (i.e. furniture, locomotives, computing equipment, pallets, avars, etc.) cannot be disposed of in the framework of a public service (i.e., quantities or compositions exceeding the capacity of the containers).
- Hazardous wastes:

Materials, equipment and accessories which are considered hazardous waste by the legislation generated by the activities of Bio-Textima Kft., in particular:

- Hazardous wastes from production
  - machine oil, adhesives
- Electronic appliances, household appliances, their components, components and components.
- Office technical equipment, their components, components, accessories, toners or cartridges containing dyes or empty.
- Used accumulators and batteries generated during the operation of instruments, computing devices and equipment.
- Electrical equipment, instrumentation and end-of-life fluorescent lamps during the operation of a building.
- Substances harmful to the environment associated with the operation of a motor vehicle (paints, fats, oils, used accumulators, detergents, chemicals, packaging, etc.).

2.4.2. Waste management at Bio-Textima Kft.

- Management of municipal solid waste
- Treatment of systematically generated waste:

Bio-Textima Kft. has concluded a contract with the Public Provider entrusted by the Municipality of the Municipality of Bősárkány for the removal and disposal of solid waste which is regularly generated.

Thecompany entrusted with this task is Kisalföldi Kommunális Wastegazdálkodási Közszolgáltató Nonprofit Kft. (9300 Csorna, Andrássy utca 33.).

The public service is complex, comprehensive, covering the provision, exchange, transport and disposal of collected waste, taking over the obligation to record and provide information. The waste generated during the day-to-day operation shall be transported to the collection site by persons responsible for cleaning or in connection with its production and placed in the waste collection vessel placed for that purpose.

The same persons shall ensure the timely placement of waste collection vessels at the place of shipment.

The collection vessels are emptied at a contractual time and frequency (2 times a week).

Periodic cleaning of the containers is carried out by the Public Provider on the basis of a separate order.

- Separately collected waste:

In order to implement environmentally conscious waste management and reduce the associated costs, the company will remove a significant part of recyclable waste (where possible and larger) from the scope of the waste management detailed in the section, collect them separately and transfer them to an undertaking contracted to carry out the task.

The selectively collected waste generated during daily operation is collected by the employees of Bio-Textima Kft. in a collection vessel with the words “RECYCLING” which are exclusively placed for this purpose. The persons responsible for cleaning or carrying out tasks in connection with its creation will transport it to the collection site provided by Bio-Textima Kft. and place it in the collection vessel that receives the weekly quantity placed there.

Collection vessels shall be emptied at a contractual time and frequency.

Periodic cleaning of the containers is carried out by the service provider on the basis of a separate order.

- Paper: letters, envelopes, records, scrapped documents, newspapers, periodicals, booklets, books, corrugated paper, wrapping paper, cardboard, etc. The collection takes place selectively, per office, in a metal bin marked “RECYCLING”, which is placed in the central collection box every working day by the outside contractor cleaning the Office Building. Paper waste is disposed of in separate waste containers located on the site at least once a year – in connection with the scrappings at the end of the year – the documents containing the data will be transported for destruction and scrapped in the presence of the staff carrying the shipment. The amount of these per year varies from 500 to 1.000 kg, and we pay a fee for crushing.

- Computing and electronic waste are handed over once a year on the basis of the list of products indicated in the scrapping protocol to the company handling it, which ensures their proper processing and destruction. Empty cartridges of toner and paint taken from our trading partners will be returned to distributors, where they are properly disposed of.

- Plastic, Styrofoam, PET bottles and their twisted caps: In the case of separate waste collection at the undertaking, they are transported to central storage, depending on the quantity, to the selective (plastic mark) storage tanks located in the municipality and, in the case of large quantities, to the marked containers of the waste yards operated by the service provider.

- Hazardous, non-degradable computing medium (floppy, CD, DVD): Based on the long-standing working relationship and agreement, these data media which are no longer usable and redundant will be taken over by the company managing them, recycled on the basis of the receipt issued by Bio-Textima Kft. and on the receipt of the receiving waste.
- Coloured and white bottles (drinks, etc.), metal cans (spirited cans): After separate collection, they will be deposited in separate waste containers located in the municipality and, in the case of larger quantities, in the marked containers of the waste yards operated by the service provider.
- Fluorescent lamps and luminaires, dry elements: After separate collection and storage, they will be deposited in designated separate waste containers of the waste company.
- Tired oil and rolls, used accumulators: The maintenance and servicing of the fleet of the company's passenger and truck fleet shall be carried out exclusively in specialised services, where the competent management of the designated hazardous waste is ensured.

Treatment of occasional waste:

The shipment of waste which does not qualify as hazardous waste which is not hazardous waste exceeds the capacity of the collection vessels provided in the public service, or because of its composition, shall be carried out by an ad hoc order.

The task shall be entrusted only to an undertaking authorised to carry out the activity. A certificate of delivery of the waste (transport note) is drawn up.

The intra-institutional treatment of the waste is currently carried out by the person(s) entrusted with that task.

The Executive Director shall arrange for the preparation of the waste for shipment, the necessary personal and material conditions, and the removal of the waste prepared by the Executive Director by ad hoc order.

2.4.3. Waste generated

Solid waste from production:

- Miscellaneous textile waste: 8.500 kg/year

(pamut, flax, viscose, polyester, tb)

- other non-textile waste: 17.500 kg/year

(Latex, mix latex, latexed coconut, PU foam, etc.)

- Foil 7.000 kg/year
- other

(paper, wood, pallets, etc.) 16.500 kg/year

2.4.4. Development objectives, expected results, impacts

Direct objective

The aim of the further development of the waste management system of the company is to reduce waste, prevent the generation of waste and, on the other hand, some recovery of the waste generated, as well as the reassuring and final disposal of the remaining wastes.

Indirect objective

With less waste generated during production, development contributes to the circular economy.

Impact of development

The waste management system of Bio-Textima Kft. will be further developed. In this context, greater attention should be paid to the selection of waste and by-products from the point of view of recovery. To this end, it is necessary to further develop separation and selective collection in production. This will be an important element of the development process, in which the waste generated is recycled into their own or other production processes, preferably without further treatment or with minimal treatment. A general solution for waste recovery requires comprehensive measures, complex thinking, a new approach, and is linked to the collection of unavoidable waste and the perfect organisation of the entire waste management process. Segregated collection according to recoverability or processing is the basis for all of this, and that the types of waste collected in this way are transferred to so-called recirculation centres, where the aim is not to destroy or dispose, but to complete and environmentally sound recovery.