WP T2 – INNOVATION ON TEXTILE WASTE MANAGEMENT

ACTIVITY A.T2.3 PILOT CASES

D.T2.3.3 PILOT CASES TECHNICAL REPORT

Version 2

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Partner:

PP 3 PBN

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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.

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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 Company

1.1. Executive Summary

The financial analysis of the feasibility study proposes a complex investment, which can be shown on the basis of financial calculations and 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 situation of the market available technologies and possible technical solutions to tackle the company waste management.

2. Mapping of the market available technologies for waste pre-treatment in partner region

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 transferring information.

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.

2.1. Technical description, conditions

In the framework of the development, Bio-Textima Kft. introduces a new integrated company management system, as well as the acquisition of the necessary IT tools.

If the development is realised, the production of the Company becomes more efficient through the integrated corporate governance system,

The processes become predictable, as in the case of an incoming order, it is possible to plan exactly when the raw materials are needed in the warehouse and from there to the production process.

By introducing a more modern corporate governance system, the company is able to make the procurement processes of outstanding importance in production and production more efficient, thereby reducing the need for human work in procurement and the resulting error rate, and information can be obtained from the corporate governance system for more efficient traceability:

- significantly improve the availability and reliability of the information required for management decisions;
- increase productivity and/or decrease the required number (with unvariable performance),
- the company's management system provides data for the transformation of the product portfolio, the establishment of a controlling system,
- system-based cost and hedging costs can help determine which products are more economical, which products are less profitable.

The acquisition of modern IT tools will make work more efficient and will be able to operate an integrated corporate governance system.

After the investment has been completed, the resulting capacities will continue to be operated by Bio-Textima Kft. The new warehouse and new technology are integrated into the organisation. According to the calculations, the investments do not require additional workforce and restructuring, and the exact redeployment plan will be developed later by the company.

3. LCA of the textile waste covered by the pilot case

Expected results of development

- reduction in amount of textile waste
- reduction of textile waste per 1 product

3.1. Solutions Variations

3.1.1. Method of selecting the appropriate variation

The following factors have been taken into account for the method of selection of variations:

- When selecting the appropriate alternative, we have planned the entire company-related operating cost and total operating income, the development program cannot be clearly defined, cannot be fully separated.
- The variants were tested for a reference period of 10 years.
- In the case of variant analysis, economic costs were calculated in all cases (costs not including VAT, determined at current prices).
- We used a 5 % discount rate to discount the cash flow, the same as that required for European Union tenders.

3.2. Definition of feasible variations

Solution "0":

Version without project implementation,

We assume that the Company operates unchanged – taking into account the expected market trends.

Feasible variation A:

Project elements implemented:

- integrated corporate governance system + IT toolkits

Amount of investment: 35 million forints.

Feasible variation B:

Project elements implemented:

- corporate governance system + IT toolkits
- manufacturing technology development

Amount of investment: 147 million HUF

Feasible variation C:

Project elements implemented:

- corporate governance system + IT toolkits
- manufacturing technology development
- Logistics development
  - purchase of tarpaulin warehouses + storage shelves, handling equipment
  - logistics process development

Amount of investment: 183 million HUF

3.3. "0" Solution – non-investment version

Technical and technical description, conditions

Version without project implementation, i.e. Bio-Textima Kft. is assumed to operate unchanged – taking into account the expected market trends.

If the development is not realised, the production of the Company would continue with the parameters and capacities to date:

- production is stagnating as there is no capacity for additional production.
- efficiency deteriorates as automation fails, the human workforce is becoming increasingly difficult to retain and its cost rises significantly

If the investment is not realised, the capacity will not increase, the products will be produced with ever higher costs, but the increase in costs cannot be validated by the company in its prices.

Forecast financial conditions

Bio-Textima's current product range and production technology does not allow it to remain competitive with competitors in the long term. In a strong competition between mattress manufacturers, it is essential to continuously renew and improve the quality of the products offered.

Inthe absence of development, we assumed a stagnation of sales, then a decrease in sales and, consequently, a slow and gradual decline in financial revenues. The figures in the table also show that the real value of revenue cash flows is decreasing year by year, while operating costs are gradually increasing, thus increasing the difference between the two cash flows.

In determining the operating cost, due to the nature of the activity, we counted as an emphasis on material costs (material costs, energy costs, etc.) and related personnel costs. Due to the retention of the workforce for mattress production, we anticipated a 10 % increase in staff costs in 1, 8 % in 2 and 6 % from 3.
The net total financial cash flow is still positive in the first two years of the reference period under consideration and thereafter shows an increasing negative value, demonstrating that the profitability of the company's operations is decreasing in the absence of development.

The table below shows numerically that non-development will have a long-term negative impact on Bio-Textima's turnover and profitability developments:

Cash flows needed to calculate return indicators (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Name	**2 019**	**2 020**	**2 021**	**2 022**	**2 023**	**2 024**	**2 025**	**2 026**	**2 027**	**2 028**
1. Investment cost	*0*	*0*	*0*							
2. Operating cost	*880 000*	*913 200*	*923 422*	*939 733*	*948 249*	*957 765*	*968 334*	*980 014*	*992 866*	*1 006 955*
3. Cash-flow of expenditure (1+ 2)	**880 000**	**913 200**	**923 422**	**939 733**	**948 249**	**957 765**	**968 334**	**980 014**	**992 866**	**1 006 955**
4. Financial revenue	*900 000*	*913 500*	*886 095*	*859 512*	*833 727*	*808 715*	*784 454*	*760 920*	*738 092*	*715 950*
5. Revenue cash flow (4)	**900 000**	**913 500**	**886 095**	**859 512**	**833 727**	**808 715**	**784 454**	**760 920**	**738 092**	**715 950**
6. Residual value										

7. Net total financial cash flow (5+ 6-3)	**20 000**	**300**	**—37 327**	**—80 221**	**— 114 523**	**— 149 050**	**— 183 880**	**— 219 094**	**— 254 773**	**—291 005**
8. Financial net present value	**FNPV**	**—901 730**								

The company's profitability becomes negative from the year 3 onwards and subsequently deteriorates year after year, resulting in significant losses accruing. In the case of a version without investment, the company should not continue to operate in this form, a significant transformation (employee number, product portfolio, customer base) is necessary for further operation. The net present value exceeds the loss of HUF 900 million over a period of 10 years.

Evolution of wastes

In this version, the amount of waste generated is reduced due to a decrease in production.

3.4. “A” Feasible Variation

Technical and technical description, conditions

In the framework of the development, Bio-Textima Kft. introduces a new integrated company management system, as well as the acquisition of the necessary IT tools.

If thedevelopment is realised, the production of the Company becomes more efficient through the integrated **corporate governance system**,

- The processes become predictable, as in the case of an incoming order, it is possible to plan exactly when the raw materials are needed in the warehouse and from there to the production process.
- By introducing a more modern corporate governance system, the company is able to make the procurement processes of outstanding importance in production and production more efficient, thereby reducing the need for human work in procurement and the resulting error rate, and information can be obtained from the corporate governance system for more efficient traceability.
- significantly improve the availability and reliability of the information required for management decisions;
- increase productivity and/or decrease the required number (with unvariable performance),
- the company’s management system provides data for the transformation of the product portfolio, the establishment of a controlling system,
- system-based cost and hedging costs can help determine which products are more economical, which products are less profitable

The acquisition of modern IT tools will make work more efficient and will be able to operate an integrated corporate governance system. The Company plans to purchase the following assets:

- 18 computers with monitor
- printers,
- multifunction printers
- barcode readers
- server
- rebuilding the network

Forecast financial conditions

Description of investment costs

Estimation of investment costs (HUF,)

	Year 1
Types of costs	**2 019**
I. Preparation costs for the project	
II.Investments/assets	***32 000***
1. Buying an area	
2. Construction, renovation, extension	
2.1 Construction, renovation and enlargement by external contractors	
2.2 Construction, renovation and extension of self-performance	
3. Acquisition of assets (IT assets)	10 000
4. Acquisition of intangible assets (Integrated corporate governance system)	22 000
III.Services	***3 000***
1. Professional services used for project implementation (Integrated corporate governance system education, IT system installation, etc.)	3 000
Total cost total	**35 000**

Amount of investment**: 35.000.000,- HUF**

With the introduction of an integrated corporate governance system and the acquisition of modern IT tools, the company can make production more efficient than in the case of a variant without investment. We planned the feasible variation "A" on the condition that the company's management will review the product range and reduce the number of products based on the information obtained from the corporate governance system. Thus, the company maintains the most economically efficient products in production. This would reduce revenues in the first year compared to the previous year, and would continue to decrease in 2, but would then start to increase significantly.

Operating costs

Operating cost evolution (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Expenditure of a material nature	630 000	530 000	567 100	629 481	654 660	674 300	694 529	715 365	736 826	758 931
Expenditure of a personal nature	195 000	214 500	231 660	254 826	270 116	286 322	303 502	321 712	341 015	361 476
Other expenses	15 000	15 300	15 606	15 918	16 236	16 561	16 892	17 230	17 575	17 926
Total operating costs	840 000	759 800	814 366	900 225	941 012	977 184	1 014 923	1 054 307	1 095 415	1 138 333

In determining the operating cost, due to the nature of the activity, we counted as an emphasis on material costs (material costs, energy costs, etc.) and related personnel costs. As a result of the efficiency gains, the revenue ratio of the material cost would be reduced by almost 10 percentage points in the second half of the period compared to the previous one.

Revenue

Revenue evolution (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net sales turnover	840 000	720 000	806 400	895 104	984 614	1 033 845	1 075 199	1 118 207	1 162 935	1 209 453
Other revenue	11 000	11 110	11 221	11 333	11 447	11 561	11 677	11 793	11 911	12 031
Total financial revenue	851 000	731 110	817 621	906 437	996 061	1 045 406	1 086 876	1 130 000	1 174 847	1 221 483

The figures in the table also show that the real value of the revenue cash flows has increased year by year, as a result of the increase in sales volumes and the production of products with higher results.

Cash flows needed to calculate return indicators (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Name	**2 019**	**2 020**	**2 021**	**2 022**	**2 023**	**2 024**	**2 025**	**2 026**	**2 027**	**2 028**
1. Investment cost	*35 000*	*0*	*0*							

2. Operating cost	*840 000*	*759 800*	*814 366*	*900 225*	*941 012*	*977 184*	*1 014 923*	*1 054 307*	*1 095 415*	*1 138 333*
3. Cash-flow of expenditure (1+ 2)	**875 000**	**759 800**	**814 366**	**900 225**	**941 012**	**977 184**	**1 014 923**	**1 054 307**	**1 095 415**	**1 138 333**
4. Financial revenue	*851 000*	*731 110*	*817 621*	*906 437*	*996 061*	*1 045 406*	*1 086 876*	*1 130 000*	*1 174 847*	*1 221 483*
5. Revenue cash flow (4)	**851 000**	**731 110**	**817 621**	**906 437**	**996 061**	**1 045 406**	**1 086 876**	**1 130 000**	**1 174 847**	**1 221 483**
6. Residual value										
7. Net total financial cash flow (5+ 6-3)	**—24 000**	**—28 690**	**3 255**	**6 212**	**55 049**	**68 222**	**71 952**	**75 693**	**79 431**	**83 151**
8. Financial net present value	**FNPV**	**257 700**								

Net total financial cash flow is still negative in the first two years of the reference period under consideration, due to the cost of investment incurred and the decrease in revenues, but at a positive and increasing pace thereafter. The table shows that the development will have a positive long-term impact on Bio-Textima's turnover and profitability.

Therefore, the financial sustainability of variation "A" can be justified, the net present value of the cash flows exceeds HUF 250 million during the period considered, but it is not recommended for implementation, because it is not the most flexible variation.

Evolution of wastes

In this version, the amount of waste generated is reduced due to a decrease in production volumes at first, but the number of pieces is expected to be added to the existing number of units as the maximum capacity.

3.5. “B” Available variation

Technical and technical description, conditions

Bio-Textima Kft. introduces a new integrated company management system within the framework of the development, as well as the acquisition of the necessary IT tools and the development of manufacturing technology

If the development is realised, the production of the Company becomes more efficient with the help of the**corporate governance system**, the detailed description of which can be found in the feasible variation point “A”.

In the framework of technology development

- automatic tailoring machine,
- side element manufacturing machinery,
- machinery for slicing fabrics,
- clearing and zipper sewing machines, and
- a MATRACMAG machine would be purchased.

The automatic tailoring machine allows optimum tailoring and contributes to accelerating production. The designed tailoring machine is fast, extremely low energy consumption and works completely digitally. Other benefits include: there is less energy consumption, flexible technological use, combined with automatic conveyor transmission and stripping system, which allows continuous tailoring throughout the entire length, optimisation of productivity and the best use of space and workforce. The automatic tailoring machine provides the opportunity to detect manufacturing defects, with the help of a repair station, the mismatched materials have gone into waste so far, and then they can be repaired. It is very important that due to optimum cutting, the resulting waste will also be reduced.

The side element machine produces the side element of the mattresses, the battery is produced in one step, not per activity, so there is no waste.

The tissue slicing machine can cut up to 50 to 70 meters of fabric in one step, so there are also fewer corpses.

The workflow, automated, improves efficiency significantly with the clarification and zipper sewing machine.

Amattress-seed machine can be used to replace manual work. Previously, the mattress was constructed in a manufactural way, after the development the mattresses can be assembled much faster and in a constant quality.

Infrastructural development will not be necessary, machinery can be installed in the existing production hall, so no works are required for technological development.

Forecast financial conditions

Description of investment costs

Estimation of investment costs (HUF,)

	Year 1
Types of costs	**2 019**
I. Preparation costs for the project	
II.Investments/assets	***144 000***
1. Buying an area	
2. Construction, renovation, extension	
2.1 Construction, renovation and enlargement by external contractors	
2.2 Construction, renovation and extension of self-performance	
3. Acquisition of assets (IT tools, technological development)	122 000
4. Acquisition of intangible assets (Integrated corporate governance system)	22 000
III.Services	***3 000***
1. Professional services used for project implementation (Integrated corporate governance system education, IT system installation, etc.)	3 000
Total cost total	**147 000**

Amount of investment**: 147.000.000,- HUF**

With the introduction of an integrated corporate governance system and the acquisition of modern IT tools, as well as technological development, the Ltd can make production even more efficient than the version without the investment or the feasible variation “A”.

Operating costs

Operating cost evolution (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Expenditure of a material nature	700 000	720 000	734 400	749 088	764 070	779 351	794 938	810 837	827 054	843 595
Expenditure of a personal nature	195 000	214 500	231 660	254 826	270 116	286 322	303 502	321 712	341 015	361 476
Other expenses	15 000	15 300	15 606	15 918	16 236	16 561	16 892	17 230	17 575	17 926
Total operating costs	910 000	949 800	981 666	1 019 832	1 050 422	1 082 235	1 115 332	1 149 779	1 185 643	1 222 997

In determining the operating cost, due to the nature of the activity, we counted material costs (material costs, energy costs, etc.) as a significant item, but we took into account automated machines, which can result in less material use due to more efficient work, thus less waste generation, and more energy-saving than our existing machinery. As a result of the efficiency gains, the revenue ratio of the material cost would be reduced by almost 10 percentage points in the second half of the period compared to the previous one. We also planned to increase the related personnel costs.

Revenue

Revenue evolution (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Net sales turnover	950 000	978 500	1 007 855	1 048 169	1 100 578	1 155 607	1 213 387	1 274 056	1 337 759	1 404 647
Other revenue	11 000	11 110	11 221	11 333	11 447	11 561	11 677	11 793	11 911	12 031
Total financial revenue	961 000	989 610	1 019 076	1 059 503	1 112 024	1 167 168	1 225 064	1 285 850	1 349 670	1 416 678

The figures in the table also show that the real value of revenue cash flows increases year by year due to the increase in sales volumes and the production of products with higher results. We planned to strengthen thecommercial part with the involvement of new dealers and the creation of a separate foreign network of agents. As a result, the Company could sign with a further business chain dealing with sleep culture, as well as the hotel market as a new sales area. As a result of technological development, efficiency increases and capacity increases, so the company can produce more mattresses.

Cash flows needed to calculate return indicators (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Name	**2 019**	**2 020**	**2 021**	**2 022**	**2 023**	**2 024**	**2 025**	**2 026**	**2 027**	**2 028**

1. Investment cost	*147 000*	*0*	*0*							
2. Operating cost	*910 000*	*949 800*	*981 666*	*1 019 832*	*1 050 422*	*1 082 235*	*1 115 332*	*1 149 779*	*1 185 643*	*1 222 997*
3. Cash-flow of expenditure (1+ 2)	**1 057 000**	**949 800**	**981 666**	**1 019 832**	**1 050 422**	**1 082 235**	**1 115 332**	**1 149 779**	**1 185 643**	**1 222 997**
4. Financial revenue	*961 000*	*989 610*	*1 019 076*	*1 059 503*	*1 112 024*	*1 167 168*	*1 225 064*	*1 285 850*	*1 349 670*	*1 416 678*
5. Revenue cash flow (4)	**961 000**	**989 610**	**1 019 076**	**1 059 503**	**1 112 024**	**1 167 168**	**1 225 064**	**1 285 850**	**1 349 670**	**1 416 678**
6. Residual value										
7. Net total financial cash flow (5+ 6-3)	**—96 000**	**39 810**	**37 410**	**39 670**	**61 603**	**84 933**	**109 731**	**136 071**	**164 027**	**193 681**
8. Financial net present value	**FNPV**	**515 997**								

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The net total financial cash flow is still negative in the first year of the reference period under consideration, due to the cost of investment incurred but at a positive and increasing pace thereafter. The table shows that the development will have a positive long-term impact on Bio-Textima's turnover and profitability.

Therefore, the financial sustainability of variation B can be justified, the net present value of the cash flows exceeds half a billion forints during the period considered, but it is not recommended for implementation, because it is not the most flexible variation

Evolution of wastes

In this version, the amount of waste generated is increasing due to an increase in production by 15-20 %.

The proportion of previously produced textile waste accounted for between 5 % and 6 % of the fabric. If version B is implemented, the waste ratio is reduced to about half, i.e. 2-3 %, due to technological development. As a result, the waste per mattress will be considerably less.

3.6. "C" Available variation

A detailed financial analysis of the proposed 'C' variation is presented in point 7 of the feasibility study.

Technical and technical description, conditions

Bio-Textima Kft. in the framework of the feasible variation "C"

- introduces a new integrated company management system and the acquisition of the necessary IT facilities;
- It also implements the development of manufacturing technology

- and logistical development, as follows:
  - construction of tarpaulin warehouses, storage shelves in tarpaulin warehouses, acquisition of material handling equipment
  - logistics process development

If the development is realised, the production of the Company becomes more efficient with the help of the corporate governance system and the development of the production technology, the detailed description of which can be found in the feasible variation point "B".

In the framework of logistical development, warehouse expansion would take place. A 700 m^2 ponyvasator with a concrete surface would be placed by the Company near the production hall. Thus, the company's extra warehouse capacity would be about 2600 m^3. The company would place shelves in the tarpaulin warehouse, as well as buy material handling equipment (trucklifts).

With the development of the logistics process, storage space would be developed for optimisation, so all stockholding units would have a pre-defined storage space. The logistical functions of the integrated corporate governance system could be utilised in this implementation version, as the earlier scarce warehouse capacity did not allow the expansion of production or the optimal storage of stored basic and finished products. In this way you can determine the exact demand for materials, electronise delivery, continuously monitor production and stocks. The reorganisation of deliveries will also be the task of developing the logistics process. The aim is to improve efficiency.

Forecast financial conditions

Description of investment costs

Estimation of investment costs (HUF,)

	Year 1
Types of costs	**2 019**
I. Preparation costs for the project	
II.Investments/assets	***182 500***
1. Buying an area	
2. Construction, renovation, extension	30 000
2.1 Construction, renovation and expansion by external contractors (passenger)	30 000
2.2 Construction, renovation and extension of self-performance	
3. Acquisition of assets (IT tools, technological development, storage shelves, handling equipment)	130 500
4. Acquisition of intangible assets (Integrated corporate governance system)	22 000
III.Services	***3 000***

1. Professional services used for project implementation (Integrated corporate governance system education, IT system installation, etc.)	3 000
Total cost total	**185 500**

Amount of investment: **185.500.000,- HUF**

Development of operating costs and revenues

Cash flows needed to calculate return indicators (HUF,)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Name	**2 019**	**2 020**	**2 021**	**2 022**	**2 023**	**2 024**	**2 025**	**2 026**	**2 027**	**2 028**
1. Investment cost	*185 500*	*0*	*0*							
2. Operating cost	*945 000*	*1 063 500*	*1 181 900*	*1 302 090*	*1 394 388*	*1 466 566*	*1 504 703*	*1 557 909*	*1 613 236*	*1 670 782*
3. Cash-flow of expenditure (1+ 2)	**1 130 500**	**1 063 500**	**1 181 900**	**1 302 090**	**1 394 388**	**1 466 566**	**1 504 703**	**1 557 909**	**1 613 236**	**1 670 782**
4. Financial revenue	*961 000*	*1 103 610*	*1 267 596*	*1 405 910*	*1 531 535*	*1 607 654*	*1 687 574*	*1 771 485*	*1 859 588*	*1 952 091*
5. Revenue cash flow (4)	**961 000**	**1 103 610**	**1 267 596**	**1 405 910**	**1 531 535**	**1 607 654**	**1 687 574**	**1 771 485**	**1 859 588**	**1 952 091**
6. Residual value										

7. Net total financial cash flow (5+ 6-3)	**— 169 500**	**40 110**	**85 696**	**103 820**	**137 147**	**141 088**	**182 871**	**213 577**	**246 352**	**281 309**
8. Financial net present value	**FNPV**	**853 153**								

We used a nominal discount rate of 5 % for thepresent value. The financial net present value of the project (FNPV) is positive for the reference period of 10 years, in terms of amount: 853 million forints.

The net total financial cash flow is still negative in the first year of the reference period under consideration, due to the cost of investment incurred but at a positive and increasing pace thereafter. The table shows that the development will have a positive long-term impact on Bio-Textima's turnover and profitability.

Therefore, the financial sustainability of the variation "B" can be justified, the net present value of the cash flows exceeds HUF 850 million during the period considered, and this version is proposed for implementation, as this is the most flexible variation.

Evolution of wastes

In this version, the amount of waste generated is increasing due to an increase in production by 40-60 %.

The proportion of previously produced textile waste accounted for between 5 % and 6 % of the fabric. If version C is implemented, the waste ratio is reduced to about half, i.e. 2-3 %, due to technological development. As a result, the waste per mattress will be considerably less.

3.7. Select the most appropriate version

Main data of the individual versions (HUF,)

Name	"A"	"B"	"C"
I. Preparation costs for the project			
II.Investments/assets	***32 000***	***144 000***	***182 500***
1. Buying an area			
2. Construction, renovation, extension			30 000
2.1 Construction, renovation and enlargement by external contractors			30 000
2.2 Construction, renovation and extension of self-performance			
3. Acquisition of assets (IT assets)	10 000	122 000	130 500

4. Acquisition of intangible assets (Integrated corporate governance system)	22 000	22 000	22 000
III.Services	***3 000***	***3 000***	***3 000***
1. Professional services used for project implementation (Integrated corporate governance system education, IT system installation, etc.)	3 000	3 000	3 000
Total cost total	**35 000**	**147 000**	**185 500**
Financial net present value FNPV	**257 700**	**515 997**	**853 153**
Financial sustainability	**Yes**	**Yes**	**Yes**
Net cumulative financial cash flow rate positive each year (period reference period)	**Yes**	**Yes**	**Yes**
Evolution of wastes	**Does not change**	**the percentage of waste per mattress is reduced to 2-3 %**	**the percentage of waste per mattress is reduced to 2-3 %**
Is it proposed for implementation?	**No**	**No**	**Yes**
Proposed order for implementation	**3.**	**2.**	**1.**

The “0” solution has been discarded because it is not financially sustainable and has not been included in the analysis.

It can be seen from the above that 3 alternatives have been outlined and analysed. From these options A differs in terms of technical content and the amount of the investment in options B and C.

For each alternative, the following conclusions can be drawn:

Comparison of variants A and B and C

The investment value of version C is the largest. In terms of operation, the ‘C’ version also shows the highest financial revenue and the highest operating cost. The financial net present value is also realised for version C, which is the most financially sustainable option.

Furthermore, for version C, it can be stated that the amount of waste is significantly reduced when proportional per product is achieved.

Given the feasible investments and the evolution of net accumulated financial flows, the implementation of version C is clearly considered to be more favourable in terms of both financial sustainability and economy and falls into the most favourable category of waste management, so we recommend that it be implemented.

4. Development of implementation variations

4.1. Presentation of technical content

Bio-Textima Kft. in the framework of the proposed "C" feasible variation

- introduces a new integrated company management system and the acquisition of the necessary IT facilities;
- It also implements the development of manufacturing technology

- and logistical development, as follows:
  - construction of tarpaulin warehouses, storage shelves in tarpaulin warehouses, acquisition of material handling equipment
  - logistics process development

Technical and technical description, conditions

In the framework of the development, Bio-Textima Kft. introduces a new integrated company management system, as well as the acquisition of the necessary IT tools.

If thedevelopment is realised, the production of the Company becomes more efficient through the integrated **corporate governance system**,

- The processes become predictable, as in the case of an incoming order, it is possible to plan exactly when the raw materials are needed in the warehouse and from there to the production process.
- By introducing a more modern corporate governance system, the company is able to make the procurement processes of outstanding importance in production and production more efficient, thereby reducing the need for human work in procurement and the resulting error rate, and information can be obtained from the corporate governance system for more efficient traceability.
- significantly improve the availability and reliability of the information required for management decisions;
- increase productivity and/or decrease the required number (with unvariable performance),
- the company's management system provides data for the transformation of the product portfolio, the establishment of a controlling system,
- system-based cost and hedging costs can help determine which products are more economical, which products are less profitable.

The acquisition of modern IT tools will make work more efficient and will be able to operate an integrated corporate governance system. The company plans to purchase the following assets:

- 18 computers with monitor
- printers,
- multifunction printers
- barcode readers
- server
- rebuilding the network

In the framework of technology development

- automatic tailoring machine,
- side element manufacturing machinery,
- machinery for slicing fabrics,
- clearing and zipper sewing machines, and
- a MATRACMAG machine would be purchased.

The automatic tailoring machine allows optimum tailoring and contributes to accelerating production. The designed tailoring machine is fast, extremely low energy consumption and works completely digitally. Other benefits include: there is less energy consumption, flexible technological use, combined with automatic conveyor transmission and stripping system, which allows continuous tailoring throughout the entire length, optimisation of productivity and the best use of space and workforce. The automatic tailoring machine provides the opportunity to detect manufacturing defects, with the help of a repair station, the mismatched materials have gone into waste so far, and then they can be repaired. It is very important that due to optimum cutting, the resulting waste will also be reduced.

The side element machine produces the side element of the mattresses, the battery is produced in one step, not per activity, so there is no waste.

The tissue slicing machine can cut up to 50 to 70 meters of fabric in one step, so there are also fewer corpses.

The workflow, automated, improves efficiency significantly with the clarification and zipper sewing machine.

Amattress-seed machine can be used to replace manual work. Previously, the mattress was constructed in a manufactural way, after the development the mattresses can be assembled much faster and in a constant quality.

Infrastructural development will not be necessary, machinery can be installed in the existing production hall, so no works are required for technological development.

In the framework of logistical development, warehouse expansion would take place. A 700 m^2 ponyvasator with a concrete surface would be placed by the Company near the production hall. Thus, the company's extra warehouse capacity would be about 2600 m^3. The company would place shelves in the tarpaulin warehouse, as well as buy material handling equipment (trucklifts).

With the development of the logistics process, storage space would be developed for optimisation, so all stockholding units would have a pre-defined storage space. The logistical functions of the integrated corporate governance system could be utilised in this implementation version, as the earlier scarce warehouse capacity did not allow the expansion of production or the optimal storage of stored basic and finished products. In this way you can

determine the exact demand for materials, electronise delivery, continuously monitor production and stocks. The reorganisation of deliveries will also be the task of developing the logistics process. The aim is to improve efficiency.

4.2. Operational and operational proposal

After the investment has been completed, the resulting capacities will continue to be operated by Bio-Textima Kft. The new warehouse (passenger) and new technology are integrated into the organisation. According to the calculations, the investments do not require additional workforce and restructuring, and the exact redeployment plan will be developed later by the Company.

4.3. Roadmap for action - proposal

Timetable for technical implementation

The implementation of the investment will be based on the following timetable:

Start date of investment: 2019.06.01.

Completion of investment: 2019.06.30.

Installation of an integrated corporate governance system + acquisition of IT asset centres: 2019.06.15. — 2019.06.30.

Production technology development: 2019.06.10. — 2019.06.30.

Logistics development

Tarpaulin warehouse + shelves: 2019.06.10. — 2019.06.30.

Logistics process development: 2019.06.01. — 2019.06.30.