PLANNING A FRUIT PROCESSING PLANT BASED ON THREE SCENARIOS

Brigitta ZSÓTÉR
Bence BAGI

Abstract: *We have compiled the financial planning of a fruit processing plant in county Bács-Kiskun. After visiting existing plants and similar activities, family farms, apple orchards and collecting interviews and company data with plant managers, we planned our own investment project. The project NTP-HHTDK-20-0001 provided assistance for professional field trips and data collection. The company of the biggest dimension has 50 partners who farm approximately 1,000 acres. They produce mainly elderberry and apple juice. Taking tender opportunities into account we carried out our financial pre-calculations. We have compiled three scenarios. In the case of the first, we performed calculations financed exclusively from equity, without leverage, and in the case of the second and third, we performed our financial calculations taking into account the tender possibilities. For all three cases we applied the NPV, IRR, PB, DPB and PI indicators. As it turned out, the two calculations financed by tenders are more economical so they should be performed in the future.*
Keywords: *farm visits, field trips to apple orchards, fruit processing plant, economic calculations*

1. INTRODUCTION

Fruit and vegetable production and food industry are in very close connection, since food-processing companies are established in the catchment areas of producers (Illés 2015), that is why most of the vegetable and fruit-processing companies can be found on the Great Plain, besides Budapest and the region of Nyírség. About 2,0-2,5 million tons of vegetable and fruit are produced in Hungary every year (Végh, Illés 2011). Of course, it depends on the climate of the given year, the quantity of precipitation, the volume of ice damage, and the number of hours of sunshine. The two most significant vegetables to be processed are sweet corn and green peas in Hungary. It is true for both that two-thirds of the amount produced is processed in the canning industry and one-third in the refrigeration industry (Dudás et al., 2016).

More than 80% of fruit-procession is made up by the production of industrial apple concentrate and juice. It means about 500 000 tons of processed fruit annually. In the ranking, apples are followed by cherries with a yield of approximately 70,000 tons, which is significantly less in volume than in the case of apples (Medina, 2005).

The largest fruit and vegetable processing company in Hungary is Bonduelle Central Europe Kft., which was founded in 1853, and this French-owned factory has been operating in Hungary for more than 25 years. It first privatized the site of the Nagykőrös Cannery in 1992, and later in 2003 acquired the Békéscsaba Cannery, too. Its third plant is in Nyírszőlős, which has been owned by the large company since 2012 (Dudás et al., 2016).

Pentafrost Ltd. has been operating for more than 25 years and it is engaged in the production and marketing of quick-frozen fruits and vegetables. On the basis of its sales revenue, it is the largest refrigeration company in the Hungary. The company is 100% Hungarian-owned and two of its three plants are located in Debrecen and the other in Vasmegyer. Fevita Hungary Zrt. also produces vegetables and fruits. The plant started operating in 1967 as a factory unit of the National Refrigeration Company. After its termination in 1988, it operated as the Székesfehérvár Refrigeration Company, and later from 1991 under the name of Székesfehérvár Refrigeration Rt. The Fevita brand appeared in 1995 and has been in the name of the company since 2011 (Dudás et al., 2016).

The absolute market leader in fruit juice production is Rauch Hungaria Kft., which was founded in 1994 and built its plant in Budapest. To this day, Hungary and most of the Eastern European market are supplied with fruit juice and tea-based soft drinks from here (Dudás et al., 2016).

Sió-Eckes Kft. was in the second place, which has been very popular for a long time, but in 2012 the sales revenue of Agrana Juice Magyarország Kft. exceeded that of Sió. The Siófok State Farm first appeared on the market in 1977 under the brand name Sió. After the change of regime, Sió-Nektár Kft. was established in 1991, which was purchased by Eckes AG, Europe's leading fruit fly producer, and Sió-Eckes Kft. was established (Dudás et al., 2016).

After visiting the above-mentioned plants and companies with similar activities nationwide, family farms, apple orchards in Nyírség and collecting interviews with plant managers and company data, we planned our own investment project. The project NTP-HHTDK-20-0001 provided assistance for professional field trips and material collection, and Bence Bagi wrote his scientific student dissertation on this topic, the results of which are published here.

2. MATERIAL AND METHOD

By performing the following calculations, our goal is to get an idea of whether it is worth embarking on a project that requires so much capital for those thinking in a similar investment and for ourselves. Fruit production in Hungary currently exceeds the processing capacity of our factories and as a result, a lot of unprocessed goods leave for Austria, Germany and the surrounding countries. Another burning problem today is the issue of food waste (Makányné Kiss, Gál 2019). Our goal is to represent higher added value with processed food products and to strengthen our domestic GDP by exporting our products with higher profits (Kis 2019). During the study, we assess the need for the investment on the basis of 5 main economic indicators. These are NPV (Net Present Value), IRR (Internal Rate of Return), PI (Profitability Index), PP (Payback Time), DPP (Discounted Payback Time). We collected the data necessary for performing our calculations from fruit processing plants of similar activities. We compared the investment of the fruit processing plant ont he basis of three scenarios: in the case of the first, we performed calculations financed exclusively from equity, in the case of the second financial taking into account the tender possibilities individually, while in the third case using tender opportunities as a consortium.

3. RESULTS OF OUR OWV RESEARCH

The cost value of the fruit processing plant is HUF 167,550,000. Using the straight-line method of depreciation for 15 years, the annual rate of depreciation is HUF 11,170,000.

The economic calculations require revenues and expenses generated during the operation of the equipment, as well as cash flows during the useful life. We deducted the annual cost and depreciation from the annual sales, then calculated the corporate tax rate, which was also deducted, then added the depreciation rate to all of it, and finally we got the annual net cash flow. Our calculations were performed using Microsoft Excel (Hampel, 2019). Since we calculated the economic levels in the first case of investment entirely on its own with 0% support, in the second case with the involvement of 50% tender funds, and then in the third case with 60% tender funds as a consortium, we will calculate with these values in the future.

The operating cash flow is HUF 28,305,300.

During the implementation of the first scenario, we carried out the project calculations only on its own. The Net Present Value (NPV) showed a positive value of 25,237,398, i.e., greater than 0 so the investment increases

the value of the business. The Internal Rate of Return (IRR) is 15%, which is higher than the 12% return expected by investors. The Profitability Index (PI) can be read from *Table 1* that it is greater than 1, so the investment will be profitable, as we can realize a revenue of HUF 1.15 for each forint spent. The payback period (PB) is less than the useful life of the investment, which is defined as 15 years, so the return on investment under 5,919 years shows a positive value for investors. Reading the value of the Discounted Payback Time (DPB) from the annuity table it is between the 10th and 11th year of the investment.

Table 1: Results from the calculations Scenario I

Name	Minimum values	Calculated results
Net Present Value (NPV)	NPV > 0	NPV = 25.237.398
Internal Rate of Return (IRR)	IRR > 12%	IRR = 15%
Profitability Index (PI)	PI > 1	PI = 1,15
Payback Period (PB)	PB < 15 year	PB = 5,919 year
Discounted Payback Time (DPB)	DPB < 15 year	DPB = 10-11 year

Source: Authors' edition

Thus, we can conclude that it is worthwhile to start a fruit processing plant investment of 167,550,000 HUF, as all economic indicators showed a positive value and, as we explained in the literature, there is a huge need to expand the country's fruit processing capacity.

Table 2: Results from the calculations Scenario II

Name	Minimum values	Calculated results
Net Present Value (NPV)	NPV > 0	NPV = 109.012.398
Internal Rate of Return (IRR)	IRR > 12%	IRR = 32%
Profitability Index (PI)	PI > 1	PI = 2,30
Payback Time (PB)	PB < 15 year	PB = 2,96 year
Discounted Payback Time (DPB)	DPB < 15 year	DPB = 4 year

Source: Authors' Edition

During the implementation of the second scenario, we performed the project calculations using a 50% intensity application source. The Net Present Value (NPV) showed a positive value of HUF 109,012,398, ie greater than 0, so the investment increases the value of the business. The Internal Rate of Return (IRR) is 32%, which is higher than the 12% return expected by investors. The Profitability Index (PI) can be read from Table 2 that it is greater than 1, so the investment will be profitable, as we can realize a revenue of HUF 2.30 for each forint spent. The payback period (PB) is less

than the useful life of the investment, which is defined as 15 years, so a return on investment of less than 2.96 shows a positive value for investors. Reading the value of the Discounted Payback Time (DPB) from the annuity table, it is in the 4th year.

Thus, we can state that it is more worthwhile to start a ó fruit processing plant of HUF 167,550,000 with the investment with a 50% intensity tender source, as all economic indicators showed a positive value, and this scenario is significantly more favorable than Scenario I.

Table 3: Results from the calculations Scenario III

Name	Minimum values	Calculated results
Net Present Value (NPV)	NPV > 0	NPV = 125.767.398
Internal Rate of Return (IRR)	IRR > 12%	IRR = 38%
Profitability Index (PI)	PI > 1	PI = 2,87
Payback Time (PB)	PB < 15 year	PB = 2,37 year
Discounted Payback Time (DPB)	DPB < 15 year	DPB = 3 year

Source: Authors' Edition

During the implementation of the third scenario, we performed the project calculations for consortia with the involvement of a 60% intensity tender. The Net Present Value (NPV) showed a positive value of 125,767,398, i.e. greater than 0 so the investment increases the value of the business. The Internal Rate of Return (IRR) is 38%, which is higher than the 12% return expected by investors. It can be read from the Profitability Index (PI) table that the investment will be more than 1, so the investment will be profitable, because I can realize a revenue of HUF 2.87 for each forint spent. The payback period (PB) is less than the useful life of the investment, which is defined as 15 years, so a return on investment of less than 2.37 years is a positive value for investors. The value of the Discounted Payback Time (DPB) can be read from the annuity table, which is the 3rd year.

4. SUMMARY

Thus, we can state that the third scenario proved to be the most economical based on the calculations and it is more worthwhile to start a fruit processing plant of HUF 167,550,000 as a consortium with 60% intensity tender funds, as all economic indicators showed a positive value and this scenario is significantly more favorable than Scenarios I and II. Furthermore, as we have explained in the literature section, there is a huge need to expand the country's fruit processing capacity in order to sell a lot of fruit produced

with higher added value. In the future, it would be very important to examine the production capacity as well (Csontos, Gál 2019). Future plans may include the involvement of the plant in agro- and gastro-tourism (Sava 2016).

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NOTES ON THE AUTHORS

Brigitta ZSÓTÉR (Dr. habil. PhD) economist, associate professor; University of Szeged, Faculty of Engineering, Department of Engineering Management and Economics, Mars ter 7. 6724 Szeged, Hungary; phone: +36 62 546 569; email: zsoterb@mk.u-szeged.hu.

Bence BAGI (Eng.) University of Szeged, Faculty of Engineering Department of Engineering Management and Economics, Mars ter 7. 6724 Szeged, Hungary.