

## ECONOMIC CALCULATIONS RELATED TO THE PURCHASE OF PACKAGING MACHINES IN A POULTRY PROCESSING PLANT

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### **Abstract**

*We completed an examination for a poultry processing plant which intends to purchase packaging equipments. On the basis of the tenders we carried out some dynamic economic examinations on the investment. We calculated the following values: discounted payback time, NPV, IRR, PI. We concluded that it would be worth purchasing the model with modified atmosphere of the Multivac R225 vacuum packaging machine.*

**Key words:** poultry processing plant, packaging equipment, discounted payback time, Net Present Value, Internal Rate of Return, Profitability Index,

### **INTRODUCTION**

In this present study of ours we are giving a report on the results of our activity of preparation in making a decision prior to exchanging the packaging machines of a poultry processing plant. In one of our previous studies we have published the results of the preparatory shelf and customers satisfaction surveys which concluded that for the company it is worth investing into new packaging equipments. We continued the examination the results of which will be presented hereby. Our objective was to give the company management clear information on which tender for the machines given by two equipment supply companies is the most economic for the company. Basically, we accomplished some economic calculations which are the following: NPV (Net Present Value), IRR (Internal Rate of Return), PI (Profitability Index) and discounted payback time.

### **MATERIAL AND METHOD**

Our methods of examination were the economic indicators. We used only dynamic indicator: discounted payback time, NPV, IRR and PI.

The discounted payback time shows in how many years the initial capital investment can be refunded from the operating cash flow (Illés Iné, 2002). The maximum discounted payback time is nothing else than the length of useful life.

The net present value (NPV) is the most frequently used indicator of the dynamic indicators (Rose, 1986).

$$NPV = -C_0 + \sum_{t=1}^n \frac{C_t}{(1+r)^t} = -C_0 + PV$$

It can be seen from the formula that the net present value is an indicator of a difference-type which shows that how big the net asset growth is after deducting the initial capital investment from the discounted sum of the cash flow during the period of the investment.  $C_0$  is the initial cash flow, while  $C_t$  indicates the operating cash flow in each year,  $r$  means the interest rate and  $t$  the time (Magyar, 2009). If the sum of NPV is bigger than 0, the investment presumably increases the company's value so the project has to be accepted. If its sum is smaller than 0, the realization of the project might reduce the company's value so the investment has to be rejected. If it is equal to 0, the investment is neutral because it will not change the company's value (Illés, 2009).

The internal rate of return (IRR) is defined as the interest rate by which the cash flows in the project are discounted and their combined present value is exactly same as the initial cash flow, so  $NPV=0$  (Cinnamon and Helweg-Larsen, 2005).

$$-C_0 + \sum_{t=1}^n \frac{C_t}{(1+IRR)^t} = 0$$

The IRR has to be bigger than the profit expected by the owners. The specialized literature allows if the IRR is equal to 0, the proposal for the investment can be accepted.

The profitability index (PI) expresses how much profit in Ft 1 Ft of investment will produce owing to the investement.

$$PI = \frac{\sum_{t=1}^n \frac{C_t}{(1+r)^t}}{C_0}$$

The investment proposal can only be accepted if the indicator is at least 1 or more than that.

We completed the calculations by three scenarios which were defined as the rates of 33-, 66-, and 100% of production (Brealey et al, 2005). The data necessary for the calculations were provided by the company management and estimations were also accomplished by them.

## RESULTS AND DISSCUSIONS

The cost of the T700 automatic tray sealing packaging machine proposed by the Multivac, if it is fitted for modified atmosphere packaging, is 63.406.449 Ft, if it is suitable only for sealing packages without modified atmosphere, it costs 59.022.203 Ft.

The cost of the vacuum packaging machine, if it is fitted for modified atmosphere packaging, is 80.041.346 Ft, while its model which is suitable for packaging without modified atmosphere costs 73.302.165 Ft.

The model with modified atmosphere of the automatic tray sealing packaging machine Sealpac A6 proposed by the Victus Ltd. is 66.661.553 Ft, while the model without modified atmosphere is 53.192.012 Ft.

The model with modified atmosphere of the Sealpac RE25 vacuum packaging machine costs 84.712.863 Ft while the one without modified atmosphere 74.676.772 Ft.

On the basis of the tenders we completed the calculation of indicators which we do not intend to detail because of the scope restrictions. We got the following results.

- Multivac T700 with modified atmosphere with 100% production expected from the company: NPV= -42 172 754.43 Ft. Discounted payback time= 20,9 years. PI= 0,3349. IRR: its calculation would have been useless because the investment would not be refunded even with an internal rate of return of 0%.

- Multivac T700 without modified atmosphere with 100% production expected from the company: NPV= -45 394 801.24 Ft. Discounted payback time = 30.32 years. PI= 0.2309. IRR= its calculation would have been useless because the investment would not be refunded even with an internal rate of return of 0%.

- Sealpac A6 with modified atmosphere with 100% production expected from the company: NPV= -45 427 858.43 Ft. Discounted payback time = 21.98 years. PI= 0.3185. IRR: its calculation would have been useless because the investment would not be refunded even with an internal rate of return of 0%

- Sealpac A6 without modified atmosphere with 100% production expected from the company: NPV= -39 564 610.24 Ft. Discounted payback time = 27.32 years. PI= 0.2562. IRR= its calculation would have been useless because the investment would not be refunded even with an internal rate of return of 0%.

- Multivac R225 with modified atmosphere with 100% production expected from the company: NPV= 94 281 942.63 Ft. Discounted payback time = 3.21 years. PI= 2.1779. IRR: 24-25%.

- Multivac R225 without modified atmosphere with 100% production expected from the company: NPV= 46 010 866.18 Ft. Discounted payback time = 4.30 years. PI= 1.6277. IRR= 13-14%.

- Sealpac RE25 with modified atmosphere with 100% production expected from the company: NPV= 89 610 425.63 Ft. Discounted payback time = 3.40 years. PI= 2.0578. IRR: 22-23%.

• Sealpac RE25 without modified atmosphere with 100% production expected from the company: NPV= 44 636 259.18 Ft. Discounted payback time = 4.38 years. PI= 1.5977. IRR= 13-14%.

## CONCLUSIONS

On the basis of our calculations we had the following proposals: it can be said about the Multivac T700 and Sealpac A6 tray sealing machines either with or without modified atmosphere that each of the requirements is well under the acceptance threshold. We do not suggest purchasing any of these machines because products packed by the tray sealing machine belong to that low price category that the machines should operate for min. 20 years with 100% of production in order to be economic. However, their useful life is only 7 years.

In case of vacuum machines we got different results. In both cases the acceptance requirements are well-performed. What is more, the models with modified atmosphere of the two machines are worth the money the most.

We talk about investment proposals which mutually exclude each other so on the basis of the results, we proposed that the model with modified atmosphere of the Multivac R225 vacuum packaging machine would be the most economic, since in this present case the NPV is the main criterion for decision. This tender has the highest net present value. In addition, its internal rate of return and performance indicator are also the highest. Of course, this choice is valid for scenario analyses which consider production levels of 66% and of 100%. In case of a production level of 33% it would not be worth purchasing this machine, either.

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