

## RESEARCH ON THE EVALUATION OF INVESTMENTS IN AGRICULTURE USING A COMPUTER APPLICATION

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**Abstract.** *The study of the procedures for choosing the investment projects is of great interest, for all the companies, the investment decision having a strategic character. Thus, I propose the development of an information system for the evaluation of investments in agriculture. This system will include three modules: Investment Efficiency, Sensitivity Analysis of Investment Projects and Risk Analysis. After such an evaluation of the investments, it will be possible to compare one investment with another, in addition to the conclusion of its viability.*

**Keywords:** *income, expenses, risks, financial decisions.*

### Introduction

The decision-making process can be partially or completely automated, but the decision is a human privilege - the man formulates the problems, chooses the evaluation criteria, sets the priorities, validates the stages, evaluates. He is the one who sets the final choice, he has the decision-making responsibility. According to one of the largest planning systems companies, Lysia Limited in London, 60% of small and medium business failures are caused by incompetent management, poor marketing and competition prospecting, poor funding or inadequate, poor computerization in the managerial field [1].

The success of a business depends on many factors. The most important thing, however, is to study every aspect of the business before consuming money and time [2].

In making the decision to make an investment, the most important thing is to develop a realistic and feasible plan. The study of investment project selection procedures is of great interest both for large companies, which are constantly faced with the need to invest, and for small or medium-sized companies, in which the investment decision has a strategic character [3]. Therefore, during this period it is necessary for the decision makers to have tools to assist them in making the decision [4]. In this context, I propose the development of an information system for evaluating investments in agriculture. This system can be used for integrated data processing in order to rigorously substantiate investment decisions.

The evaluation of investments in agriculture through the use of computer applications consists in the development of a computer application in view of the fact that the administration and financial management of a company can no longer rely exclusively on the "flair" and intuition of managers.

The effectiveness of initiatives can only be ensured to the extent that decisions are well-founded through elaborate, timely information, which is inconceivable today without the use of electronic computers [5]. In this context, computer applications are transformed from management tools into means of knowledge and decision.

### Description of the IT application for the evaluation of agricultural investments

The economic-financial analysis is manifested as a tool of scientific research of agricultural holdings [6]. It also has a diagnostic function - helping to diagnose the various economic and financial results in terms of the causal relationships that determined them and the requirements of the stage and a regulatory function - helping to improve these results.

The composition of the proposed application includes a module that focuses on investment.

**The efficiency of the investment** from a quantitative point of view has a general character. It can be used to evaluate any type of investment.

The analysis of the economic efficiency of the projects is done in this case by calculating the main indicators of the economic efficiency of the investments, the result being expressed in percentages that reveal the viability of the investment [7].

The data entering the mode are: the value of the investment, the duration of efficient operation, the type of depreciation, the residual value at the end of the period.

Also, if external loans are used, the amount of the loan, the repayment period and the interest can be entered, and the program calculates the monthly rate to be paid.

For all the amounts specified below - prices, revenues, expenses - forecasts will be made throughout the life of the objective.

For the calculation of sales revenue (Vs) will be taken into account:

- unit selling price each year (P)
- quantities expected to be sold annually (Q)

$$V_s = P \times Q \quad (1)$$

If there are other sources of income (V) - from operating  $V_o$ , financial (eg. subsidies)  $V_f$  or exceptional  $V_{ex}$  - the total income is calculated with the formula:

$$V = V_v + V_o + V_f + V_{ex} \quad (2)$$

The costs (C) considered are: production costs; rents and possible monthly payments; staff costs; taxes and fees; interest and loans; other expenses.

Gross profit (Gp) is calculated by the formula:

$$G_p = V - C \quad (3)$$

Net profit (Np) is determined by deducting from net profit the profit tax (Ip):

$$N_p = G_p - I_p \quad (4)$$

### ***Sensitivity analysis of investment projects***

Over time, there may be some causes that can influence the economic results, such as: prolongation of the goal, exceeding the volume of investments initially planned, rising prices for raw materials and materials, rising wages, changing product prices. Therefore, it is necessary to carry out a sensitivity analysis of investment projects. This analysis aims to establish how sensitive the future investment objective will be to some changes, especially negative ones, that appear during its future operation.

All of these changes result in changes in the internal rate of return and net present value (NPV), which requires an analysis of the sensitivity of investment projects to the various changes that may occur by recalculating these amounts.

The program allows to take into account the simultaneous change of several variables (discount coefficient, investment value, duration of the project) and to determine their influence on the internal rate of return and updated net income. For easier interpretation of the results, the program may have graphical features.

For example, the slope of curved graphs can show how sensitive the NPV of an investment project is to changes in each of the determinant variables (the steeper the slope of the curve, the more sensitive the NPV).

To determine the level of risk associated with a project, the module - ***Risk Analysis*** - proposes to complete a questionnaire on the values of certain indicators. Depending on the answer selected, each criterion is given a grade from 1 to 3. Each criterion is also given a weight, depending on its importance.

The score associated with each project is calculated by making a weighted sum of the marks awarded. The higher the score, the riskier the project. Let  $X$  be the score obtained. Its evaluation is done as follows:

- if  $X > 2$ , then the project is very risky and it is recommended that the investment not be made.
- if  $1 \leq X \leq 2$ , then the risk attached to the project is medium. An analysis is needed to identify weaknesses in the project.
- if  $X < 1$ , then the risk attached to the project is small.

Thus, managers of agricultural companies will be able to easily compare one investment with another, in addition to the conclusion of its viability.

### Conclusions

The computerization of decisions is determined by the knowledge of managers and skills necessary for the proper use of computer technology, equipping companies with computers, the existence, at the company level, of information banks necessary in the decision-making process and in evaluating the effects of decision implementation. To meet the information needs of managers, the existence of an information system.

A well-organized information system in the financial field that contains relevant indicators for managers, calculated on the basis of accurate and real information, acquires an increasingly important role, both for the company in question and for its business partners. In addition, the indicators resulting from the financial analysis can be used to make a diagnosis of profitability, risk and value.

### References

1. Cofas Elena, 2009, Eficienta sistemelor informatice in analiza rentabilitatii exploatatilor agricole, Editura ArsAcademica Bucuresti;
2. Onofrei M., 2007, Managent Financiar, Editura C.H. Beck, București;
3. Achim, M.V. & Borlea, S.N. 2012. Analiza financiară a entității economice, Editura Risoprint, Cluj-Napoca;
4. Ameer, R. & Othman, R., 2012. Sustainability practices and corporate financial performance – A study based on the top global corporations, *Journal of Business Ethics*, 108: 61-79;
5. Love, I., 2003, Financial Development and Financing Constraints: International Evidence from the Structural Investment Model, *Review of Financial Studies*, vol. 16(3): 765-791,
6. Patnaik, S.; Ip, A.W.H.; Tavana, M.; Jain, V. (Eds.) 2020. *New Paradigm in Decision Science and Management*. In *Proceedings of ICDSM 2018; Advances in Intelligent Systems and Computing*; Springer: Singapore.
7. Räisänen, J.; Tuovinen, T., 2020, Digital innovations in rural micro-enterprises. *Journal Rural Studies*, 73, 56–67.