COMPUTER MODEL USED TO CALCULATE PROFITABILITY AND ECONOMIC RISK ON FARMS

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Abstract

Economic information is an essential element of progress, being present in all fields. With the development of market economy must grow and economic information in order to reflect as accurately as patrimonial situation and results of financial and economic activity of enterprises. The main source of economic information is the accounting, which is the main instrument of knowledge, management and control of assets and results of any enterprise. In this paper we present a computer model to analyze economic information on the profitability and economic risk, available both in the vegetable farms and for the livestock sector.

Key words: *agriculture, economic risk, income, information systems, profitability*

INTRODUCTION

Information systems for farms aim to support agricultural business in an original and easily accessible, providing information for effective management and efficient organization of farm work [3].
In Romania are becoming more progress in agriculture, an area with much potential. These steps must be taken by a uniform policy through effective rules and technological modernization of agriculture programs that support growth of labor productivity, level of education and skills and the development of products farmers marketing channels.

MATERIALS AND METHODS

Underlying computer models to develop any system and is characterized by a life cycle that begins with the decision of putting together a new system to better meet new user requirements and ends with the decision to replace the existing system with a new more efficient. The life cycle takes place in stages, each stage being defined phases and specific activities[5].
There is a range of approaches to developing computer models. There is a methodology to ensure success of the model. Choosing a methodology for a particular model depends on a number of factors, from the size of the system, criticality of up to factors such as environmental dynamism and organizational culture. The information proposed in this paper is based on a type Methodological Development Rapid Application Development (RAD), which uses minimal planning in favor of making prototypes. Lack of excessive planning generally allows writing code faster and easier changing requirements [10]. RAD involves methods like iterative development and software prototyping and can be seen as a merger of various structured techniques, especially data-driven information engineering, with prototyping techniques to accelerate software systems development.
Development of a new computer model, and then the computer system must be in an early stage of the project to ensure that all functionality can be implemented. In this case, those based on phase are useful in this situation as they provide technology to investigate the possibility to design the end phase [13].

RESULTS AND DISCUSSIONS

Any modern agricultural unit, regardless of size, shape, profile property and socio-economic space in which operate, requires a management style based on flexibility, dynamism and foresight, which is inconceivable without an operative information, complex and quality to provide the basis to take decisions [2]. The continuous development of computer technologies designed for agriculture can have a real impact on improvement of productive activities and agriculture efficiency. Actually, a computer system may become a viable tool in agriculture management process [4].
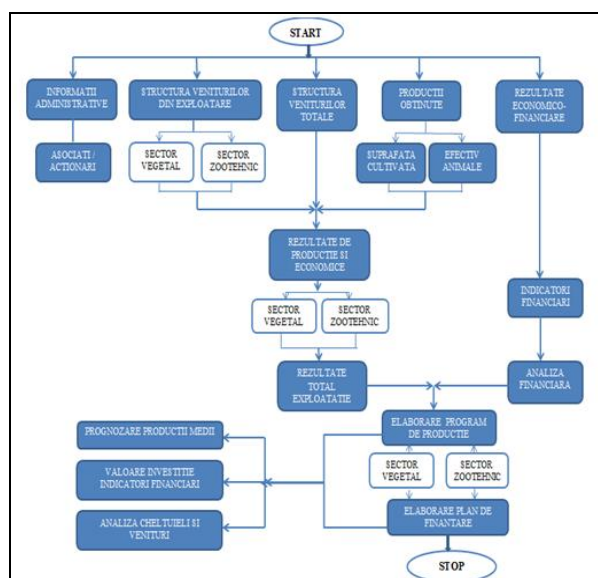

Fig. 1. Flowchart - computer information flow model proposed

I. Flow of information - data entry

In the proposed model the input data will consist of administrative information (general information about farm), information about the structure of operating revenue (MDL) sectors, respectively natty total income structure (MDL) and acreage information about different types of crops (ha) and livestock (number of heads) and obtained production (tones, liters etc.).

Assessment of profitability of an enterprise, using the information in the financial statements involves measuring wealth at a time and during its enrichment and risk assessment of "illiquid" and maintaining the company's capital.
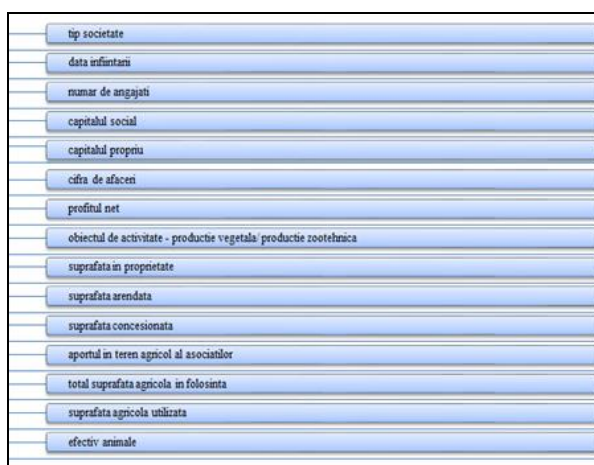

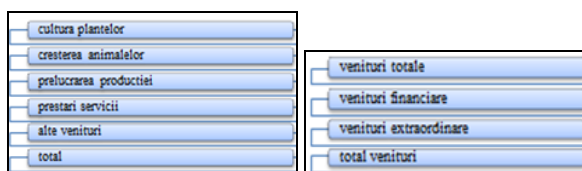Fig. 2. Administrative information

Fig. 3. Breakdown of operating revenues (Ron) sectors / structure total revenues (Ron)

Fig. 4. Acreage/livestock and yields obtained

Under the current economic and financial planning and accounting, profitability indicators are [12]:
-Indicators reflecting net profitability (net profit, return on net) profitability analysis allowing only the total activity of the economic entity;
-Indicators reflecting gross profitability (gross profit, gross rate of return) that facilitate profitability analysis at the level of total business unit and the types of activities or the entire chain organizational structures as well as each product.
The balance sheet is the main source of information, which is based on economic and financial analysis. Balance heritage provides information on assets, liabilities and equity, enabling evidence modalities of financial balance short and long term.

Analysis of internal and external financial balance sheet is to determine a diagnosis on profitability and financial situation and future of society [1].

Fig. 5. Economic-financial results (to be taken from the balance sheet)

Regarding asset items are presented in the balance sheet net of the gross value corrected resulting from impairments observed with continued exercise. Equity is included in a broader category ie permanent capital, which expresses all the sources of finance available to a business. Determining the optimal size of permanent capital is a particular problem in financial management as a possible impairment of long-term sources of liquidity and solvency influence on its profitability.

Profit or loss is the basic source of information to characterize synthesizers profitability as a form of enterprise performance. Profit and loss is the image output of the enterprise to measure business performance by addressing the economic profit, ie the difference between revenues and expenses. The measured performance of a business enterprise during a given period of three ways:

-In terms of *heritage*, by comparing the value of an enterprise on two different times using the same evaluation methods;
-In *economic* terms, the deduction of income, both relating to the same period;
-In *financial* terms, net of amortization of net cash flows.

By providing information explaining the composition of benefits - revenues, expenses, gains, losses - balance actually highlights relationships between these components. Profit and loss will permit assessment of performance indicators: turnover, namely production year, or indicators can be constructed from the information in this document: commercial margin, value added, gross operating surplus by doing the preparation intermediary balance management.

Structure has the advantage of expenses by nature and year of production determine the value added to the enterprise level indicators are placed in the center of profitability analysis. Profit and loss forecast values provides the necessary information and calendar companies' ability to generate cash flows.

Cash flow statement is more used in providing the relevant information on receipts and payments of an enterprise during an exercise to help users of financial statements to assess solvency. Cash flow from operating activities is, in fact, the central indicator of a company situation analysis.

Breakeven reflect the size of the business in which the revenue from sale of goods are equal to the costs (variable and fixed workload related debt), the profit is zero. In conclusion, operating breakeven is where the operating revenues cover operating expenses and operating result is null. After this threshold, the operating activity becomes profitable.

In relation to the dynamic workload of expenditure items are classified into fixed and variable. Variable costs are constant in size per unit (their amount increases with the volume of activity) and fixed costs are variable per unit (their total amount is constant, means that they are reduced while increasing the workload by increasing the degree of utilization of the production capacity). This link between the amount of operating expenses and the workload to be achieved, so sales revenue to cover expenditure incurred is reflected by the profitability threshold [11].

The point of breakeven (neutral) and increase the dead point to the value of 365 days express increased risk of exploitation. From statistical studies deduced that the firm is in a situation:
- Unstable when neutral exceed 304 days ;
- Stable when neutral is between 183 and 304 days;
- Comfortable, when the neutral is more than 183 days.

II.Flow of information - data output
Gross margin (MB) of the difference between the culture crude product (PB) of crop / livestock effectively and expenses proportionally (ChDP). Gross margin is calculated per unit of activity: area (1 ha) and livestock.

$$MB = PB - ChDP$$

The crude product (BP) is the sum of the main output value (PPV) and the second output (VPS), to which was added specific grants (SS) for the crop.

$$PB = VPP + VPS + SS$$

where,
-VPP is obtained by multiplying the selling price at farm level, the output obtained
-VPS secondary output is obtained by multiplying the sale price obtained at the farm level,
- SS are given both farmers and farm level by observing certain criteria.

Direct expenses proportionate (ChDP) are expenses that vary directly with changes in the size of agricultural production (fertilizer costs, seed, feed etc.). These expenses may come in direct proportion purchased inputs (pesticides, fertilizers) or own inputs (eg seeds or concentrated animal consumed on the farm). These values are calculated to estimate the sales price of the farm.

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Besides the direct costs at the farm level, there are overheads, which in turn can be proportional (ChGP) and disproportionate (ChGN).
A proportionate cost at the farm level is the cost of water and electricity.

Fig. 6. Results of production and economic results - the vegetable / livestock

Disproportionate overheads are those that remain unchanged whether or not there is a production activity (eg permanent workers employed expenses, costs of machinery, equipment, buildings).
Overheads with direct costs are total costs at the farm level and general expenses (proportional and non-proportional) with disproportionate direct costs are sometimes called fixed expenses (ChF).

$$ChF = ChGN + ChGP + ChDN$$

Profit is calculated at farm level. If the total income of the farm are greater than total expenses, the firm is profitable. Gross profit is calculated by the difference between total revenue (VT) and total expenditure.
Gross profit = total revenue - total expenses
The gross margin level of manufacturing activity can be formulated as follows:

$$(MB)_i = (PB)_i - (ChDP)_i$$

where:
$(MB)_i$ = gross margin ,,i" business
$(PB)_i$ = product ,,i" activity
$(ChDP)_i$ = Variable expenses related to the ,,i" activity.

If you know which is the gross margin level of manufacturing activity (MB) and the profit can be calculated at farm level, the difference between the amount of gross margin and fixed costs of all activities of the farm.

Gross profit = VT – ChDP – ChF

Total gross margin (amount MB activities) is a measurement used to describe the benefits for a particular farm as a whole.

Total gross margin is computed by summing the activities of all the holding, ie:

$MB = MB_1 + MB_2 + ... + MB_i = \sum MB_i$
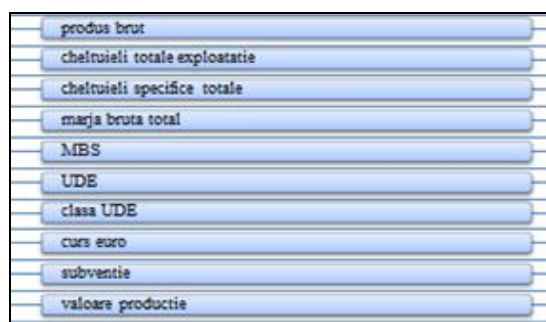
Gross profit = $\sum MB_i$ on activities – ChF

Fig. 7. Overall results per total holding

Bankruptcy risk. Bankruptcy risk analysis is essential for any company that feels worsening financial situation, but can not specify the time when it comes to bankruptcy. A simple calculation can prevent many ailments and can provide long before worsening economic and financial situation [6, 7, 8, 9]. To analyze the bankruptcy risk scores are used method - this method is presented in several versions, depending on the analysts who prepared it, namely *Altman method* and *Canon and Holder method* [6].

a. Altman method uses a score function "Z" constructed:

Z= 3,3 x T1 + 1,0 x T2 + 0,6 x T3 + 1,4 x T4 + 1,2 x T5

where:

T1 = economic rate of return = (gross profit/total assets) x 100

T2 = coverage of income assets = (total revenue/total assets) x 100

T3 = coverage of total debt on account of reinvested profit = (Equity/Debt) x 100

T4 = economic rate of return expected on account of reinvested profit = (reinvested earnings / total assets) x 100

T5 = current assets to total assets ratio = (current assets/total assets) x 100

Interpretation of results:

• Z <1.8 → critical situation for bankruptcy

• Z> 1.8 and Z <3.0 → risk of bankruptcy is in a normal margin,

• Z> 3 → risk of default is minimal.

b. Conan and Holder B. Method is based on the following function:

Z= 16 R1+ 22 R2 – 87 R3 -10 R4+ 24 R5

where:

R1 = partial liquidity ratio = (current assets - Inventories)/Current x 100

R2 = financial stability rate = (permanent capital/total liabilities) x 100

R3 = rate of financial expenses (financial expenses/turnover) x 100

R4 = rate of remuneration for staff (staff costs/value added) x 100

Interpretation of results for Z:

• <0 → bankruptcy probability > 80%

•75-80%→ failure probability 0-1.5

•70-75%→failure probability 1.5-4

•4 to 8.5 → 50-70% probability of bankruptcy

•35-50%→ failure probability 8.5-9.5

•30-35%→ failure probability from 9.5 to 10

• > 16 → 10% probability of bankruptcy

Fig. 8. Financial indicators

CONCLUSIONS

Creating integrated systems based on computer models allow a coherent viable

agricultural activities and high control economic information used.

Information provided by the annual financial statements relate to the past and the decisions to be taken concern the future. Not integrating phenomena of price leads to a distorted presentation of reality. Some information from the annual financial statements are subjective (eg, information on the net tangible assets and depreciation, which depend on the duration of use retained). There is useful information for analyzing profitability, but they are not provided because they can not be quantified in money, and other information of interest though and can be measured, are not included in the summary documents as they generate competitive disadvantages.

The continuous development of computer technologies designed for agriculture can have a real impact on improvement of productive activities and agriculture efficiency.

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