

Taking the financing decision considering the comparison between their own or borrowed funding and public funding

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Abstract: - In this paper we present a method to determine the best financing solution for an enterprise with insufficient funding but with innovative ideas that need funding. We propose a model that calculates the total profit from the developed project. We take into consideration two cases, both for the analysis and also for model: first, financing with borrowed capital (loan capital financing) and second, public funding. As it will be shown, equity financing is a particular case of loan-based financing which is taken in consideration in this model. The proposed instrument is an objective one, so that managers can choose the most profitable path from the two situations presented. Many enterprises from the south-eastern countries are in this situation. They have innovative ideas but few possibilities for implementing them. The model is a fast decision instrument and it can be applied both at the level of large organizations and also for start-ups.

Key-Words: - Virtual Enterprise, Funding sources, Borrowed capital, Business Models, Profitability, Comparison, Forecast, Development

1 Introduction

Financing a company's business depends on the type of the company, technology, contractor's relation to the risk, the possibility of accessing credit and fundraising opportunities [1,3,8]. Technological Entrepreneurship should benefit from funding sources, which may be obtained from internal or external sources. Successful managers are those who have mastered the depth of various technologies, assume responsibility for the company's yields, have sound judgment, know how to cope with technological and market changes and have a thorough knowledge of market conditions.

Investing in innovative projects located in the early stages of development, identifying the volume of research funding necessary and providing financial support becomes an essential element both in social development and regional development [2].

Proposals aim improving the entrepreneurial business environment, entrepreneurial culture, education, access to finance and contracts awarded by state regulation and taxation, coordinated support [3]. Possible solutions are considering substantial improvement in the absorption of EU funds, developing public-private partnerships, reducing the share of public social spending in the budget to increase fiscal space dedicated to investments, multi-annual budgets and prioritizing investment.

Regarding financing through banks, according FNGCIMM (National Guarantee Fund for Loans to Small and Medium Enterprises), in Romania only 15% of SMEs are credited by banks, while in the European Union the percentage is 70%.

In the main Romanian banks, the rules for granting credit to customers with a turnover of more than 3 mil Euro and / or exposure exceeding

400,000 Euro are analyzed through a software scoring application that takes into account all balance sheet items (turnover, operating profit, number of employees, the company's main activity, the financial history of the company, indicators for risk, guarantees granted, market trend, national economic growth or recession). According to customer request (long-term or short-term loan) and related with the financial indicators introduced, the risk profile of the client, the transactional conduct (Payment Incidents, Debts to other loans), guarantees introduced, the software application generates a certain type of answer: granting credit, additional analysis or a negative response. It is also of importance the product type (line of credit, seasonal credit, overdraft on his business card, credit investments etc.), generally short term loans are designed in terms of turnover and long-term loans based on the capacity of self-corrected current maturities.

Subsequently the documents are forwarded for approval to the risk department, approved; credit agreements and guarantees are established and then published in the Land Registry and the Electronic Archive of Security Securities. The interest rate varies by counterparty and guarantees.

There is a connection between bank lending and financing through European funds in order to ensure co-financing; eligible expenditures may be financed through grants (up to collecting them from the management authority), expenses representing customer contribution; there is also the possibility of a credit co-financing ROSEF (energy efficiency projects and renewable energy solutions) and other types of special governmental credits. Referring to startups, bank financing conditions are more drastic given that their history cannot be presented and for this reason these companies will explore other solutions.

2 Analysis of SME Financing Possibilities on Projects / Grants

Generally, possible sources of funding for SMEs to access are coming from: European Union (Structural Funds and Cohesion, European Defence Agency, research and development); NATO (initiatives for cooperation and development, science for peace and security); Romania (public-private partnerships, other national programs) and other regional sources (grants programs from Switzerland, the Nordic countries and bilateral cooperation).

EU cohesion policy presents implications for SMEs through research and innovation, economic

competitiveness, information and communication technology or environmental protection [4]. They were drawn by the entrepreneurial operational programs during the 2014-2020 period, involving increased competitiveness through innovation [10].

European funds are a complex financial instrument and identifying funding solutions is based on strict rules by the laws and European practices. By applying the Europe 2020 strategy, it is aimed to stimulate SMEs' competitiveness, research and sustainable development with emphasis on rewarding the performance [5,7,9]. Expanding financing solutions represents an element of flexibility and efficiency at the macroeconomic level.

POSCCE grant (Sectoral Operational Programme for Increasing Economic Competitiveness) beneficiaries have complained about problems related to delays in the granting of advances and repayments. Procurement procedures have created some problems (identified by the Managing Authority and Intermediate Organizations), like: the use of discriminatory criteria to acquisition, misuse of selection and qualifying criteria, communication of the results. Also, not achieving the objectives drew reduction or even cessation of funding.

Implementation issues were considered: the verification process of public acquisition, shifting deadlines of the stages, the difficulty of obtaining loans necessary to pay for the work that did not receive pre-financing, inconsistencies between the information contained in projects execution and the actual situation on the ground, multitude of addendums, not updating documentation etc.

New lines of research should be directed towards new segments of interest, for example: highlighting moments that are most likely for strategic moves; the potential for obtaining financing; identifying optimal funding source for obtaining higher yields; the role of utility functions for value creation; how business models (and more generally for participating ecosystems through partnerships or independent firms using their own resources) affect strategic success and sustainability through the system design on a number of hierarchical levels inappropriately designed.

[6] analyzed the impact of higher capabilities to improve performance. There is required, however, a study on the rational supporting of the decision of financing, a fundamental problem in any entrepreneurial or managerial action being funding the projects developed. The company's sustainable competitive advantage is based on the examination of internal resources and identifying the factors that influence capturing value to the company.

To analyze the possibilities of financing SMEs by taking into consideration projects / grants, we propose a model that helps improve the performance of the company by following three stages of implementation for the entrepreneur's innovative ideas. The model identifies the source of financing and its attainment, corroborated with managing it from an organizational perspective. The three steps involve:

- Creating and developing a business involves careful and realistic planning its expansion (capital growth, increasing market share, turnover, profit);

- Identifying an optimal financing solution, from own or borrowed funds, taking into account the essential parameters (cost, time). We propose the discussion of the second stage of the model in this paper. This targets the minimization of the financial burden that is considered in the initial phase of development, but decreases with the integration of financing external/ internal long-term solutions;

- After obtaining financing in any of the options presented above, it can be provided a functional, optimal architecture (both on decisions taken at the tactical and strategic level), a justified management of the fund time and the limited resources for financing obtained, a stage that represents a discussion of future research.

3 Proposed Model

Taking the financing decision considering the comparison between their own or borrowed funding and public funding is a fundamental problem in any entrepreneurial venture or a managerial one - financing the projects developed. Whether it is a company's own action, or a cooperative approach to a formula type of a virtual enterprise, the development project reaches a milestone that requests a specified level of funding and its sources. From this point of view, there are three possible sources: full funding of equity, debt financing and financing (total or partial) from public funds. From their source, public funds can be: national, European (European Community) or international (non-European Community).

In most cases, funding from the company's (or cooperatives group) own resources is the most advantageous one, provided that the company (or group) has no other possibilities for a more profitable placement for the funds. The main reason for this advantage is that using their own funds does not add extra costs of purchasing them (interest, fees etc.) nor induce risks by depositing a guarantee of the patrimony.

Procurement of funds by loan has the disadvantage that, in addition to the amounts actually used for development, there are additional costs on interest and fees and that limits, somehow, an unrestricted use of its own capital immobilized, given that in most cases, it should be submitted as a guarantee for the loan. There are several sources of debt financing: bank loans, loans from shareholders (which usually avoid guarantees), issuance of shares etc.

Both financing arrangements set out above, have the advantage that the provision of funds is relatively fast, especially if funds are in a liquid (cash) form for the companies own funds. Even accessing funds borrowed from financial institutions, in the current conditions, the analysis of the financing documentation is done in a reasonable time horizon, of about 10 to 20 days. This allows starting the development process to a time close to the moment of the decision to start this process.

Public funding is obtained by more complex mechanisms than those of bank loans. First you have wait for the launch of the projects (the so-called "calls"), which contain funding options for the company. It should be noted that public funds are the priority areas of interest to the public authority funding. Also, funding priorities and the areas are different from one strategic period to another. Some fields may disappear as funding priorities and other new areas can be prioritized. Then comes the period of submitting the project that, usually, takes a few months - the so called "dead-line".

Some projects suffered delays of several weeks, some repeatedly. After documentation submitting follows a period of evaluation of projects that can last 3 to 5 months. At the end of the assessment, the list of the winning projects is made public. If the project submitted by the company or group of companies joined to cooperate, united in the same project, is on the list of projects to be funded, then follows project signing that can last about one month.

In the stage of signing the contract, negotiations could be conducted regarding the level of funding, which usually lead to a decrease in the amounts proposed by the project. Only at the end of this period the company or cooperative group has the complete picture on project financing. Experience shown in recent years proves the existence of renegotiations on the financing of the project even after signing the contract, with consequence in decreasing funding throughout the project.

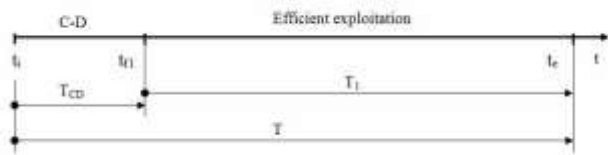
To determine which is the best financing solution we propose a model that calculates the estimated

total profit from the development project. Two cases will be considered for funding: financing with borrowed capital (loan capital financing) and public funding. As it will be shown, equity financing is a particular case of loan-based financing.

3.1 Loan capital financing

The main moments that occur when financing through borrowed resources are arranged on a time axis in Fig.1.

Fig.1. Moments that occur when financing through borrowed resources



These moments are:

- t_i – the moment when decision is taken to research and develop for a new project and the financing consists in borrowed resources; this moment is preceded by market studies, project opportunity and related risks; financial projections, expected project phases and their durations are already prepared;
- t_{f1} – the predicted moment when the R & D process is completed, with all the sub-stages involved (this moment can last a few months to several years), including developing and testing the models and, where appropriate, achieving the first production lot; after this moment, starts the production and marketing of the new product, in this moment begins the efficient exploitation of the project results; R & D processes can have durations, depending on the complexity of the product, from several months to several years reaching;
- t_e – the predicted moment by which project results can be commercialized efficiently on the market; in free economies, this moment is decided by the market; however, it can be predicted by scientific methods, especially for companies that have experience in the manufacture and marketing of products of the same family as the one involved in the project; one of the methods used is the Monte Carlo method.

As shown in Fig.1, T_1 is the process of efficient exploitation of the project results. If financing was obtained through debt (as in the case of self-financing), this is the only time gainful which could cover all the costs involved and bring profit.

Because profit is a fundamental parameter for assessing the economic activities, we will next

determine the profitability of the entire project. Thus, profit P_1 for the project conducted through borrowed funds and the commercial exploitation of the results to the extent determined by the profitability of the market will be:

$$P_1 = V_{E1} - C_{E1} - C_{CD} - Co_i \quad (1)$$

The elements involved in the previous relation are:

- V_{E1} – the revenue throughout the period T_1 of efficient exploitation;
- C_{E1} – expenses incurred throughout the period T_1 of efficient exploitation;
- C_{CD} – research and development expenses;
- Co_i – the total cost of the loan (interest, fees) until its full reimbursement.

Writing the mathematical relation based on the unit selling price P_v , the total unit cost of manufacturing and marketing C_i and the annual quantity manufactured and sold Q_a , we have:

$$P_1 = P_v Q_a T_1 - C_i Q_a T_1 - C_{CD} - Co_i \quad (2)$$

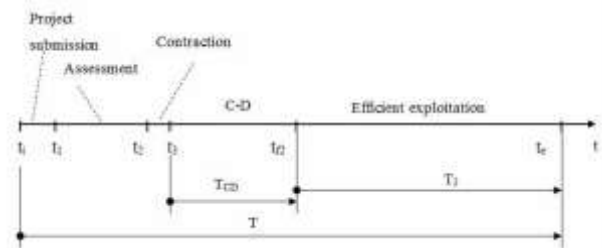
In the above relation, if funding is from the company's own funds, then Co_i costs are zero. Still, a comment can be made. By engaging own funds in the project, the company loses the possible benefits they might bring in using them in lower risk investments (such as bank deposits), but of course with lower profitability unless they are involved in the project.

3.2 Public funding

Next, we will consider the situation when product development is achieved through public funding.

The differences involved as against funding from borrowed funds (or their own) are marked on the same time axis in the figure below:

Fig.2. Moments that occur when financing through public funds



We note that new steps appear in the usual stages in order to obtain public funds and lifespan significantly changes the outcome and the efficient exploitation of the project. Also in the figure, one can see that in addition to these differences, there are also the following constants: t_i , t_e (and consequently T) and T_{CD} .

The significance of the moments is:

- t_i – the time at which the company takes the decision to research and develop for a project and finance it from public funds. This moment coincides with the launch of the competition for projects (“call”); as in the case of borrowed funds (or self-financing), this moment must be preceded by market and opportunity studies of the project;
- t_1 – is the moment when the project should be submitted (deadline);
- t_2 – is the moment when the results are announced;
- t_3 – coincides with completion of the contracting and the actual start of research and development;
- t_{f2} – has the same meaning as the previous case, that is the time at which the planned R & D is completely finished; we find that this moment is different from t_{f1} ;
- t_e – is one of the constants of the two cases analyzed; it is the predicted moment in time when the results of the project can be effectively commercialized on the market.

As shown in Fig.2, T_2 is in this case lower than T_1 from the previous case, as a large resource of time is occupied by the preliminary stages, before the actual research process.

Similarly to the previous case, we will calculate the profit P_2 when the project is conducted with European funds:

$$P_2 = V_{E2} - C_{E2} - aC_{CD} - aCo_i + (1-a)C_{CD} - (1-a)C_{CD}R_dT_R \quad (3)$$

The elements involved in the previous relation are:

- V_{E2} – the income obtained throughout the period T_2 of efficient exploitation;
- C_{E2} – expenses incurred throughout the period T_2 of efficient exploitation;
- a – the share of co-financing from own funds (or borrowed) by the enterprise; it is found that the total public funding is $(1-a)C_{CD}$; if the project is entirely financed by public financing (without co-financing) then $a = 0$;
- R_d – is bank interest rate on borrowed funds during the period of performing expense and repayment. On most projects publicly funded, public money made available for the project at a time T_R (average time of repayment) after the expenditure is

incurred from own funds (or borrowed); if the company is not obliged to borrow money because it has them as own funds, then the last term of the relation will reflect the loss due to the removal of funds from another form of capitalization (as, for example, interest on bank deposits not received liquidated to put cash to the project).

Writing the mathematical relation of profit P_2 according to P_v - unit selling price, the total unit cost of manufacturing and marketing – C_t and the annual quantity manufactured and sold – Q_a , we have:

$$P_2 = P_v Q_a T_2 - C_t Q_a T_2 - a C_{CD} - a C o_i + (1-a) C_{CD} - (1-a) C_{CD} R_d T_R \quad (4)$$

Public funding is more advantageous than the borrowed funds (or the self-financing) if:

$$P_2 > P_1 \quad (5)$$

By ordering the previous mathematical relation we have:

$$(1-a)C_{CD} > \frac{Q_a(P_v - C_t)(T_1 - T_2) - C o_i}{2 - R_d T_R} \quad (6)$$

The left hand side of the relation is the amount of public funds that, for the project to be approved for funding from these funds, in terms of the enterprise, must meet the above condition. Otherwise, for the enterprise the borrowed capital solution is more advantageous.

A more sensitive problem arises when the two terms of the inequality have close values. In this case, differentiation for funding decision will be made on other criteria such as:

- Difficulties in accessing loans, depending on the source;
 - Access requirements: guarantees, unfair terms imposed by banks, the level of penalties etc.
 - The chances of success in public funding of the project, taking into account the total funds allocated and the number of projects that will be proposed for funding on the same axis;
 - Consideration of the difficulties involved with project management;
 - Consideration of the public authority’s decision to reduce funds, following the signing of the contract, during the course thereof.

Of those presented in this subsection, that, contrary to appearances, public funding is not in all cases, the most advantageous solution for the enterprise. For example, the relation has established that if the difference between T_1 and T_2 is high, the

amount of public funding should be high for the project to be beneficial to the enterprise.

We note that this condition verification is not required by any of the assessment documentation publicly funded projects. Usually, the institution requires information related to the internal rate of return, updated flows of the revenue and expenditure, projected balance sheets etc., but not compliance with the fundamental conditions for the project to be a success and for an efficient spending of public money.

Therefore, including a verification as the one proposed in this model in relation (6) for the data in the assessment criteria for publicly funded projects would lead to a more accurate assessment of them.

4 Results and discussion

Initially, we collected data from 2014 and 2015 on five companies from the productive area, pursuing the motivation for the situation in which they are in need of external funding. The managers of these companies have pursued several goals:

- An improvement of the production process in terms of execution time, product quality, the number of operations to follow;
- A decrease of the cost of implementing the product and the number of employees required;
- A production diversification, with new benchmarks from the same product range, or complementary milestones, to provide customers a more complete view of the product;
- The replacement of an old production line; the repairs are very expensive and provide only short and medium term vulnerability by failing to anticipate a new malfunction in the production chain, situation which would lead to a production stoppage for an undefined period of time.

Thereby, the main major targets were identified and were correlated with the company's financial data and, as a result, it can be observed the downtrend of the sales profit (by default, the production cost per unit and the execution time of the production had increased), justifying the need of changing the production process and, because of this, the need of applying the proposed method for identifying the optimal financing option.

The next step is to collect the necessary data for identifying the cheapest financing sources for the company. The collected data refers to credit terms from five different banks (interest rate, fees, reimbursement terms of the loan, warranties, endorsers, approximate time for settling the credit file, data referring to the minimum accounting

values from the financial statements for banking institutions to agree in funding).

At the same time, discussions were held with companies which have the preparation and deposition of European funding applications as the main activity. There were found information on the open "calls", the conditions for obtaining financing, the company's co-financing part, the implementation deadline, the financial conditions imposed by the project implementation and the possibility of meeting them, the eligible outgoings in case of financing and the taxes which are or aren't deductible in the work file, the anticipated term for receiving the funds.

Following the collected data, the enterprises managers have discussed in order to choose the best financing options, both in terms of the opportunity of accessing and receiving funds but also in terms of ability to meet the conditions imposed by each creditor. Discussions about the opportunity of accessing financing are necessary, but the opportunity can be objectively determined by the method proposed in the previous chapter, which offers an optimal financing solution, suitable for companies analyzed by comparing the obtained profits in each option considered.

Quantitative monetary data are, in fact, the ones that stand at the base of the manager's decision and the path to follow for achieving the strategic goals of the company. These quantitative data are the next period budgeted income, the costs for obtaining financing and the cost of borrowing, cost of production and the difference represents the company's profit.

For the analyzed companies, by applying the method, two cases have been identified:

- When the required amount for investment was smaller by 20% than the total income of the company, in which case the best option of crediting was a bank credit; the profit was 8% higher than in the case of obtaining European funds. The difference is given by the longer time that is necessary for obtaining European funding. Even for smaller sums the steps taken are similar and the efficient exploitation is limited;

- The situation in which the necessary funding was higher than 20% of the total revenue of the company. The obtained amount generated a higher profit than the bank credit had done because the credit's interest rate made the repayment capacity difficult for the company. Even if the funds were fully achieved in a longer period of time, the benefits were 12% higher than in the case of choosing the bank credit.

5 Conclusion

A key element in the organizational development is changing and changing attitudes towards the way of thinking for obtaining and managing resources. The proposed model is an objective resource for the process of organizational development, by identifying optimal funding sources that generate high performance at lowest costs in a variety of partnership, corroborated with an organizational structure in conjunction with the amount of time available.

The applicability of the model results from exemplifying the operation of its system and the actual parameters, the model is applicable both at the level of large organizations, entrepreneurs and start-ups. After applying the model, Romania may approach the values of the EU in terms of SME lending by the banking system.

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