

INCREASING ECONOMIC PERFORMANCE OF INTEGRATED VALUE CHAIN

Raluca Andreea ION ¹, Iuliana DOBRE ²

¹ Associate Professor, The Bucharest University of Economic Studies, Faculty of Agro-food and Environmental Economics, email: raluca.ion@eam.ase.ro,

² Associate Professor, The Bucharest University of Economic Studies, Faculty of Agro-food and Environmental Economics, email: iulya_dobre@yahoo.com

Abstract

The research presents an assessment of economic efficiency of integrating activities down-stream agriculture in a cooperative unit from the region around Bucharest, Romania. This unit collects agricultural products from farmers, process and sell them to the market. The paper tries to answer the question whether the investment of such a business is efficient or not. The research methodology includes analysis, synthesis and calculation of economic and financial indicators to assess the business feasibility, in three possible scenarios. The findings show that investment is feasible from economic and financial point of view, the available cash at the end of the period being positive, in all case studies.

Keywords:

Value chain, shortening the chain, vertical integration, horizontal integration

Introduction

Nowadays, businesses within agro-food chains are more complex, the chains are longer and the risks associated with them are higher. The chain consists of the stages through which the product passes through, the activities and agents involved in them and the relationships between the operators. In analysing the chain, at least three elements are identified and characterized – agents, activities and the mechanisms of coordination. Calling again the fact that chains are more complex, it comes in the light the need of shortening it. Shortening the chain is criticised with pros and cons. One benefit of a longer chain consists in the fact that each activity adds value to the product. As a result, at the end of the chain, the higher value product corresponds to higher consumers' utility. The disadvantages refer to higher prices of products to final consumers, due to the fact that each operator gets profit from total value of the product.

There are two ways of shortening the chain. One is to cut the activities, but this cannot be done because agricultural products, including vegetables, have to go through all activities. They need to be stored or processed, because they are perishable products. Another way is to cut the operators. In this case, one operator can perform more activities. This situation is called vertical integration. Or, more operators from the same stage of the chain can perform one activity. This situation is called horizontal integration. Another way is to combine vertical with horizontal integration, meaning that more operators could perform more activities. This is the model of shorter chain proposed in this piece of research.

As the model implies conducting several activities down-stream agriculture in a single unit, called cooperative, and it involves many members, the vegetables chain is integrated vertically and horizontally: vertically, because all the post-harvest activities of collection, reception, storage, sorting, processing, conditioning, packaging, marketing are undertaken in the same unit; and horizontally, because the cooperative include many farmers who act as operators at the same stage of the chain.

The article investigates the feasibility of investing in activity of processing vegetables, trying to find the answer to the questions “how efficient is this activity?” and “what are the levels of its profit, rate of return and financial indicators of business achievement?”.

Vegetables chain starts from farmers who perform agricultural activities. The areas cultivated with vegetables in Romania decreased in the last years, from 253 thousand hectares in 2007 to 239 thousand hectares in 2014. The production increased from 3116 thousand tonnes to 3807 thousand tonnes in 2014. The fact that production increased while the area decreased means that average production grew.

The need for investing in vegetables chain consists in the market opportunities that can be exploited by chain operators and the many weaknesses of vegetables chain which can be overcome. The main weak point of the value chain is collecting vegetables from many farmers who deliver small quantities of vegetables production (Manole, 2005, Turek, 2008). By the one hand, farmers deliver small quantities, by the other hand, hypermarkets and supermarkets ask larger quantities of products. To meet these requirements, farmers can choose to integrate activities of processing and marketing into a single economic unit. Because processing vegetables needs investment in production lines of high value, farmers should associate themselves in an associative form.

Economic performance depends on the mechanism of coordination. These mechanisms are subsidies system, price, contracts, horizontal and vertical integration (Marion, 1986). Previous research (Manole, 2006) assesses the impact of coordination upon agro-food system performance. It was found that performance increases as activities are more integrated. This is the reason why the objective of this piece of research is to investigate the integrated activities of vegetables chain; and the scope is to assessing their economic efficiency.

1. Materials and methods

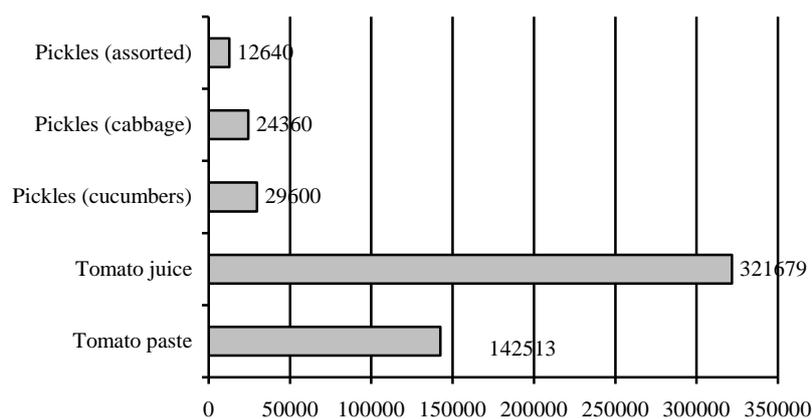
The cooperative is set up in a vegetable area around Bucharest. The products have been chosen considering the results of a survey which show that, among vegetable cans, tomatoes juice, tomatoes paste and pickles are the most demanded (Ion, 2015). For obtaining these products, farmers should invest in equipment and buildings. The technical objectives are to build a factory for processing vegetables and a warehouse for storing them, to set up a network of collecting tomatoes. The financial objectives of the business are to buy a car for collecting vegetables and delivering the vegetables cans to hypermarkets and supermarkets in Bucharest, to purchase machineries and equipment for sorting, packaging, storage and handling vegetables and to build the warehouse and the factory. The total investment value is 1,175,523 lei.

The production is planed considering the activities in the field (vegetables are phased harvested) and storage, sorting and packaging areas and capacities. The period of obtaining tomatoes juice and paste is July to October, and the period of processing pickles is July-January the following year. In Table 1, the production program is presented.

Table 1 Program of production

No.	Product	Number of cans	Value (lei)
1	Tomato paste	20,359	142,513
2	Tomato juice	37,845	321,679
3	Pickles (cucumbers)	5,920	29,600
4	Pickles (cabbage)	8,120	24,360
5	Pickles (assorted)	3,160	12,640

Source: authors' calculations



Source: authors' calculations

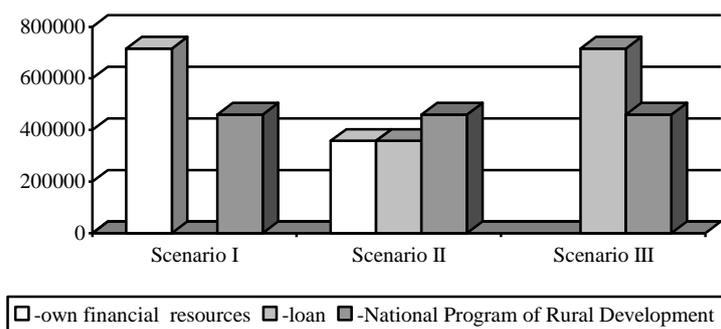
Fig.1 The structure of production (lei)

The investment could be financed through the National Program of Rural Development, which, in the case of an associative unit, covers 50 per cent of eligible expenditures. For the rest of the investment, three scenarios have been considered. The first one takes in consideration the situation where farmers finance themselves the rest of the amount. The second one takes into consideration the situation where farmers finance themselves only half of the rest of the amount, and the other half is financed through a bank loan. The third one takes into consideration that farmers will not finance themselves any amount, but they cash a loan. Income and expenditure for the three scenarios are presented in Table 2 and 3.

Table 2 Revenues from operational activity and investment, for each scenario (lei)

No.	Product	Revenues		
		Scenario I	Scenario II	Scenario III
1	Tomato paste	142,513	142,513	142,513
2	Tomato juice	321,678	321,678	321,678
3	Pickles (cucumbers)	29,600	29,600	29,600
4	Pickles (cabbage)	24,360	24,360	24,360
5	Pickles (assorted)	12,640	12,640	12,640
6	Seedlings	2,500	2,500	2,500
7	Total	533,291	533,291	533,291
8	Investment, of which	1,175,523	1,175,523	1,175,523
8.1.	-Own financial resources	715,472	357,736	
8.2.	-loan		357,736	715,472
8.3.	-National Program of Rural Development	460,051	460,051	460,051

Source: authors' calculations



Source: authors' calculations

Fig.2 Investment structure, by scenario (%)

Table 2 present the income and investment for each scenario. The annual product revenues are equal to 533,291 lei, of which 26.7 per cent come from tomato paste, 60.3 per cent from tomato juice, 5.5 per cent from pickled cucumbers, 4.5 per cent from pickled cabbage, and 2.5 per cent from assorted pickles. Total value of investment is 1,175,523 lei, made up of farmers own contribution and grant from the European Fund for Agriculture and Rural Development. Within the total value of investment, the member contribution is 60.9 per cent and the European Fund for Agriculture and Rural Development is 39.1 per cent. In the second scenario, the total investment is made up of 30.4 per cent of farmers' contribution, 30.4 per cent from a loan and 39.1 per cent granted from National Program of Rural Development. In the third scenario, the total investment is made up of 60.9 per cent of a loan and 39.1 per cent granted from National Program of Rural Development.

Table 3 Expenditure for each scenario (lei)

No.	Product	Expenditure		
		Scenario I	Scenario II	Scenario III
1	Total expenditure, of which:	1,574,086	1,610,311	1,646,537
2	Materials	200,371	200,371	200,371
3	Salaries	116,820	116,820	116,820
4	Amortization	71,772	71,772	71,772
5	Other expenditure	9,600	9,600	9,600
6	Loans and interest paid		36,225	72,451
7	Assets acquisition	1,175,523	1,175,523	1,175,523
8	Available cash at the end of the year	134,728	98,503	62,277

Source: authors' calculations

The total expenditure refers to operating expenses and investment for assets acquisition. In the first scenario, total expenses are 1,574,086 lei, of which 1,175,523, 76 per cent, is assets acquisition. Among the total costs, 12.7 per cent is held by material expenses. If the allocation of investment is excluded, the share of material expenses grows to 50.27 per cent. Available cash at end of period is 134,728 lei. In the second scenario, the total expenses are 1,610,311 lei, higher than in the first scenario, because of the interest paid to

the bank for the loan. In the third scenario, the total expenditure is 1,646,537 lei, higher than in the first and the second scenario. As a result, the available cash at the end of the year, calculated as expenditures' deduction from revenues, are 134,728 lei, in the first scenario, 98,503 lei in the second one and 62,277 lei in the third one.

2. Results and discussions

Analysing the economic data, all scenarios register positive results. Moreover, the economic and financial indicators, presented in Table 4 and Table 5, show that the business is feasible.

2.1 Synthesis of the economic indicators of the investment

A synthesis of the economic indicators of the investment, for each scenario, is presented in Table 4. The rate of return is 33.8 per cent in the case of farmers' own financial contribution, 22.6 per cent in the case in which the farmers cash a loan of 50 per cent of the amount that cannot be granted by the National Program for Rural Development, and 13.2 per cent in the third scenario.

Table 4 Economic indicators of the investment, by scenario

No.	Indicators	MU	Scenario I	Scenario II	Scenario III
1	Total revenues	lei	533,291	533,291	533,291
2	Total expenses	lei	398,563	434,788	471,014
3	Economic results	lei	134,728	98,503	62,277
4	Rate of return	%	33.8	22.6	13.2
5	Economic return of the investment	%	103	75	48

Source: authors' calculations

The economic return of the investment is higher than 100 per cent only in the first scenario, showing that the total profit recorded throughout the period of use of equipment, ten years, is higher than the investment of 1.03 times or 103 per cent.

2.2 Assessment of the financial indicators of the investment

For assessing the financial indicators, a period of five years has been considered, as required by the documents that farmers should submit for cash a grant from the National Program of Rural Development.

Table 5 Financial indicators of the investment, by scenario

No.	Indicators	MU	Scenario I	Scenario II	Scenario III
1	Value of investment (without VAT)	lei	993,436		
2	Investment payback period	years	7.37	10	15.9
3	The cash flow coverage rate	no.	n.a.	3.98	1.99
4	Discount rate	%	8		
5	Net present value	lei	21,884	-251,113	-524,111

Source: authors' calculations

The profit provides the payback period of investment of 7.37 years, in the first scenario, 10 years in the second one and 15.9 in the third scenario. The net present value, calculated at a

discount rate of 8 per cent, is positive in the first scenario and negative in the second and third scenarios. This situation is considered to be normal considering that, in the latter cases, the unit spends money for financial expenses (interest expense on the loan). The net present value is negative in the case of cashing the loan, but it would become positive if the period considered for its calculation was longer (the period considered was five years).

Conclusions

This piece of research aimed at answering the question whether the shorter chain is more efficient. The economic and financial results of the business of integrating chain's activities in a single economic unit show high profitability. The rate of return varies between 13.2 per cent and 33.8 per cent, depending on the scenario and the period of payback the investment varies between 7.37 and 15.9 years, again, depending on the scenario.

Vertical and horizontal integration represent solutions for shortening the value chain and the project presented can be a model for such an approach. The initiation of this project will positively influence the small farmers for their integration into organized structures, giving them income stability and making possible their transition from subsistence farms to the formation of commercial farms.

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