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Financial Feasibility of Sugar-Free Medium-Scale Dry Fruit Production: a Hypothetical Business Model

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ABSTRACT

This article studies the financial feasibility of a medium-scale business model operating in dry fruit processing sector, which can also provide an economic insight for those who want to transform the substantial fruit processing into a well-performing business enterprise. To evaluate how viable the business is, the main capital budgeting techniques have been applied. The financial model shows that the business is profitable with positive net present value, profitability index equal to 1.20, payback period of 4.3 years and internal rate of return (IRR) greater than the weighted average cost of capital.

Introduction

Fruit production sector in Armenia is extremely fragmented, and there are many large and small households, which are not registered as legal entities but they continue their business activities in the production (SMEDNC, 2018). However, recently there is a positive trend towards establishing larger enterprises to maximize efficiency and productivity.

According to the data provided by the Ministry of Agriculture (currently operating as a subdivision in the Ministry of Economy) there are about 35 fruit and vegetable processing companies in Armenia, out of which 8 are considered comparatively larger and provide around 250 tons of processed fruit and vegetables per year

(Minagro, 2018). On the other hand, there are 350 physical and legal entities producing dried fruit and spices, only 6 out of which are medium-sized. Those only constitute 15 tons of the total annual capacity for the fruit and vegetable processing sector (Privacy Shield Framework, 2018).

During the recent years, the fruit production and processing sector is developing in the Armenian economy as shown in Figure 1, due to the fact, that the Government of the RA has also prioritized the sector and developed export-oriented strategies, which provide an incentive for the enterprises to be involved in the processing activities.

The export volumes of the Armenian processed fruit and vegetable products have also increased which is depicted in Figure 2 (NSC, 2020).

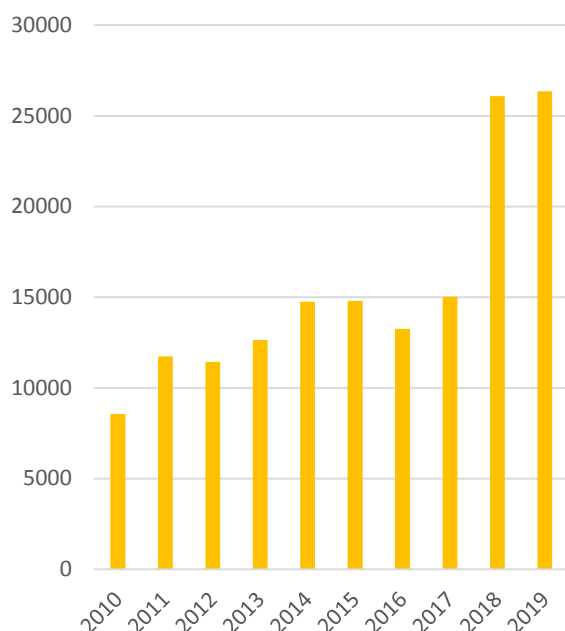


Figure 1. The volumes of the fruit and vegetables processing with current prices (*mln, AMD*) (composed by the authors).

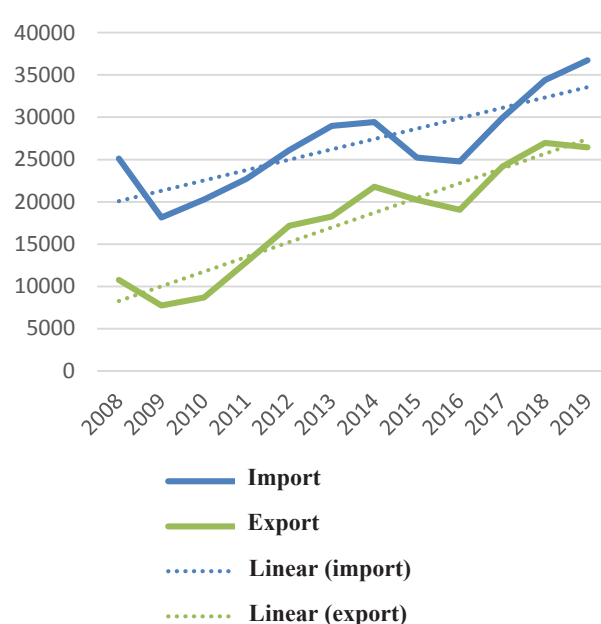


Figure 2. Foreign trade of the processed fruit, vegetable and plants products (*thousand, USD*) (composed by the authors).

Materials and methods

The viability of a business model is dependent on many factors. This paper will outline the economic and financial feasibility of a business model involved in the production of sugar-free dried fruits. The investment in this business opportunity will be attractive, if the financial indicators of the project correspond to the evaluation criteria, such as a positive net present value (NPV), internal rate of return (IRR) greater than the weighted average cost of capital (WACC), shorter payback period and higher profitability index.

This paper will apply the operational and assumption-based planning techniques to provide a reasonable insight for the investors.

Operational planning, as an important type of technique in business-modeling, aligns various functions of the business including marketing and sales with major objective of the business. Through this method, the overall resources of the organizations are rationally allocated within each department and the corresponding budget is composed for the specific time period (ACCIPIO).

In addition, desk research will be conducted which aims at acquiring more information on that specific business environment including competitor analysis.

To identify the major challenges and applicability of

innovation in the processing sector a qualitative online survey has been conducted with selected agricultural experts.

For a thorough investment outlook, some marketing and sales tactics will be applied especially from the perspective of behavioral economics. A few visits have been made to the most famous supermarkets of Armenia, including Yerevan City and SAS Supermarket to explore the level of applicability for those behavioral tactics, which have been mentioned in the literature. According to the findings, the general recommendations have been made in the marketing section to boost the sales and visibility of the products.

Results and discussions

Industry analysis

Some studies have shown that the fruit production sector in Armenia has been flourishing within the last few years, as the government has adopted many support programs for the farmers through financial assistance, subsidized loans and other extension services. In addition, many international organizations have also started to support the agricultural sector, hence granting monetary assistance to small and medium business entities for enhanced capacity and productivity.

According to the SMEDNC, however, only 5-10 large companies provide proper packaging and labeling in the market. Their products are realized in the chain and non-chain stores. Most of the small producers, though, are involved in the wholesale, through getting profits from re-selling the products. The main dried fruits in Armenia are received from apricots, black and red plums, peach and even dried tomatoes in the recent years. The dried apricot, plum and peach products compose 75 % of the Armenian fruit processing sector. There are also dried apple, pineapple, pear and fig products, however, their volumes are comparatively smaller.

There is also a newly evolving trend of drying fruit from such vegetables and fruits as, watermelon, melon, eggplant and green beans.

Consumption

According to the experts' opinions, almost 70% of the Armenian population is considered dried fruit consumer (SMEDNC, 2018). Due to the lack of the fresh fruit during the winter time, the demand for the dried fruit is comparatively larger.

One of the obstacles to the expansion of apricot processing is the scarcity of raw materials. Because of the extreme weather conditions in late March and early April, apricot harvest can fluctuate significantly. The production of dried apricots in Armenia practically stops in unfavorable years. According to SMEDNC, the apricot harvest may exceed 100 000 tons per year under favorable weather conditions, however, only 3 % is directed for dried fruit production, experts say. In the case of peaches and plums growing, the trend is positive as there is a large raw materials availability. Due to this fact, the raw plum costs 175-200 AMD/kg during the harvest season, which is affordable for those who are ready to buy them for dried fruit production.

Production plan

It is assumed that the company will receive 30% of its raw fruit products from the own orchard, which is located right next to the production facility, the rest of the raw materials will be purchased from other providers. The following assumptions should be made while calculating the COGS (Cost of Goods Sold) of the dry fruit production.

It is assumed that the initial volume of the raw material will be 7 400 kg, which will have a 10% growth rate in each year. The raw material will be distributed according to the proportions provided in Table 1.

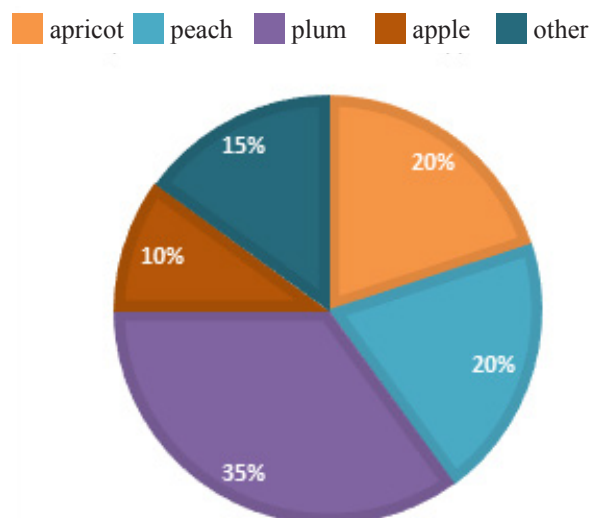


Figure 2. Dried fruit production from the raw fruit type, 2018
(Source: SMEDNC, experts' opinion).

Table 1. Raw materials and their proportion for processing*

Fruit type	Raw mass necessary for 1 kg dry fruit, kg	The proportion directed for processing, %
Apricot	3.5	30
Plum	5	30
Apples	7	30
Peach	8	10

*Composed by the authors.

Table 2 shows the raw material quantity needed in the 10-year lifetime for each fruit. As can be noted further, in the 10th year the total volume of the raw materials will reach 17 449 kg.

The main component of the COGS of dry fruit is the cost of the raw materials, which is approximately 40-45%, therefore, the fluctuations of the prices in raw materials can highly affect the price of the dry fruit.

The electricity costs compose the next biggest share in the COGS, especially if an artificial fruit dryer is purchased. It is assumed that there will be no need for extensive labor force, because the business will be small-scale.

Table 2. The volume of raw materials for the entire lifecycle of the business*

Raw materials quantity (fresh fruit mass)	Year									
	1	2	3	4	5	6	7	8	9	10
Apricot	2.220	2.442	2.686	2.955	3.250	3.575	3.933	4.326	4.759	5.235
Peach	740	814	895	985	1.083	1.192	1.311	1.442	1.586	1.745
Plum	2.220	2.442	2.686	2.955	3.250	3.575	3.933	4.326	4.759	5.235
Apple	2.220	2.442	2.686	2.955	3.250	3.575	3.933	4.326	4.759	5.235
Total	7.400	8.140	8.954	9.849	10.834	11.918	13.110	14.421	15.863	17.449

*Composed by the authors.

The number of the labor force will be increased for some seasonal works. During the production period, people will need to be involved in pest control and management and 2 other seasonal workers will be required for the following actions: harvesting, washing, sorting, packaging and other activities.

Based on the above-mentioned parameters, the cost of goods sold and the selling price (AMD) were determined (Table 3).

Table 3. COGS and the selling price of the products*

Processed fruit	Cost of goods sold (per 1 kg)	Selling price
Apricot	2.085	4.170.00
Peach	5.780	8.670.00
Plum	2.630	5.260.00
Apples	2.750	5.500.00

*Composed by the authors.

The company will pay income and turnover tax which will be 3.5%. In the table 4, the income statement of the enterprise is presented with 5 years of time period, though the overall business lifecycle is assumed to be 10 years.

According to the project evaluation criteria, if time span of the business model is less than 10 years, the project will not be financially viable.

As can be noted in the Table 4, the net income margin

is increasing year by year and the following project evaluation indicators have been calculated:

- Net present value (NPV) = 3 038 315.08 AMD
- Payback period = 4.3 Years
- Internal rate of return (IRR) = 19 %, which is greater than the weighted average cost of capital (WACC=15%)
- Profitability index (PI) = 1.20

The financial indicators of the project show that the business with the assumptions made can be financially viable: the net present value is positive, IRR is greater than the WACC and profitability index is greater than 1.

Marketing and branding

There are many small and medium producers in the market and it is vital to have a strong competitive advantage over other products. Additionally, the enterprise needs to adopt good marketing practices in order to position itself in the local and international markets.

Marketing mix and SWOT analysis

For a comprehensive analysis, the marketing mix of the business was also applied with regard to product, price, place and promotion (Table 5).

A SWOT analysis (strengths, weaknesses, opportunities and threats) is a tool, that helps determine the internal and external factors that can affect the business activity. It can have a huge impact on the business success, as it helps identify all the challenges and opportunities for the business. In this paper the SWOT analysis has been applied for the hypothetical business model (Table 6).

Table 4. Income Statement of the enterprise for the first 5 years*

Income Statement	Year				
	1	2	3	4	5
Revenue	5.546.736	6.101.410	6.711.551	7.382.706	8.120.976
<i>Revenue, USD</i>	11.093	12.203	13.423	14.765	16.242
COGS	1.258.740	1.384.614	1.523.075	1.675.383	1.842.921
Gross Profit/EBITDA - Earnings before interest, taxes, depreciation and amortization/	4.287.996	4.716.796	5.188.475	5.707.323	6.278.055
<i>EBITDA Margin, %</i>	77	77	77	77	77
Total Administrative Expenses	(1.445.000)	(1.445.000)	(1.445.000)	(1.445.000)	(1.445.000)
<i>Accountant</i>	(204.000)	(204.000)	(204.000)	(204.000)	(204.000)
<i>Administrative expenses (Entrepreneur salary)</i>	(1.200.000)	(1.200.000)	(1.200.000)	(1.200.000)	(1.200.000)
<i>Other</i>	(41.000)	(41.000)	(41.000)	(41.000)	(41.000)
Storage and Marketing Expenses	(735.000)	(735.000)	(735.000)	(735.000)	(735.000)
<i>Marketing costs</i>	(600.000)	(600.000)	(600.000)	(600.000)	(600.000)
<i>Product transportation costs</i>	(90.000)	(90.000)	(90.000)	(90.000)	(90.000)
<i>Raw materials transportation</i>	(45.000)	(45.000)	(45.000)	(45.000)	(45.000)
Operational Profit (EBIT)	2.107.996	2.536.796	3.008.475	3.527.323	4.098.055
<i>EBIT margin, %</i>	38	42	45	48	50
<i>Depreciation and amortization</i>	(342.500)	(192.500)	(192.500)	(342.500)	(492.500)
<i>Interest expense</i>	-	-	-	-	-
<i>Profit before tax</i>	1.765.496	2.344.296	2.815.975	3.184.823	3.605.555
<i>Turnover tax, 3.5 %</i>	(194.136)	(213.549)	(234.904)	(258.395)	(284.234)
<i>Income tax</i>	(60.000)	(60.000)	(60.000)	(60.000)	(60.000)
Net Income	1.511.360	2.070.746	2.521.071	2.866.428	3.261.321
<i>Net income margin, %</i>	27	34	38	39	40

Table 5. The marketing mix of the business*

Product	Price
<ul style="list-style-type: none"> Dried fruit products from local raw materials: apricots, plums, peach, apples Juice and jams from the above mentioned products Quality products which are sugar-free or with sugar substitutes Packaging with Armenian Art works. 	<ul style="list-style-type: none"> Ordinary packaging: market price 3500-4500 AMD Special package: market price 5000-8000 AMD Discounts during the Christmas times Sales with credits
Place	Promotion
<ul style="list-style-type: none"> Sales to store chains and supermarkets, Small stores and boutiques. Wholesale Restaurants Healthy food cafes and restaurants 	<ul style="list-style-type: none"> Social media channels Branding and positioning Outbound advertising Inbound advertising Tasting Tours Collaboration with tour agencies

*Composed by the authors.

Table 6. SWOT analysis for the enterprise and the sector*

	Helpful	Harmful
	<i>Strengths</i>	<i>Weaknesses</i>
Internal	a) Armenia has favorable weather conditions, which allows to receive high quality fruit products to process b) Government and many international organizations provide financial assistance through subsidies, loans with lower interest rates, etc. c) Sugar-free dried products will promote healthy lifestyle due to its non-use of sugar. d) Business diversification: juice, jam, other processed products	a) Limited financial resources and cash flows b) Limited infrastructure: rural roads, transportation issues c) Uncertainty about the weather conditions d) Higher costs on innovative and modern technologies e) Higher costs of packaging f) Many unregistered and unlabeled processed food. g) lack of knowledge and skills in processing h) Lack of innovative technologies
	<i>Opportunities</i>	<i>Threats</i>
External	a) Vertical integration through buying additional land resources b) Expansion and transformation to an intensive orchard c) Agritourism development d) Increasing demand towards healthy and local products e) Support programs for agriculture development	a) Worsening political situation in Armenia b) Increasing number of COVID-19 infections c) Climate change and global warming d) Market saturation e) Limited market access f) Increasing price of inputs

*Composed by the authors.

According to the interviewed experts, the processing sector has major gaps, that needs to be addressed. Based on their assessment, the private sector may take some steps for improving its productivity. The two main factors affecting the productivity in fruit processing sector are the quality of raw materials and technical knowledge and skills. According to their assessment, dry fruit processors intensively apply the solar dryers and artificial dryers, however, they are using mainly energy intense technologies, hence having a financial burden in terms of operational costs. Experts also mention that product diversification is widely applicable in Armenia. According to the survey results, the main challenges in the fruit processing sector are: lack of knowledge and skills, limited access to market, small-scale and substantial processing, lack of marketing and sales skills.

Behavioral selling

While making decisions, people are not always rational, because of some external factors that affect the buying process. For example, when people are short of time, they are influenced by the time factor and the decisions can be absolutely different from the one they would make without that limitation. Here are some actions and tactics,

which will help to boost the sales through the application of behavioral selling.

a. Decoy effect

The decoy effect is a cognitive bias by which consumers will tend to have a specific change in preference between two options when they are also presented with a third option that includes the mix of the positive benefits of the two other options (Intelligent Economics, 2018). Examples of decoy effect is the bundle pricing, when we include a few products within the set price. Additionally, packaging the products in small, medium and large boxes, will boost the sales of the medium size because people tend to choose the best combination of the price and quantity.

b. Anchoring

Anchoring bias occurs when people rely too much on pre-existing information or the first information they find when making decisions (Investopedia, 2021). While buying something people are highly influenced by the numbers that come to our eyesight first. Therefore, putting a bigger number on the packages than the price itself, can stimulate the buyer subconsciously think that the offer is indeed reasonable.

Table 7. Risk Management Matrix*

Risks	Level	Response activities
Lack of expertise and practical skills of fruit processing without sugar or sugar substitutes.	Medium	To train employees, finance their studies in agricultural education
Insufficient amount of raw materials	Medium/High	Vertical integration can be a solution: additional lands and raw materials
Lack of innovative and energy-efficient technologies	Medium	To find external sources to finance
Biological hazards: <ul style="list-style-type: none"> • Untimely contamination • Chemicals usage affecting people's health 	Low/Medium	More actions should be taken for ensuring the food safety measures
Packaging damage	Medium/High	To choose high quality packaging materials
Demand risk	Low	To organize aggressive marketing and advertising, promotion, brand awareness, visibility
Higher competition	High	To urgently add more features, state the competitive advantage, diversify the food, think of an out of the box solutions to the quality, packaging and delivery
(Natural) Extreme weather conditions: <ul style="list-style-type: none"> • Floods, storms, hails, • Land desertification • Overall climate change • Earthquake 	Medium/high	To apply anti-hail nets, agricultural insurance
Price increase in raw materials	Medium	To implement vertical integration, buy more lands

*Composed by the authors.

c. Endowment effect (Free trials)

It is very important people to taste your product and see how it tastes, that is why there are many occasions, such as fairs and festivals, where the company can offer some free products for our potential customers, who can taste and buy further.

Personalization

It is very important to use the personalization technique, because your product gives more value to your customer and they will eventually come back to you again. This includes customization of the product based on the holidays, celebrations, etc.

Risk management and mitigation plan

Risk management is a process, which helps the companies to identify the potential threats to the organization and implement response actions to mitigate or eliminate the risk. The risk can stem from various sources including

but not limited to the external environment such as the financial instability of the country and legal environment, decreased quantity demanded, weather conditions, etc. Table 7 identified the most relevant risks related to the sectors and the corresponding actions have been proposed.

Conclusion

This paper outlined the investment opportunities in the fruit processing sector particularly focusing on the dry fruit production on a small-scale basis. In this hypothetical model four fruit types were considered for processing: apple, peach, plum and apricot. Those were selected taking the availability of raw materials into account.

For the first year 7 400 kg raw materials will be processed from the raw sources proportionately and the volume will be increasing by 10 % for each 10 following years. The processing will be without the usage of sugar considering the latest trend of healthy lifestyle which is appreciated by the consumers. The business also targets those who are suffering from the diabetes, obesity and other diseases,

which are highly dependent on the diet we undertake. For the model, the 10-year enterprise budget was estimated to evaluate the business viability. Based on the results of capital budgeting techniques (positive NPV, $IRR > WACC$ and $PI > 1$), it can be stated that the project is profitable and can be implemented with the assumptions made.

Apart from testing the financial feasibility, a comprehensive industry analysis was made and a marketing strategy was developed based on the result of the current business environment. In addition, a SWOT analysis and a few behavioral techniques were proposed, which can be applicable for making the products more sellable in the market. This business model shows, that proper application of the agricultural potential in Armenia can turn into a profitable business, rather than small and substantial farming practices.

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