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Answering the Producers' Question: Is It Feasible?

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Answering the Producers' Question: Is It Feasible?

Abstract

Producers are trying to increase their profitability through new business ventures. However, before starting the business they often ask Extension professionals for help in determining if the project would be profitable. This article provides a brief overview of a five-step process for conducting a feasibility study. It then applies the process and analysis to the pork industry by examining the economic feasibility of a newly constructed, small, producer-owned pork processing facility. Results indicate that such a facility is not profitable or sustainable if hogs were purchased at the mean historic market price.

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Introduction

Producers are often looking for ways to increase their profitability and have become more interested in owning and operating processing facilities. However, before they build the facility, they frequently ask Extension professionals if the project would be profitable. This article provides an overview of the steps that must be taken to determine if a project is feasible. The feasibility of building a producer-owned, small, 2,500 head per day pork processing facility illustrates the process.

The purpose of a feasibility study is to model the proposed business to determine if it would be successful. It also helps the owner(s) consider the various possibilities, challenges, and opportunities in starting a business. A feasibility study should be completed prior to creating the business plan. The steps of preparing a feasibility study are shown below.

1. Describe the project.
2. Describe the market.
3. Describe the capital requirements.
4. Describe the raw materials needed.
5. Describe the financial situation.

Along with these five basic steps, sensitivity analysis should also be performed. Feasibility studies are often created using a spreadsheet; therefore, conducting sensitivity analysis is quite easy. By changing individual variables, the effects on the model as a whole can be determined. This is important to understanding how various changes would affect the proposed business. Sensitivity analysis also helps show if the model is realistic. After the sensitivity analysis is complete, one can examine the model as well as the information gained through the sensitivity analysis to determine

if the proposed business is feasible.

Key results such as net income, internal rate of return, net earnings per unit, and break-even point are examined to determine if the project is feasible. Other results may be examined as well based on the goals of the business. If it is determined that the proposed company is feasible, the next step would be to write a business plan (not be discussed in this article). If it is not feasible, other possible options for the proposed business may be explored via scenario analysis to determine if any would be feasible. After the scenario analysis has been completed, the findings should be reported and a recommendation should be made.

Application to the Pork Industry

Background

The pork industry has faced many changes and challenges in recent years. Today there are fewer farms raising hogs, but these producers are much larger than in the past (Plain, 2000). The whole industry is much more coordinated and consolidated. There has also been a shift in pork production to the Southeast and the Great Plains. With large producers moving to these areas, there are fewer hog operations in the Midwest. Those operations that remain in the Midwest are increasingly looking for ways to add value to their product and become more profitable. Finding ways to become more profitable was especially important in 1998, when hog prices hit all-time lows.

Due to the past low prices for market hogs, pork producers in the tri-state area of Indiana, Michigan, and Ohio have been exploring marketing alternatives for protection against extremely low prices. One alternative is the formation of a cooperative to produce value-added pork products through a producer-owned pork-processing facility. The objective of the study reported here was to determine the feasibility of operating a newly constructed, small, producer-owned pork-processing facility in the tri-state area to further process primal cuts by cutting, trimming, boning, and vacuum packaging those cuts.

Methods and Data

An economic simulation model was used in the research to estimate the cost structure of a new, producer-owned pork-processing facility. The simulation model was customized for the research but uses an economic-engineering approach. The Stellar Group of Jacksonville, Florida has built several packing plants and used their experience to initially develop the model (J. Bove, The Stellar Group, 2900 Hartley Road, Jacksonville, Florida 32257, personal communications, October 25, 2001). The Stellar Group performed an analysis to determine the utilities and infrastructure required for a 2,500 head per day capacity pork slaughter facility. The engineering data compiled was then combined with economic parameters to determine the costs for this facility. Once the costs were determined, a computer spreadsheet was used to perform further analysis.

The initial model included information on each of the following: key parameters (input costs, products prices, marketing costs), hog weights, output and sales, price, product mix, yield, overhead costs, labor costs, packaging, miscellaneous expenses, capital costs, vacuum packaging costs, financing, and utilities. The model also allows for customization; several variables can be changed to reflect appropriate figures for the geographic area being examined. The above feasibility steps were then applied to determine if a new producer-owned pork-processing facility is profitable.

Step 1: Describe the Project

For the project, producers were interested in starting a small pork-processing facility in Indiana, Michigan, or Ohio in order to provide value added pork products to the region. Therefore, a location for the facility had to be chosen first that was near large cities and had labor available. Several cities were considered for the location of the facility, but Fort Wayne, Indiana was the one selected for several reasons, including:

1. It was in close proximity to major cities such as Chicago, Detroit, Indianapolis, Cincinnati, Columbus, Cleveland, St. Louis, and Pittsburgh,
2. Major highways, railroads, and a regional airport are readily accessible,
3. The Toledo/Lucas County Port Authority is only 110 miles away, and
4. A good infrastructure and large workforce of both skilled and unskilled labor are available.

Once the location was chosen, the spreadsheet was customized based on specifics of the Fort Wayne metropolitan area. Variables that were modified included input cost of the animal, lean premium, carcass yield, hourly labor and benefit rate, land cost, amount of land, property taxes,

worker's compensation rates, sewage charges, and utility rates. Due to the large amounts of electricity, natural gas, and water required; the large amount of waste generated; and the number of employees needed, the utility and labor rates were examined closely. Compared to the initial model, the cost of electricity, natural gas, and labor were decreased, and the cost of water was increased. It was found that the labor and benefit rates in Fort Wayne were lower than those presented in the original spreadsheet and more accurately reflected the national trends for meatpacking wages.

The customized model was examined further to identify key relationships and to determine the sensitivity of the model. Factors influencing the cost of the plant output included hog price, wage rate, hog weight, yield percentage, waste percentage, interest rate, utility rates, sewage charges, land cost, amount of land, property tax rate, and value-added processing options. It was found that the cost of land, amount of land, and property tax rate had no effect on the net earnings per head while changes in interest rates only had a minor affect. However, changes in hog price, engaging in further processing, wage rate, and hog weight had the greatest impacts on the net earnings per head. This indicates that the variables that make up the plant's cost of goods sold have the greatest impact while changes in the fixed costs have very little impact.

The next item to be determined was how the business would be formed. All forms of business ownership were considered. Since it was a group of producers who were interested in starting this business, a cooperative seemed like a logical choice. The characteristics of a traditional cooperative and new generation cooperative (NGC) were compared, as seen in Table 1, to determine which form would be better for this project.

Table 1.
Comparison of a Traditional Cooperative and a New Generation Cooperative

Item	Traditional	NGC
Delivery Rights	No Limit	Quantity Specified
Delivery Obligation	None	Required
Quality Accepted	Broad	Narrow and Specific
Identity Preserved	Usually Not	Potential but Not Necessary
Initial Payment	Market Price	Progress Payment
Cash Patronage Rate	Low	High
Retained Profit/Investment	High	Low
Pooling Distributions	Never or Rare	Common
Initial Investment	None or Low	Substantial
Liquidity	Low	High
Exchange Value	Fixed at par	Variable at Market
Eligibility	Delivery	Planned Prior to Production (restricted)
Voting	One Member/One Vote	Combination: One Member/One Vote + Proportional
(Belleville, 2001)		

In a NGC, membership is closed, and members buy equity shares. The investment of each member determines the amount of patronage that member receives. Patronage rights are transferable at market value. NGCs typically do not market raw commodities or supply production inputs; rather, they concentrate on processing and marketing agricultural products. Members of the NGC pool their resources by supplying the raw commodities for the cooperative to further process. As members of a NGC, producers must deliver a certain quality of product at a certain time. The amount of product delivered is tied to the number of equity shares individual producers own. Through creating a NGC, pork producers would be able to integrate at the processor level and possibly obtain a greater share of the consumer food dollar. Given the characteristics and advantages of a NGC, it was the form of business ownership selected.

Step 2: Describe the Market

The average per capita pork consumption in the United States is 51 pounds, and pork consumption is highest in the Midwest (Davis & Lin, 2005). Consumers are also demanding leaner and higher quality pork. Based on the 2000 U.S. Census (U.S. Census Bureau, 2000), the population in the tri-state region is 27.4 million, which is 9.73% of the U.S. total. By state, the population is 11.4 million

in Ohio, 6.1 million in Indiana, and 9.9 million in Michigan. In addition, large metropolitan areas such as Chicago, St. Louis, and Pittsburgh are in close proximity to the tri-state region, and the East Coast is within 700 miles. Therefore, a large local and regional population exists for pork products marketed from a slaughter facility located in the tri-state region.

In the United States, the largest 47 pork-packing companies provide 407,875 head of daily slaughter capacity via 71 individual plants. Of these 71 plants, seven are located in the tri-state region. The owners, location, and daily slaughter capacity of these plants are:

1. Tyson Foods, Logansport, IN, 14,500 hogs,
2. Indiana Pack, Delphi, IN, 12,500 hogs,
3. J.H. Routh, Sandusky, OH, 4,200 hogs
4. Vin-Lee-Ron, Mentone, IN, 1,400 hogs, and
5. Bob Evans, three plants located in the tri-state region, 1,100 hogs (this figure also includes a fourth plant outside the region) (Pork Quick Facts, 2005).

Based on market and competition analysis, the plant proposed in the feasibility study was assumed to have a daily slaughter capacity of 2,500 hogs.

Step 3: Describe the Capital Requirements

For any project it is very important to determine the amount of capital necessary in order to secure the needed equipment, land, facilities, and working capital. For a processing facility, the majority of the capital cost is due to the slaughtering and fabrication processes; in the study, approximately 85% of the capital costs were for the processing building and equipment. Additional costs are incurred for the land (~0.3%), site preparation (~3%), office area/equipment (~4%), animal holding area (~6%), and miscellaneous expenses (~2%). The total capital requirement estimated for this project was approximately \$34.8 million.

When determining the amount of capital needed, it is also necessary to establish the financing structure that will be used. Items to consider include amount of debt, the term of the debt, and the interest rate for both long-term and short-term debt. In the study, the following assumptions were made:

1. Producers were going to provide 60% equity and assume 40% of the total cost as debt,
2. The debt was going to be financed through a 10 year note at an interest rate of 10%, and
3. The short-term annual interest rate would be 10.5% for 3 years.

Step 4: Describe the Raw Materials Needed

For the project, the most obvious raw material that was needed was live hogs. According to Belleville (2001), there are producers in the tri-state region that would be interested in supplying hogs to a cooperative and there would be 2,640 - 5,475 hogs available for slaughter daily. These hogs would be transported to the facility from cooperative members by truck.

In order to determine the cost of these hogs for the cooperative, the 15-year average (1990 - 2004) market hog price in the Eastern Cornbelt of \$44.32/cwt was used. The cost of the live hogs is by far the largest expense for the proposed company and is the single most important driver in determining the total cost of the output from the plant. In the model, a 10% change in hog price changes the profitability of the plant by an average of 168.4%. This relationship indicates that small changes in the price of hogs significantly influence the profitability of the processing plant.

Step 5: Describe the Financial Situation

Using the spreadsheet customized for the Fort Wayne, Indiana area and the average market hog price of \$44.32/cwt, a 10-year pro forma profit and loss statement was generated. The major costs as a percentage of total costs are shown in Table 2. The average revenue was approximately \$80.6 million, and the plant was expected to experience a positive gross margin per year; however, high cost of goods sold (~\$74.4 million average) and operating expenses (~\$10.2 million average) indicated that the plant would lose approximately \$3.7 million to \$4.4 million per year. Therefore, this proposed project is not profitable. Due to the fact that the firm was not profitable in the original analysis, several other scenarios were analyzed to determine if changing certain factors would impact the profitability of the plant.

Table 2.
Cost Items as a Percentage of Total Costs

Cost Item	% of Total Costs
Hogs	79.5%
Packaging	5.2%
Other Variable Costs (other than marketing)	5.0%
Fixed Costs	4.7%
Direct Labor	3.3%
Marketing	2.4%

The option of adding a second shift was explored as a means to reduce fixed costs. Even with two shifts, the proposed plant would still not be profitable at prevailing prices for market hogs. Therefore, other scenarios were analyzed as well. The impact of changing the prices and the weights of the hogs would make on the profitability of the single shift processing plant was examined next.

Combinations of live animal weights ranging from 250 - 270 pounds and market hog prices per cwt ranging from \$30 - \$44 were evaluated. At the prevailing wages in Indiana of \$8.00 per hour for unskilled labor (floor workers) and \$10.50 per hour for skilled labor (value added staff), which represents the lower end of slaughterhouse employee wages, positive earnings per head were not realized until slaughter weights reach 260 pounds when purchased at \$42 per cwt. Positive return on equity and earnings per head are both gained when the hogs can be purchased for \$40 per cwt or less.

Because both return on equity and earnings per head were positive at \$40 per cwt, the scenario of procuring hogs at \$40 per cwt and paying hourly wages of \$8.00 and \$10.50 was further analyzed to determine its operating efficiency. To do this, a pro forma balance sheet and pro forma income statement were created for year 5, which is the midpoint of operating years specified in the model. Comparisons were then made to Dun and Bradstreet benchmark data for similar firms in the meatpacking industry.

Table 3.
Financial Ratios, A Comparison of the Model (\$40/cwt price, \$8.00 and \$10.50 wages) and Dun and Bradstreet, 2004

Ratios	Model Values	Dun & Bradstreet 2004 Average
Solvency Ratios		
Quick Ratio (times)	0.65	0.8
Current Ratio (times)	1.49	2.1
Fixed Assets to Net Worth (%)	105	63.6
Efficiency Ratios		
Assets to Sales (%)	58	25.6
Sales to Net Working Capital (times)	8.86	13.9
Accounts Payable to Sales (%)	7	4.1
Profitability Ratios		
Return on Sales (%)	2	1.8
Return on Assets (%)	3.4	8.8
Return on Net Worth (%)	9	16.6

Under this scenario, the proposed plant would behave similarly to the meatpacking industry in that liabilities tend to be high and solvency is an issue. Both the current and quick ratios are somewhat low, while the fixed assets to net worth measure is high. The meatpacking industry as a whole would not be able to handle a financial downturn very well. The efficiency ratios for the meatpacking industry suggest that the efficiency of the industry could be improved. It is important to note that management is also a key to how efficiently the plant operates. Profitability measures show that meatpacking is not a highly profitable industry.

Conclusions of Research and Recommendations

Based on the 15-year average market hog price of \$44.32/cwt, a small, producer-owned pork-processing facility located in Fort Wayne, Indiana would not be feasible. At this price, adding a second shift was not profitable either. The proposed processing plant realized positive earnings per head at a price of \$42 per cwt and a hog weight of 260 pounds. Varying the wage rate affected the profitability of the plant slightly. In general, as the long-term average acquisition price of market hogs decreases, the plant becomes more profitable.

Financial ratios for a plant that was able to purchase hogs at \$40 per cwt were calculated and analyzed. From this analysis, it was discovered that the plant would be similar to other meatpacking plants. The plant would have issues with solvency and be vulnerable to unexpected changes. This plant would be slightly more profitable than most meatpackers but would not realize a high profit margin.

The only way that a small, pork-processing facility could earn a profit is if it is able to purchase hogs at a low price. The interest in a producer owned pork processing facility was generated due to the low hog prices and lost profits experienced in the late 1990s. Now that hog prices have rebounded and profits have returned, interest in such a venture has decreased. The price of building a small pork processing facility is approximately \$34.8 million and profits are not regularly achieved. At this time, constructing and operating a 2,500 head per day pork processing facility would not be recommended.

Conducting a feasibility study is an important process to go through prior to deciding to open a business. Prospective business owners often ask the question, "Is it feasible?," and look to Extension professionals for help in answering this question. By following the five-step process described in this article, answering the feasibility question becomes much easier. As seen in this application to the pork industry, the five steps were completed, and analysis was performed to determine that the formation of a cooperative to produce value-added pork products through a producer-owned, 2,500 head per day pork processing facility was not feasible.

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