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Feasibility Templates for Value-Added Manufacturing Businesses

Phil Kenkel and Rodney Holcomb

Individual producers, producer groups and existing agribusinesses are frequently faced with evaluating value-added processing and other potential business ventures. A detailed feasibility study is an essential step in developing a successful venture. A feasibility study is an examination of the production and marketing processes of an enterprise or project to determine the likelihood of success. A feasibility study helps a company or individual decide whether or not a project is financially feasible, economically feasible, and physically feasible. A completed feasibility study is an ideal document for planning purposes and provides the foundation for the development of a business plan. The feasibility study and business plan increase the chances of securing the necessary financing. A feasibility study is also required if a business is considering significant changes to existing operations.

Unfortunately, developing a feasibility study is neither cheap nor easy. Outside consultants can be commissioned to conduct a feasibility study, but, depending upon the specific business venture, locating and selecting a qualified consultant can be difficult and expensive, with fees ranging from \$10,000 to \$100,000 or more. Individual producers, or even producer groups making a preliminary feasibility assessment, may not have the funds for an outside study. University and extension professionals are often called on to assist with preliminary feasibility assessments. Despite their economic and business skills, the development of even a preliminary feasibility assessment can be a time-consuming process for most university professionals. In order to address these difficulties, researchers at Oklahoma State University developed several feasibility-assessment templates. These included a generic feasibility-assessment template and more-specialized templates for assessing the feasibility of cow and

bull slaughter-processing, alfalfa-dehydration, commercial-bakery, and flour-milling operations. This report describes the basic structure and uses of the generic feasibility-assessment template.

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A feasibility study can be essentially divided into two parts: market determination, and operations and finance. The template described in this report is most useful for building the second of these sections. That is, it assists with developing profit and expense projection, summarizes the results into an analysis of return on investment, and helps the user understand the sensitivity of the results to changes in key variables impacting income and expenses.

The Feasibility Assessment Template

The feasibility-assessment template is a standard Microsoft Excel® spreadsheet. Figure 1 illustrates the basic flow of information through the template. The template can be used as-is to analyze simple projects or it can be modified for more advanced applications. Figure 1 illustrates the basic flow of information through the template.

Inputs

Most of the basic inputs are entered in the “Input” sheet. This includes information on capital structure and interest rates, tax and payroll benefit rates, insurance, utilities and maintenance costs, and anticipated inflation rates. The price, sales volume, and variable cost of production for the major product(s) are also entered on the input page. More-specialized inputs are entered on two other sheets. Information on the cost and useful life of plant and equipment is entered on the “Depreciation” sheet. Personnel information including a list of positions, salaries, or wage rates for each position and anticipated overtime rates are entered on the “Personnel Expenses” sheet.

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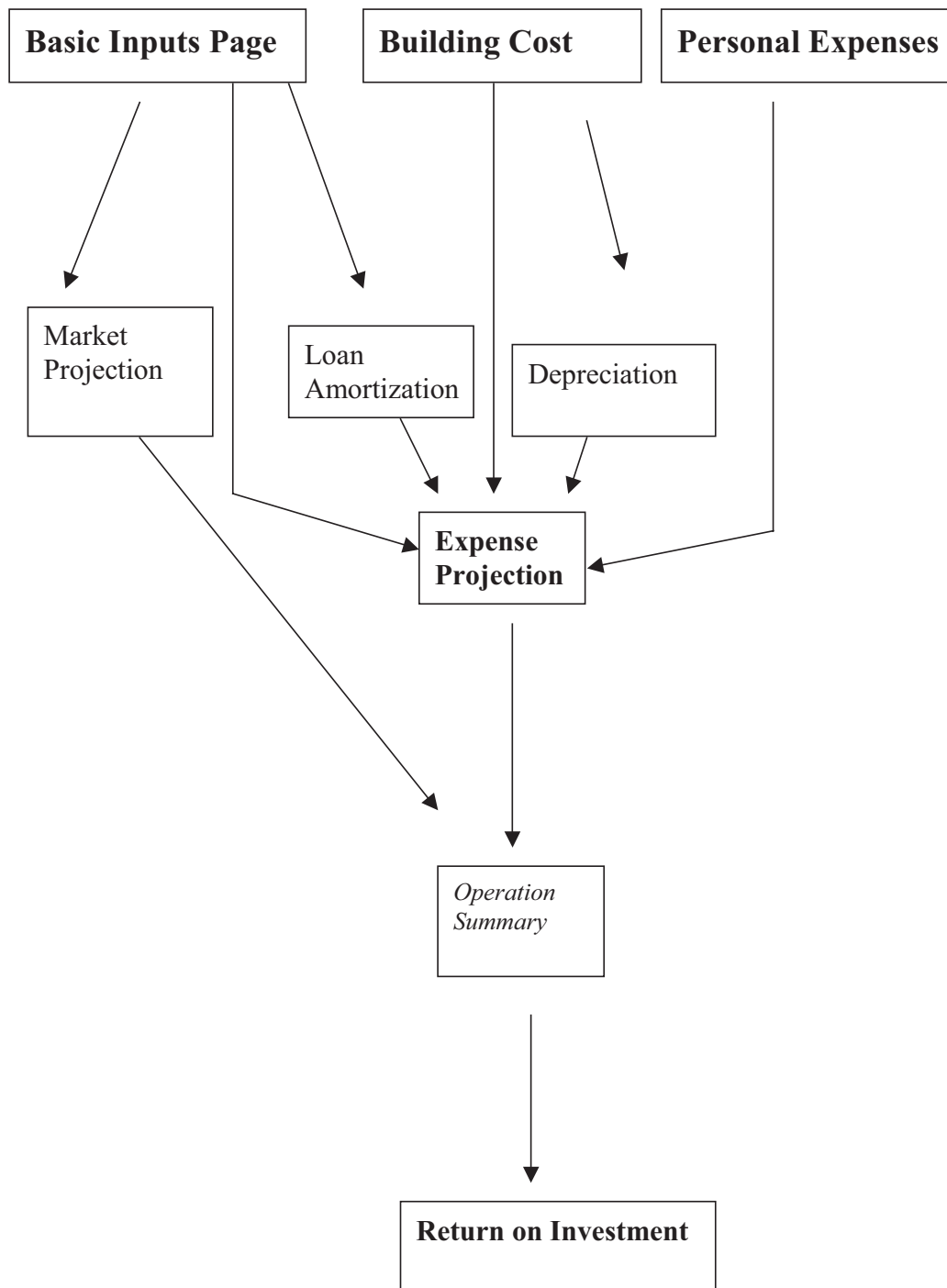


Figure 1: Flowchart of Feasibility Assessment Template.

Intermediate Calculations

The inputted data provides the basis for four worksheets containing intermediate calculations relating to sales margins, depreciation expenses, personnel expenses, and loan interest and principle payments. The “Market Projection” worksheet creates a 10-year forecast of sales, variable costs of production, and gross margins for the four products identified on the input sheet. The sales and gross-margin forecast reflect the sales-growth rates that are included in the input sheet. The sales forecast could be further customized by turning off the protection feature and entering specific sales estimates for each year of operation.

The “Depreciation” worksheet calculates annual depreciation expenses for four categories of buildings and equipment. Buildings are depreciated on a straight-line basis using a 39-year life and the designated salvage value. Special-purpose buildings are depreciated over a 10-year life. Equipment and heavy rolling stock are depreciated over 7 years using MACRS (modified accelerated cost recovery system) while light trucks and vehicles are depreciated over 5 years using MACRS.

The “Personnel Expense” worksheet allows the user to enter salary, benefit, and overtime information for four categories of employees. The sheet can easily be expanded by disabling the protection feature and adding additional listings. The total personnel wage and salary costs, benefit costs, and overtime costs flow to the “Operation Summary” worksheet.

The “Loan Amortization” worksheet calculates annual interest and principle payments for a term loan using the interest rate, loan length, and leverage percentage specified in the “Input Values” worksheet. Annual interest costs on working capital are also calculated using the working-capital level and short-term interest rate specified. The annual total interest expenses flow to the “Expense Projection” worksheet. Loan principle payments also flow to the “Operation Summary” where they are used in calculating annual cash flow from operations.

Projected Income and Expense Statements

The template provides a simple 10-year income and expense statement for the project (on the “Operations Summary” worksheet). The statement summarizes gross sales, variable and fixed expenses,

before-tax profits, taxes, and after-tax profits. A simple projection of cash flows from operations is also created by adjusting the annual after-tax profits for the cash-flow impacts of depreciation expenses (a non-cash expense) and loan-principle payments (a cash-flow requirement not reflected as an expense).

Measures of Feasibility

The final worksheet in the template, “Return on Investment” summarizes the feasibility of the project. The basic feasibility template includes four common feasibility measures: *benefit/cost ratio*, *internal rate of return*, *the net present value*, and *the payback period*. More-specialized versions of the template have been developed which include a parallel set of return measures for one of more classes of investors. The investor-based measures can be useful for users investigating alternative business forms or profit-allocation systems.

Sensitivity Analysis

Another key step in feasibility assessment is determining how the projected profits will be affected by changes in internal and external factors. The feasibility template allows users to analyze the impact of sales volume, sales price, interest rates, raw material costs, energy and utility costs, and other assumptions on the profitability of their project.

More-Specialized Uses

Another envisioned use of the feasibility-assessment template was to serve as a foundation for the construction of more-specialized templates. Customizing the template for more-advanced projects often requires expanding the tables of products, gross margins, and production costs on the “Input Values” sheet, expanding the equipment lists on the “Depreciation” sheet, and expanding the positions list on the “Personnel Expenses” sheet. As the following examples illustrate, it may also be useful to add additional worksheets providing more-detailed projections of particular costs.

Alfalfa-Dehydration Template

The alfalfa-dehydration template is available on the Ag Marketing Resource Center web site at <http://>

[//www.agmrc.org/biomass/info/alfalfadehydration-template.xls](http://www.agmrc.org/biomass/info/alfalfadehydration-template.xls)) The template, which was developed by modifying the generic template, analyzes the feasibility of an 8-ton/hour alfalfa-dehydration operation. The major modifications included additions to the “Input Values” sheet to include more information on utility costs, forage characteristics, and throughput (hours of operation) assumptions. Because utility costs (primarily drying costs) are a major factor in alfalfa dehydration, an additional sheet on utility costs was added to the template.

Flour Mill Feasibility-Assessment Template

The flour mill feasibility-assessment template was also developed for the Ag Marketing Resource Center <http://www.agmrc.org/wheat/info/flourmillingtemplate.xls>

The template contains an embedded PDF file that describes the flour-milling process and typical equipment compliments. The adaptation of the template to the flour-milling example required expansion of the product sales components to reflect typical flour products and bulk- and packaged-flour options. The personnel-expense section was also

expanded to reflect a larger workforce and multiple-shift operations. The “Input Values” section was also expanded to include cost and throughput information unique to flour milling.

Summary

The feasibility templates described in this report were created as part of a project support by the Agricultural Marketing Resource Center. The templates are not intended as replacements for detailed studies performed by qualified, unbiased professionals. They do provide an important resource for producers, producer groups, or university professionals in determining the preliminary feasibility of value-added projects and other business ventures. As the examples in this report illustrate, the basic template is easily modified and can be used as the foundation for creating a specialized template for a particular project. More information about the templates is available by contacting the authors: phil.kenkel@okstate.edu, or rodney.holcomb@okstate.edu. The templates are available on the Agricultural Marketing Resource Center website: www.agmrc.org.