

# ANALYZE REFRIGERATOR TOOLING INVESTMENT LIVIA MODEL AT PT LG ELECTRONICS INDONESIA

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## ABSTRACT

*For a large firm like PT LG Electronics Indonesia (LGEIN), which has resulted in high manufacturing utilization, require a few percent reductions in component prices every year. The one of potential project for cost reduction is tooling investment. After Livia is produced and the expenditure of new tooling is made, it is continually faced with the problem that current method computing profits are conventional without considering the expenditure of tooling in the long run. Finally, a firm's capital budgeting decisions is needed because it defines its strategic direction. Four primary methods in the capital budget to decide whether or not the project should be accepted are: discounted payback, net present value, internal rate of return and profitability index. In addition, we use sensitivity analysis to indicate which factor has significant interfere with the project. The results generated that discounted payback is just 2 year 6 months less life of the project for 3 years, NPV generated positive result \$3,502,387, and an IRR of this project is 25% greater than required rate of return 10% and profitability index gets 1.8 greater than 1. In sensitivity analysis shows that the project's NPV is very sensitive to changes in sales and COGS, and relatively insensitive to changes in either growth rate or rate of return.*

*In a method of capital budgeting analysis, Livia project could be accepted with initial investment for \$4,199,288 and still more detailed analysis is required to support the expenditure.*

**Keywords:** *capital budgeting, expenditure, tooling, sensitivity analysis*

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## INTRODUCTION

### Background

The global company especially LG Electronics Indonesia (LGEIN) has grown substantially in the last few years that have resulted in high manufacturing utilization. Inflation in the customer price indices however has remained below the historical average. Perhaps this contradictory behavior is due to attempts of original equipment manufacturers to contain or even reduce product cost. It is not unusual, for instance, for a large firm to require a few percent reductions in component prices every year. If the firm doesn't meet their demands, the customer goes elsewhere. As such, the firm is witnessing continued pressure to reduce part costs. The part production cost is a function of material utilization, machine requirements, energy consumptions, cycle time, labor charges and production yields. Since product cost is based on multiple factors, there are several approaches towards cost reduction that can and should be pursued. The one of potential project for cost reduction is tooling investment. Examples of projects include investments in plant, and equipment (tooling, machinery), research and development projects, large advertising campaigns or any other project that requires a capital expenditure and generates a future cash flow.

### Problem Description

The manufacturing industry is highly capital-intensive. It entails large, irreversible investment in plant and equipment (tooling, machinery). Typically, these investments are characterized by long lead times, long operating lives and matching pay off periods.

The production of a new product (model) or part has to take different steps in LGEIN before it is determined where to produce it. When launching a new refrigerator product for premium model (GN-M/B 492, 562, 602) on July 2007 which is named *Livia*, the Business Area, LG Electronics Indonesia, holds the main responsibility. Expansion into new products like *Livia* is relatively complex to make decision for investment and so, detailed analysis is necessary before the decision could be taken. Each new part for the plastic of injection surely requires the new mold so that by dozens expense for the investment of the mold. But not all new part of plastic injection uses the mold newly but there is some tooling which is delivering Korean.

After *Livia* was took over from LGECW (Korea) to LGEIN (Indonesia), it is continually faced with the problem of deciding whether new parts from new model should be imported or localized. Since the managers of the firm decided to localized, current accounting profits as conventionally computed, only compare price part by part (import to local) which one is the cheapest without considering the expenditure of tooling in the long-run.

## OVERVIEW OF BASIC THEORIES

### Capital Budgeting Decision Rules

Four primary methods are used to rank projects and to decide whether or not they should be accepted for inclusion in the capital budget: (1) discounted payback, (2) net present value (NPV), (3) internal rate of return (IRR), and (4) profitability index (PI).

### **Discounted Payback**

The discounted payback period, which is similar to the regular payback period except that the expected cash flows are discounted by the project's cost of capital. A project's cost of capital

reflects the overall cost of capital to the firm and the differential risk between the firm's existing projects being evaluated. Thus, the discounted payback period is defined as the number of years required to recover the investment from discounted net cash flows. Instead of computing the length of time required to recover the original investment, some analyst compute the length of time required to generate cash flows until the present value turns from being negative to positive. If the life of the asset exceeds this break-even life, the asset will have a positive present value. The discounted payback period can be used to make independent investment decisions, since any investment with a discounted payback period less than its life will at least earn the required return. Both the payback and discounted payback methods for determining value of capital projects are inconsistent with our criteria. Although occasionally employed in industry as a thumbnail measure of a project's value, neither is consistent or fully acceptable for evaluating capital projects.

### **Net Present Value (NPV)**

Net present value (NPV) method, which relies on discounted cash flow (DCF) methodology. To implement this approach, we proceed as follows:

1. Find the present value of each period's net cash flow, including both inflows and outflows, discounted at the project's cost of capital.
2. Sum these discounted net cash flows; this sum is defined as the project's NPV.
3. If the NPV is positive, the project should be accepted. If the NPV is negative, it should be rejected. And if two projects are mutually exclusive, the one with the higher positive NPV should be chosen.

The NPV is found using this equation:

$$NPV = \sum_{t=1}^n \frac{C_t}{(1+r)^t} - C_0$$

Where t = the time of the cash flow

n = the total time of the project

r = the discount rate

$C_t$  = the net cash flow (the amount of cash) at time t

$C_0$  = the capital outlay at the beginning of the investment time ( $t = 0$ )

Cash outflows (expenditures on the project, such as the cost of buying equipment or building factories) are treated as negative cash flows. Inflows and outflows could occur on any time basis, quarterly and monthly, in which case t would represent quarters or months rather than years.

### **Internal Rate of Return (IRR)**

The IRR is defined as that discount rate which equates the present value of a project's expected cash inflows to the present value of the project's expected costs or, equivalently, forces the NPV to equal zero:

$$NPV = 0 = \text{Initial Investment} + \sum_{t=1}^N \frac{C_t}{(1 + IRR)^t}$$

Notice that the IRR formula is simply the NPV formula, solved for the particular discount rate that forces the NPV to equal zero. Thus, the same basic equation is used for both methods, but in the NPV method the discount rate,  $k$  is specified and the NPV is found, whereas in the IRR method the NPV is specified to equal zero, and the value of IRR that forces this equality is determined.

### Profitability Index

Another method used to evaluate projects is the profitability index (PI). The ratio is calculated as follows:

$$PI = \frac{\text{PV of future cash flows}}{\text{Initial cost}} = \frac{\sum_{t=1}^n \frac{CF_t}{(1+k)^t}}{CF_0}$$

Here  $CF_t$  represents the expected future cash flows, and  $CF_0$  represents the initial cost. The PI shows the relative profitability of any project, or the present value per dollar of initial cost.

### Cash Flows Estimation

The most important, but also the most difficult, step in capital budgeting is estimating project's cash flows—the investment outlays and the annual net cash inflows after a project goes into operation.

### Identifying the Relevant Cash Flows

The starting point in any capital budgeting analysis is identifying the **relevant cash flows**, defined as the specific set of cash flows that should be considered in the decision at hand. Analysts often make errors in estimating cash flows, but two cardinal rules can avoid mistakes: (1) Capital budgeting decisions must be based on cash flows, not accounting income. (2) Only *incremental cash flows* are relevant.

Recall that free cash flow is calculated as follows:

$$\begin{aligned} \text{Free Cash flow} &= \\ &= \text{Net operating profit after taxes (NOPAT)} + \text{depreciation} - \text{change in net working capital} \\ &= \\ &= \text{EBIT} - \text{Tax} + \text{depreciation} - \text{change in working capital} \end{aligned}$$

### Incremental Cash Flows

In evaluating a project, we focus on those cash flows that occur if and only if we accept the project. These cash flows, called **incremental cash flows**, represent the change in the firm's total cash flow that occurs as a direct result of accepting the project. As noted previously, in capital budgeting our concern is with those cash flows that result directly from the project, or projects incremental cash flows. Three special problems can occur when estimating incremental cash flows:

1. Sunk cost. Sunk costs are not incremental costs, so they should not be included in capital budgeting analysis. A sunk cost refers to an outlay that has already occurred (or been committed), so it is an outlay that is not affected by the accept/reject decision under consideration.

2. Opportunity costs. The second potential problem relates to opportunity costs. All relevant opportunity costs should be included in a capital budgeting analysis. For example if the company decides to use some land it owns for a new facility, the market value of that land should be included as a cost for the facility because the land could be sold. If the land were sold it would produce a positive cash flow to company.
3. Effects on other projects. The third problem involves the effects of the project being considered on the firm's other projects. For example, Nike comes out with a new tennis shoe that competes with Nike's other shoes. In analyzing the sales for the new shoe, the incremental (new) sales the shoe is expected to generate should be considered.

**Tax Effects (MACRS)**

Taxes can have a major impact on cash flows, and in many cases tax effects can make or break a project. Therefore, it is critical that taxes be dealt with correctly in capital budgeting decisions. However as financial analysts, we encounter two problems: (1) the tax laws are extremely complex, and (2) these laws are subject to interpretation and to change. The financial staff can get assistance from the firm's accountants and tax lawyers, but even so, it is necessary for financial analysts to have a working knowledge of the current tax laws and their effects on cash flows.

For tax purposes, Congress changes the permissible depreciation methods from time to time. Prior to 1954 the straight line method was required for tax purposes, but in 1954 accelerated methods (double declining balance and sum-of-years'-digits) were permitted. Then, in 1981, the old accelerated methods were replaced by a simpler procedure known as the *Accelerated Cost Recovery System (ACRS)*. The ACRS system was changed in 1986 as a part of the Tax Reform Act, and it was now called the Modified Accelerated Cost Recovery System (MACRS).

A major effect of the MACRS system has been to shorten the depreciable lives of assets, thus giving business larger tax deductions and thereby increasing their cash flows available for new investment. Table 1. describes the types of property that fit into the different class life groups, and Table 2. sets forth the MACRS recovery allowances (depreciation rates) for the various classes of investment property.

**Table 1. Major Classes and Asset Lives for MACRS**

Class (year)	Type of Property
3	Specially designated tools and devices and tractor units
5	Automobiles, trucks, computers, typewriters, copiers, and other designated equipment
7	Most industrial equipment, office furniture, and fixtures
10	Certain longer-lived types of equipment
27.5	Residential rental real property such as apartment buildings
31.5	All nonresidential real property, including commercial and industrial buildings

**Table 2.** MACRS recovery Allowance Percentages for Personal Property

Ownership Year	Class of Investment			
	3 Year	5 Year	7 Year	10 Year
1	33%	20%	14%	10%
2	45%	32%	25%	18%
3	15%	19%	17%	14%
4	7%	12%	13%	12%
5		11%	9%	9%
6		6%	9%	7%
7			9%	7%
8			4%	7%
9				7%
10				6%
11				3%
	100%	100%	100%	100%

### Sensitivity Analysis

Intuitively, we know that many of the variables that determine a project's cash flows could turn out to be different from the values used in the analysis. We also know that a change in a key input variable, such as units sold, will cause the NPV to change. Sensitivity analysis is a technique that indicates how much NPV will change in response to a given change in an input variable, other things held constant.

Sensitivity analysis begins with a *base-case* situation, which is developed using the expected values for each input. In a sensitivity analysis, each variable is changed by several percentage points above and below the expected value, holding all other variables constant. Then a new NPV is calculated using each of these values. Finally, the set of NPVs is plotted to show how sensitive NPV is to changes in each variable.

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### Required Rate of Return

We know that systematic risk is the only relevant risk-the rest can be diversified away, and the required rate of return equals the risk-free rate plus risk-premium. We can now put this element together to estimate required rates of return. The finance profession has had difficulty in developing a practical approach to measure the investor's required rates of return; however, financial managers often used a method called the capital asset pricing model (CAPM). The capital asset pricing model is an equation that equates the expected rate of return on a stock to

the risk-free rate plus a risk-premium for the stock's systematic risk. Although not without its critics, the CAPM provides an intuitive approach for thinking about the return that investor should require on an investment, given the asset's systematic or market risk.

Equation above provides the natural starting point for measuring the investor's required rate of return and sets up to use the CAPM. Rearranging this equation to solve for the risk premium ( $k_{rp}$ ), we have

$$k_{rp} = k - k_{rf}$$

Which simply says that the risk premium for a security ( $k_{rp}$ ), equals the security's expected return,  $k$  less the risk-free rate existing in the market.

In the same market, a security with a beta of 2 should provide a risk premium of 16 percent, or twice the 8 percent risk premium existing for the market as a whole. Hence, in general, the appropriate required rate of return for the  $j$ th security,  $k_j$  should be determined by

$$k_j = k_{rf} + \beta_j(k_{rp} - k_{rf})$$

### **Financial Statement Forecasting**

Once sales have been forecasted, we must forecast future balance sheets and income statements. The most commonly used technique is the percent of sales method, which begins with the sales forecast, expressed as an annual growth rate in dollar sales revenues. Many items on the income statement and balance sheets are assumed to increase proportionally with sales, with their values for a particular year estimated as percentages of the forecasted sales for that year. The remaining items on the forecasted statements items that are not tied directly to sales-depend on the company's dividend policy and its relative use of debt and equity financing.

#### **Forecast the Income Statement**

In this section we explain how to forecast the income statement, and in the following section we forecast the balance sheet. Although we cover these topics in two separate sections, the forecasted financial statements are actually integrated with one another and with the previous year's statements. For example, the income statement item "depreciation" depends on net plant and equipment, which is a balance sheet item, and retained earnings, the forecasted net income, and the firm's dividend policy.

#### **Forecast the Balance Sheet**

Before going into the details of forecasting balance sheets, let's take a look at the big picture. First, a firm must have assets to support the sales as forecasted on the income statement, and if sales are growing, then assets typically must also grow. Second, if assets are to grow, then the firm must obtain funds to purchase the new assets. Third, the needed funds can come from internal sources, mainly as reinvested earnings, or externally, from the sale of short-term investments, from new loans (either notes payable or long-term bonds) from new stock issues or by increasing operating current liabilities, mainly accounts payable or accruals. Here are the steps: (1) determine the amount of new assets needed to support the forecasted sales, (2) determine the amount of internal funds that will be available and (3) plan to raise any required additional financing.

## **Financial Ratio Analysis**

Financial ratio helps us identify some of the financial strengths and weakness of the firm. The ratios give us two ways of making meaningful comparison of a firm's financial data.

1. We can examine the ratios across time to identify any trends.
2. We can compare the firm's ratios with those of other firms.

Mathematically, a financial ratio is nothing more than a ratio whose numerator and denominator are comprised of financial data. The objective in using a ratio when analyzing financial information is simply to standardize the information being analyzed so that comparisons can be made between ratios of different firms or possibly the same firm at different points in time.

In learning about ratios, we could simply study the different types or categories of ratios, or we could use ratios to answer some important questions about a firm's operations. We prefer the latter approach and choose the following four questions as a map in using financial ratios:

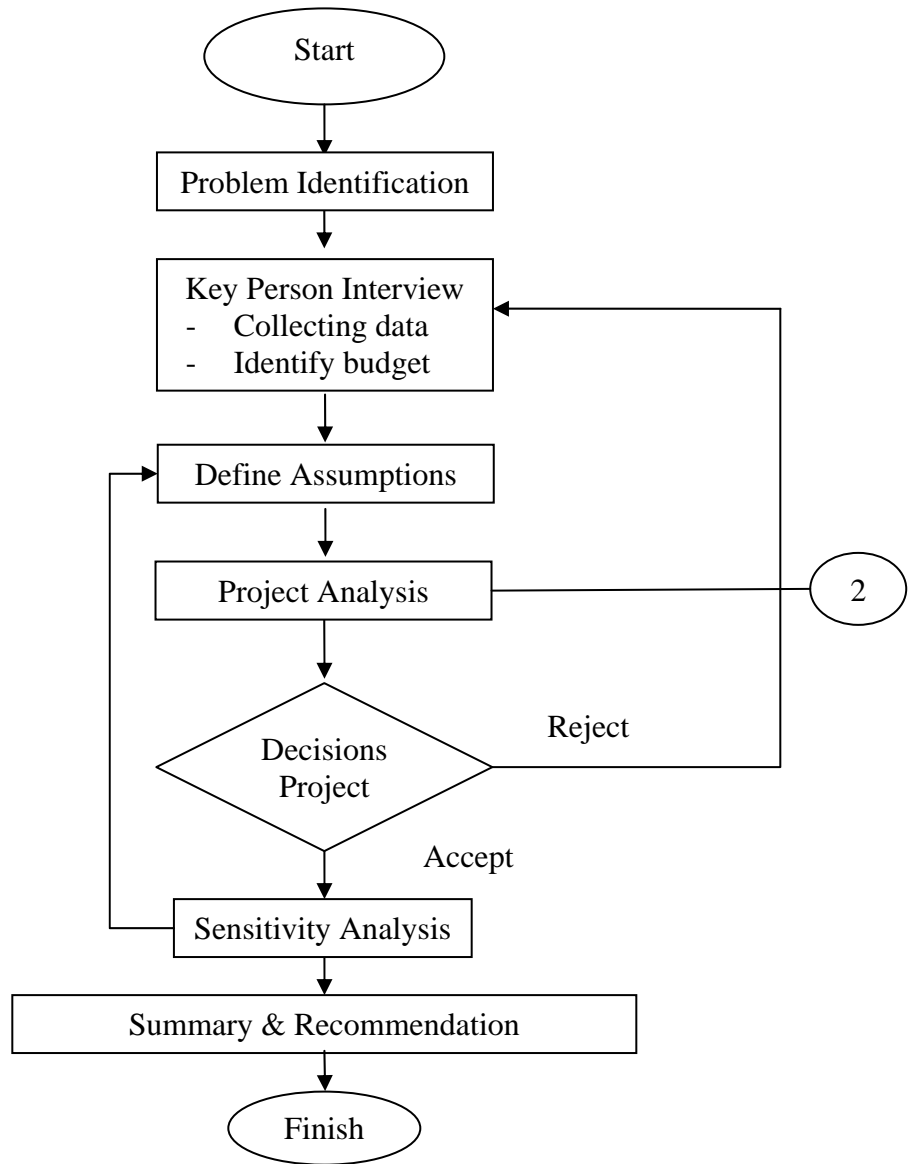
1. How liquid is the firm?
2. Is management generating adequate operating profits on the firm's assets?
3. How is the firm financing its assets?
4. Are the owners (stockholders) receiving an adequate return on their investment?

## **METHODOLOGY**

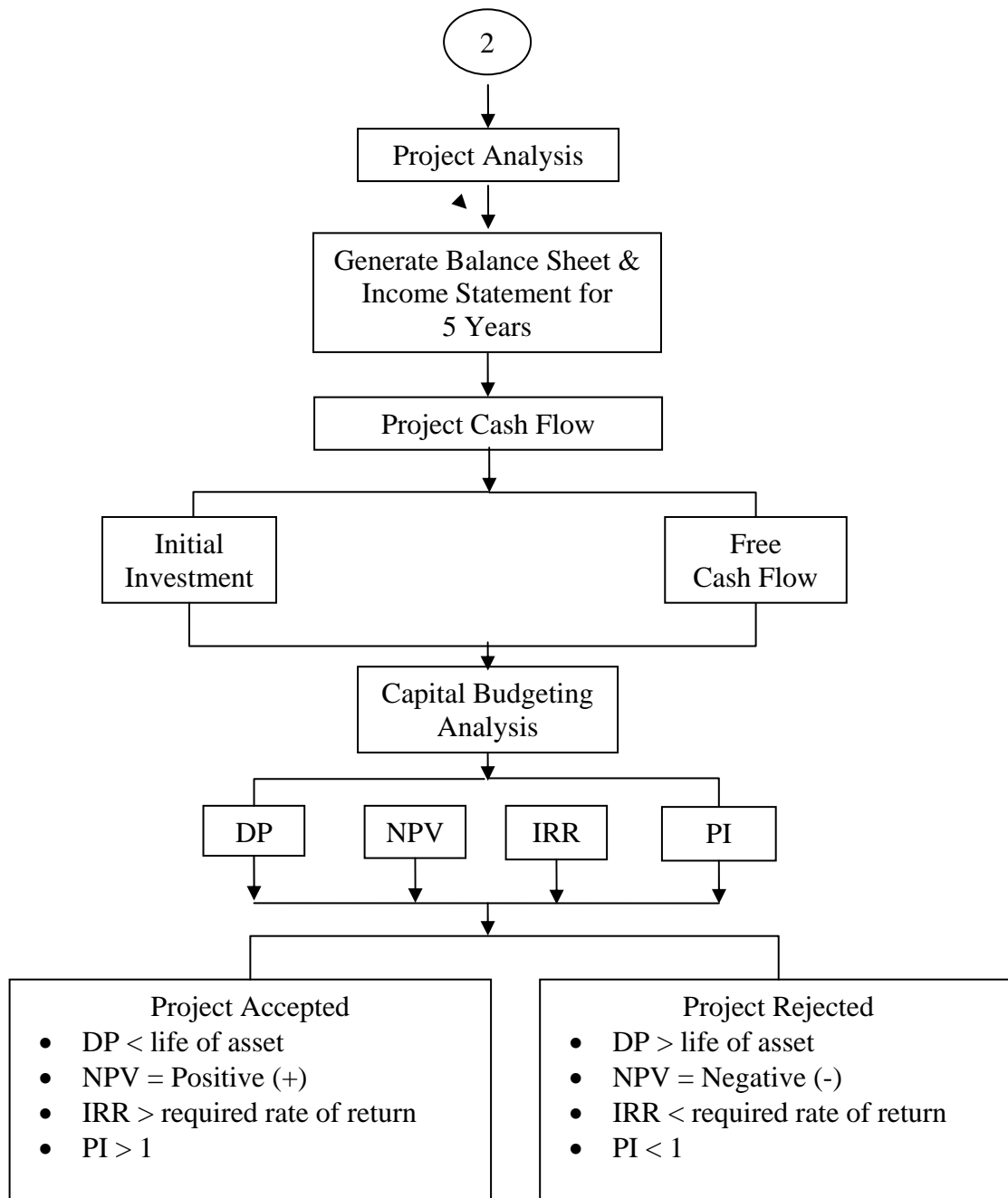
For survival in the face of competition, for growth and development a firm needs a constant flow of ideas for new products and ways to make existing products better or at a lower cost. With imaginative executives and employees, many ideas for capital investment will be advanced. Since some ideas will be good ones, procedures must be established for screening projects. Moreover, a well managed firm will go to great lengths to develop good capital budgeting proposals e.g. a sales representative may report that customers are asking for a particular product which the company is not producing now, the sales manager will discuss the idea with the marketing research group to determine the market size for the proposed product. If a substantial market does exist, cost accountant and engineers will estimate production costs. If it is appears that the product can be produced and sold to yield a sufficient profit, the project will be undertaken.

Capital budgeting is a multi-faced activity. There are several sequential stages in the process. For typical investment of a large firm, the distinctive stages in the capital budgeting process are depicted in the form of a highly simplified flow chart, in Figure 1 & 2 :





**Figure 1.** The Distinctive Stages in The Capital Budgeting Process



**Figure 2.** The Distinctive Stages in the Capital Budgeting Process

## ANALYSIS

### Data & Assumptions and Initial Investment

In this chapter, we illustrate all cash flow analysis by examining capital budgeting decision that faces LGEIN, refrigerator plant. LGEIN's research and development (R&D) department has been applying its expertise to develop a premium model of refrigerator. This project has now reached the stage where a decision on whether to go forward with production must be made.

LGEIN believes that monthly net sales would be 30,000 units and the refrigerator sales at \$18,925,000. The firm would need a new tooling which could be made and ready for production after the "go" decision is made. The project would also require an initial investment equal to \$4,199,288 and estimated economic life is three years. Net sales are projected to increase which is expected to average 10 percent per year over the 3-year life of the project.

### Assumptions

This section provides the basic data used in the analysis. The inputs are really "assumptions".

- a. Exchange rate.  
We are using IDR 9,050 covert to USD, which we obtain from middle Bank of Indonesia July 2007. This rates will used for next calculation.
- b. Inflation.  
We are using 6.5% inflation get from December 2007 inflation
- c. Growth rate  
Estimated growth 10 percent for 3 years period of time project in net sales
- d. In the analysis we assume that 5,000 set/month for GN-M/B602, 10,000 set/month for GN-M/B562 and 15,000 set/month for GN-M/B492 can be sold at a price \$724, \$671, \$573 each model.
- e. Some of the inputs in selling and administrative expense are known with near certainty, for example transportation, 5 percent from net sales, maintenance 2 percent from net sales, campaign 3 percent from net sales, SPG/SPM 2 percent from net sales are not likely to change.

### Financial Statement Forecasting

In the following sections we explain the percent of sales method and use it to forecast LGEIN's financial statements.

### Forecast the Income Statement

In this section we explain how to forecast the income statement, and in the following section we forecast the balance sheet. Although we cover these topics in two separate sections, the forecasted financial statements are actually integrated with one another and with the previous year's statements. For example, the income statement item "depreciation" depends on net plant and equipment, which is a balance sheet item, and retained earnings, the forecasted net income, and the firm's dividend policy.

1. Forecast sales

Table 1 shows the forecasted income statement. Management forecasts that sales will be grow by 10 percent. Thus, forecasted sales, shown in Row 1, Column 3, is the product of \$94,620,166(1.10) = \$104,082,182.

2. Forecast earnings before interest and taxes (EBIT)

Table 1 shows that LGEIN's ratio of costs to sales for most recent years was 56 percent (\$52,881,754/\$94,620,166 = 0.56). Thus, to get a dollar of sales, LGEIN had to incur 56 cents of costs. Initially, we assume that the cost structure will remain unchanged. Later on, we explore the impact of changes in the cost structure, but for now we assume that forecasted costs will equal 56 percent of forecasted sales. The depreciation to tooling equipment we are using MACRS depreciation.

3. Depreciation

The tooling would fall into the MACRS 3-year class, and it would cost \$4,199,288. The depreciation amounts were obtained by multiplying each asset's depreciable basis by MACRS recovery allowance rates set forth in Table 3

4. Completing the income statement

Earnings before taxes (EBT) are calculated by subtracting interest from EBIT, and then we deduct taxes. The tax is computed as follows:

$$\begin{aligned} \text{Earnings before taxes} &= \$5,477,662 \times 9.050 = \text{Rp}49.572.841.355 \\ \text{Tax} &= (\text{Rp}49.572.841.355 - 10.000.000) \times 30\% + (50.000.000 \times 10\%) \\ &\quad + (50.000.000 \times 15\%) \\ \text{Tax} &= \text{Rp}14.854.352.047 + 9050 \\ \text{Tax} &= \text{\$1.641.365} \end{aligned}$$

Thus, LGEIN's forecasted net income in 2007 is \$3,836,297, by subtracting the EBT and taxes.

**Table 1. Projected Income Statement**

PT LG Electronics Indonesia Refrigerator Division  
Projected Income Statements  
For the Year Ended 31 December  
(In USD)

Description	2007	Forecast basis % of sales	2008	2009
Sales	94,620,166	100%	104,082,182	114,490,401
Cost of Sales	52,881,754	56%	58,169,929	63,986,922
Gross Profit	41,738,412	44%	45,912,253	50,503,478
Selling & Administrative Expenses				
Transportation	4,748,212	5%	5,223,033	5,745,336
Maintenance Expense	1,651,552	2%	1,816,707	1,998,378
Blind Bonus	1,469,337	2%	1,616,271	1,777,898
Branch Budget	1,469,337	2%	1,616,271	1,777,898
Campaign	2,938,674	3%	3,232,541	3,555,796
Aging	685,691	1%	754,260	829,686
JK2 Support	783,646	1%	862,011	948,212
Trading Term	6,509,292	7%	7,160,221	7,876,243
SPG/SPM	1,627,323	2%	1,790,055	1,969,061
Pull Campaign	3,254,646	3%	3,580,110	3,938,122
Salary	1,548,330	2%	1,703,163	1,873,479
Advertising	3,199,882	3%	3,519,870	3,871,857
Other S&A	3,612,770	4%	3,974,047	4,371,452
Depreciation	1,385,765	MACRS	1,889,680	629,893
Total Selling & Administrative Expenses	34,884,457		38,738,240	41,163,310
Earnings Before Interest and Taxes	6,853,955	7%	7,174,013	9,340,168
Interest Expense	1,376,293	1%	1,513,923	1,665,315
Earnings Before Taxes	5,477,662	6%	5,660,090	7,674,854
Taxes	1,641,365	2%	1,696,093	2,300,522
Net Income	3,836,297	4%	3,963,997	5,374,331

### Forecast the Balance Sheet

Before going into the details of forecasting balance sheets, let's take a look at the big picture. First, a firm must have assets to support the sales as forecasted on the income statement, and if sales are growing, then assets typically must also grow. Second, if assets are to grow, then the firm must obtain funds to purchase the new assets. Third, the needed funds can come from internal sources, mainly as reinvested earnings, or externally, from the sale of short-term investments, from new loans (either notes payable or long-term bonds) from new stock issues or by increasing operating current liabilities, mainly accounts payable or accruals.

1. Forecast operating assets

As noted earlier, LGEIN assets must increase if sales are increase too. The firm's most recent ratio of accounts receivable to sales was 20 percent ( $\$18,924,033/\$94,620,166 = 0.20$ ) and we believe this ratio should remain constant. Therefore, the forecasted accounts receivable in 2008, shown in Table 2 is  $0.2(\$104,082,182) = \$2,816,436$ .

The most recent inventory to sales ratio was  $\$9,726,977/\$94,620,166 = 0.1 = 10$  percent. Assuming no change in LGEIN's inventory policy, the forecasted inventory is  $0.1(\$104,082,182) = \$10,699,675$ . Next we make the temporary assumption that tools and equipment will remain at their current level.

2. Forecast operating current liabilities

As noted earlier, operating current liabilities are called spontaneously generated funds because they increase automatically, as sales increase. LGEIN's most recent ratio of foreign currency short-term borrowings to sales was  $\$13,646,933/\$94,620,166 = 0.14 = 14$  percent. In its initial financial plan, LGEIN kept short-term borrowings at the 2007 level.

3. Raising the additional funds needed

Based on the forecasted balance sheet, LGEIN will needed  $\$50,552,723$  of operating assets to support is forecasted  $\$94,620,166$  of sales. We define specified sources of financing as the sum of forecasted levels of interdivision account. Based on its required assets and specified sources of financing, LGEIN's AFN is  $\$61,936,604 - \$60,766,417 = \$1,170,187$ . Because the AFN is positive, LGEIN needs  $\$1,170,187$  of additional financing, and its initial financial policy is to obtain these funds as interdivision account. Therefore, we add  $\$1,170,187$  into interdivision account, bringing the forecasted total to  $\$12,639,918 + \$1,170,187 = \$13,465,778$ .

**Table 2. Projected Balance Sheet**

**PT LG Electronics Indonesia Refrigerator Division**

**Projected Balance Sheets**

**Desember 31**

**(in USD)**

Description	2007	Forecast basis % of sales	2008	2009
<b>Assets</b>				
Trade accounts and notes receivable, net	18,924,033	20%	20,816,436	22,898,080
Inventories, net	9,726,977	10%	10,699,675	11,769,643
Other accounts receivable, net	20,000,000		20,000,000	20,000,000
Short-term loans receivable, net	129	0%	142	157
Prepaid income tax	1,898,383	2%	2,088,221	2,297,043
Guarantee deposits	3,200	0%	3,520	3,872
<b>Total current assets</b>	<b>50,552,723</b>	<b>53%</b>	<b>53,607,995</b>	<b>56,968,795</b>
Long-term loans receivable, net	145,159	0%	159,675	175,643
Land				
Building and structures, net				
Tools and equipment, net	4,199,288		4,199,288	4,199,288
Accu Depreciation Tools & Equipment	699,881	1%	1,399,763	2,099,644
Office equipment	50,000	0%	55,000	60,500
<b>Total assets</b>	<b>55,647,051</b>	<b>59%</b>	<b>59,421,721</b>	<b>63,503,869</b>
<b>Liabilities and Shareholders' Equity</b>				
Short-term borrowings	6,300,000		6,300,000	6,300,000
Trade accounts and notes payable	8,813,626		9,026,176	9,243,851
Foreign currency, short-term borrowings	13,646,933	14%	15,011,627	16,512,789
Other accounts payable	5,182,350	5%	5,700,585	6,270,644
Other current liabilities	2,060,688	2%	2,266,757	2,493,433
<b>Total current liabilities</b>	<b>36,003,597</b>	<b>38%</b>	<b>38,305,144</b>	<b>40,820,717</b>
Accrued severance benefits, net	417,056	0%	458,761	504,637
Product warranty reserve	282,959	0%	311,254	342,380
<b>Total liabilities</b>	<b>36,703,611</b>	<b>39%</b>	<b>39,075,160</b>	<b>41,667,734</b>
Common Equity	5,477,662		5,660,090	7,674,854
Retained Earnings				
Interdivision Account	13,465,778		14,686,471	14,161,281
<b>Total shareholders' equity</b>	<b>18,943,440</b>	<b>20%</b>	<b>20,346,561</b>	<b>21,836,135</b>
<b>Total liabilities and shareholders' equity</b>	<b>55,647,051</b>	<b>59%</b>	<b>59,421,721</b>	<b>63,503,869</b>

### Determining Free Cash Flows

The first step in analysis is to forecast the cash flows that will occur once production begins; these are set forth in Table 4. The operating cash flow estimates are based on information provided by LGEIN's various departments. Note that the sales price is projected to increase each year by 10 percent.

To compute LGEIN free cash flow, we must add back to earnings the depreciation expense for the equipment (a non-cash charge) and subtract the actual capital expenditure that will be paid for the equipment in year 0.

Working capital is also an important part of a cash flow analysis. It is defined as the amount of money needed to facilitate business operations and transactions, and is calculated as represent the additional investments required to support sales increase (10 percent of the next year's sales increase) during 2007-2008, and the recovery of the cumulative net working capital investment in 2009. For example, sales in 2008 are \$9,462,017 over 2007 sales, so the addition to NWC in 2007 required to support 2008 sales is  $0.1(\$9,462,017) = \$946,202$ . The cumulative working capital investment is recovered when the project ends in 2009. Computing the amount of working capital gives us a quick analysis of the liquidity of the business over the future accounting period. The depreciation amounts were obtained by multiplying each asset depreciable basis by the MACRS recovery allowance rates set forth in Table 3.

The analysis also requires an estimation of the cash flows generated by salvage values. Table 3 summarizes this analysis. The indicated percentages are multiplied by the depreciable basis  $0.33(\$4,199,288) = \$1,385,765$ . Ending book value we obtain by subtracting initial investment \$4,199,288 with tooling depreciation \$839,858 equals to \$2,813,523. Book value equals depreciable basis (initial investment) minus accumulated MACRS depreciation. For the tooling, accumulated depreciation equals \$3,905,338, so book value equals \$4,199,288 - \$3,905,338 = \$293,950. The tax computed as follows:

$$\begin{aligned} \text{Expected gain} &= -\$83,986 \times 9,050 = -Rp760.071.091 \\ \text{Tax} &= (-Rp760.071.091 - 10,000,000) \times 30\% + (50,000,000 \times 10\%) \\ &\quad + (50,000,000 \times 15\%) \\ \text{Tax} &= -Rp245.521.327 + 9050 \\ \text{Tax} &= -\$27,129 \end{aligned}$$

Net cash flow from salvage equals salvage (market) value minus taxes. For the tooling, net salvage value = \$209,964 - (\$27,129) = \$237,094.

Next in Table 4, we use the information developed in Table 1 to table 4.53 to find the projected cash flows over the project's life. Three periods are shown, from year 2007 to 2009. Taxable operating income (EBIT) we were obtained from Table 1 projected income statements for each year. When taxes (from Table 1) are subtracted, we are left with net operating profit after taxes, or NOPAT. Note, though, that we are seeking cash flows, not accounting income. Thus, depreciation must be added back.

LGEIN must purchase raw materials and replenish them each year as they are used. In investment NWC, we assume that LGEIN must have an amount of NWC on hand equal to 10 percent of the upcoming year's sales. For example, sales in 2007 is \$18,924,003, so LGEIN must have  $0.1(\$18,924,003) = \$1,892,400$  in NWC at year 2007.

Recall that free cash is calculated as follows:

$$\begin{aligned} \text{Free Cash flow} &= \\ &= \text{Net Operating Profit After Taxes (NOPAT)} + \text{depreciation} - \text{change in networking capital} \\ &= \text{EBIT} - \text{Tax} + \text{depreciation} - \text{change in working capital} \end{aligned}$$

$$= \$6,853,955 - \$1,641,365 + \$1,385,765 - \$10,408,2184$$

$$= -\$3,809,863$$

**Table 3.** Net Salvage Values in 2009

Description	YEARS			Cumulative Depreciation
	1	2	3	
Tooling Depreciation Rate	33%	45%	15%	<b>\$ 3,905,338</b>
Tooling Depreciation	\$ 1,385,765	\$ 1,889,680	\$ 629,893	
Ending Book Value	\$ 2,813,523	\$ 923,843	\$ 293,950	

Estimated Market Value in 2009	\$ 209,964
Book Value in 2009	\$ 293,950
Expected Gain	\$ (83,986)
Taxes	\$ (27,129)
Net Cash flow from salvage	\$ 237,094
Total Gain	Rp (760,071,091)
Taxes	Rp (245,521,327)
	\$ (27,129)

**Table 4.** Calculation of Free Cash Flow for LGEIN

**PT LG Electronics Indonesia Refrigerator Division**

**Free Cash Flows**

**(in USD)**

YEAR	2007	2008	2009
<b>Operating Cash Flows</b>			
EBIT	6,853,955	7,174,013	9,340,168
Minus : taxes	1,641,365	1,696,093	2,300,522
NOPAT	5,212,590	5,477,919	7,039,646
Plus : depreciation	1,385,765	1,889,680	629,893
Operating Cash Flows	6,598,355	7,367,599	7,669,539
Investment in NWC	(10,408,218)	(11,449,040)	11,449,040
Plus : Net Salvage Value			237,094
Free Cash Flow	(3,809,863)	(4,081,441)	19,355,673

**Capital Budgeting Decisions**

A capital budgeting decision is characterized by cash flows (cost and benefits) that are spread out over several time periods. The time value of money must be considered in order to evaluate the alternatives correctly.



### **The Required Rate of Return**

We shall use the term time value of money to describe the required rate of return that can be used to compute present values. Before we determine the required rate of return, we first need to know about Bank of Indonesia rate and inflation.

Based on the Bank of Indonesia rate, we will use 8 percent by the end of 2007.

To calculate the risk-free rate, we need to get the data about inflation rate as shown in Table 5.

**Table 5.** Inflation Rate

Month Year	Inflation
December 2007	6.59 %
November 2007	6.71 %
October 2007	6.88 %
September 2007	6.95 %
August 2007	6.51 %
July 2007	6.06 %
June 2007	5.77 %
May 2007	6.01 %
April 2007	6.29 %
March 2007	6.52 %
February 2007	6.30 %
January 2007	6.26 %

$$\begin{aligned} \text{Risk-free rate } (k_{rf}) &= (1 + 8\%)(1 + 6.59\%) - 1 \\ &= 15\% \end{aligned}$$

In our view that refrigerator sales will be growth in 10% with beta coefficient for electronic industry is 0.65 that we obtain from Bloomberg.

$$\begin{aligned} \text{Market risk premium } (k_{rp}) &= 0.65 \times 10\% \\ &= 7\% \end{aligned}$$

$$\begin{aligned} \text{Required rate of return} = k_j &= k_{rf} + \beta_j (k_{rp} - k_{rf}) \\ &= 15\% + 0.65 \times (7\% - 15\%) \\ &= 10\% \end{aligned}$$

### **Discounted Cash Flow Method**

Four primary methods are used to rank projects and to decide whether or not they should be accepted for inclusion in the capital budget: (1) discounted payback, (2) net present value (NPV), (3) internal rate of return (IRR), and (4) profitability index (PI).

#### 1. Discounted payback

Discounted payback is almost the same as payback, but before we figure it, we first discount the free cash flows. Why? Because it is money we will get in the future, and will be less valuable than money today.

**Table 6.** Calculation for DP illustration of Investment in New Tooling

YEAR	UNDISCOUNTED FREE CASH FLOWS	PVIF 10%,n	DISCOUNTED FREE CASH FLOWS	CUMULATIVE DISCOUNTED FREE CASH FLOWS
0	(4,199,288)	1.000	(4,199,288)	(4,199,288)
1	(3,809,863)	0.909	(3,463,165)	(7,662,453)
2	(4,081,441)	0.826	(3,371,270)	(11,033,723)
3	19,355,673	0.751	14,536,111	3,502,387

After 3 years, the project will have generated \$3,502,387 in discounted cash inflows. Since the cost is \$3,502,387, the discounted payback is just under 3 years, or, to be precise,  $2 + (\$11,033,723 / \$19,355,673) = 2.57$  years. So, using the discounted payback method we break even after 2.57 years.

2. Net Present Value

Net present value (NPV) is the final running total number. Basically, NPV and discounted payback are the same idea, with slightly different answer. Discounted payback is a period of time, and NPV is the final dollar amount we get by adding all the discounted cash flows together. If the NPV is positive, then approve the project. It shows that we are making more money on the investment than we are spending on required rate of return. If NPV is negative, then do not approve the project because we are paying more in interest on the borrowed money than we are making from the project.

**Table 7.** Calculation for NPV illustration of Investment in New Tooling

YEAR	FREE CASH FLOW	PRESENT VALUE FACTOR AT 10%	PRESENT VALUE
2007	(3,809,863)	0.909	(3,463,165)
2008	(4,081,441)	0.826	(3,371,270)
2009	19,355,673	0.751	14,536,111
Present value of free cash flows			7,701,675
Initial Investment			(4,199,288)
<b>Net Present value</b>			<b>3,502,387</b>

3. Internal Rate of Return

IRR is the amount of profit we get by investing in a certain project. It is a percentage. IRR can be calculated with financial calculators and computers. As shown in Table 8, IRR is 25%. The decision criterion is this: accept the project if IRR greater than or equal to the required rate of return. We reject the project if its IRR is less than this required rate of return. This accept-reject criterion can be stated as:

IRR > required rate of return: Accept

IRR < required rate of return: Reject

Since the IRR project is 25%, we accept the project.

**Table 8.** Calculation for IRR illustration of Investment in New Tooling

YEAR	FREE CASH FLOW
Initial Investment	(4,199,288)
Year 1	(3,809,863)
Year 2	(4,081,441)
Year 3	19,355,673
<b>IRR</b>	<b>25%</b>

An IRR of 25% means we make 25% profit per year on the money invested in the project.

4. Probability Index

The PI shows the relative profitability of any project, or the present value of benefits per present value dollar of costs. The PI for project, based on 10% required rate of return is 1.8.

$$PI = \frac{NPV}{Initial\ Investment} + 1$$

$$PI = \frac{\$7,701,675}{\$4,199,288} + 1$$

$$PI = 1.8$$

**Table 9.** Calculation for PI illustration of Investment in New Tooling

YEAR	FREE CASH FLOW	PRESENT VALUE FACTOR AT 10%	PRESENT VALUE
2007	(3,809,863)	0.909	(3,463,165)
2008	(4,081,441)	0.826	(3,371,270)
2009	19,355,673	0.751	14,536,111
Present value of free cash flows			7,701,675
Initial Investment			(4,199,288)
<b>Net Present value</b>			<b>3,502,387</b>
<b>Probability Index</b>		<b>1.8</b>	

For every dollar borrowed and invested we get back \$1 8 cents. This project is acceptable if its PI is greater than 1.0. Therefore, this project would be accepted by the PI criterion.

**Sensitivity Analysis**

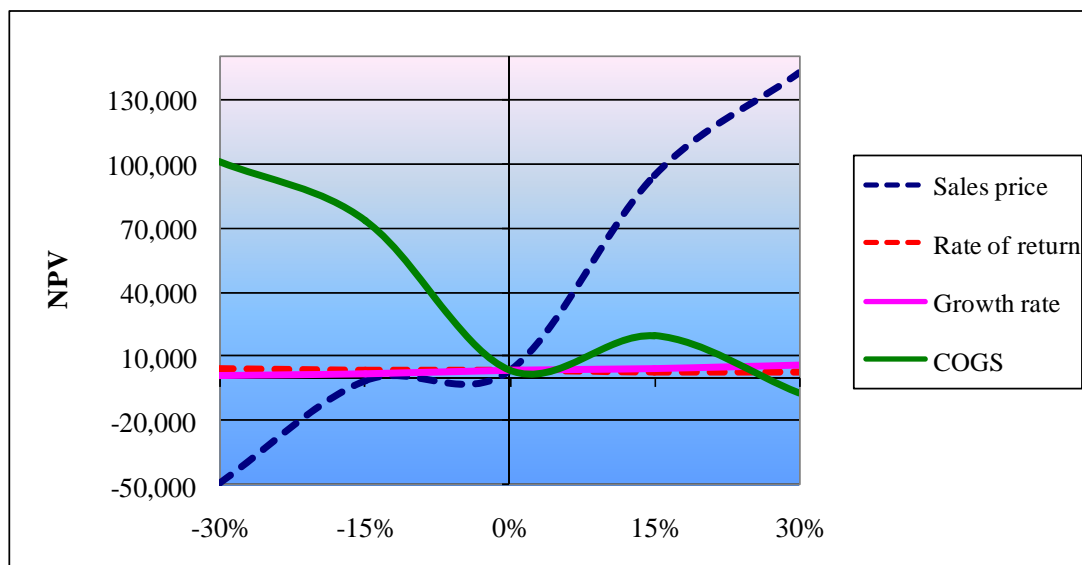
Sensitivity analysis begins with a base-case situation, which is developed using the expected values for each input. To illustrate, consider the data given back in Table 6, where projected cash flows for LGEIN were shown. This values used to develop the table, including sales price, required rate of return, cost of goods sold, growth rate, are all most likely, or base-case, values and the resulting \$3,502,387 NPV shown in Table 10 is called the base-case NPV. Now we ask a series of “what if” questions:”what if sales price fall 15 percent below the most likely level.” “What if the cost of goods sold falls?”

In a sensitivity analysis, each variable is changed by several percentage points above and below the expected value, holding all variables constant. Then a new NPV is calculated using each of these values. Finally, the set of NPVs is plotted to show how sensitive NPV is to changes in each variable. Figure 3 shows the Livia's project sensitivity graph for four of the input variables.

**Table 10.** Sensitivity Analyses

Deviation from Base Case	NPV at Different Deviations from Base			
	Sales price	Rate of Return	Growth Rate	COGS
-30%	\$ (49,023)	\$ 4,470	\$ 867	\$ 100,833
-15%	\$ (1,142)	\$ 3,813	\$ 1,745	\$ 73,786
0%	\$ 3,502	\$ 3,502	\$ 3,502	\$ 3,502
15%	\$ 94,621	\$ 2,927	\$ 4,382	\$ 19,693
30%	\$ 142,503	\$ 2,647	\$ 6,144	\$ (7,353)
<b>Range</b>	<b>191,526</b>	<b>7,116</b>	<b>7,012</b>	<b>108,186</b>

The table above the graph gives the NPVs that were used to construct the graph. The slopes of the lines in the graph show how sensitive NPV is to changes in each of the inputs: the steeper the slope, the more sensitive the NPV is to a change in the variable. From the figure and the table, we see that the project's NPV is very sensitive to changes in the sales price and COGS and not very sensitive to changes in either growth rate or rate of return.



**Figure 3.** NPV Sensitivity Graph for Livia's Project

### Financial Ratio Analysis

Financial ratio helps us identify some of the financial strengths and weakness of the firm. In addition to ratio analysis, we use ratios to compare related items from the financial statements. We will calculate the year 2007 to 2011 financial ratios for LGEIN, using data from balance sheets and income statements given in Table 3 and 4.4 we will also evaluate the ratios in relation to the industry averages that obtained from the risk management association ([www.rmahq.org](http://www.rmahq.org)) for Electronic industry electrical equipment and household appliances. It can be grouped into the categories below:

Table 11 summarizes LGEIN's financial ratios. As the table indicates, the company has many problems.

**Table 11.** LGEIN, Ratio Analysis

**PT LG Electronics Indonesia Refrigerator Division**

**Ratio Analysis**

**31 December**

Description	2007	2008	2009	Industry Average	Comment
<b>Firm Liquidity</b>					
Current Ratio	1.40	1.40	1.40	1.1	OK
Quick Ratio	1.13	1.12	1.11	1.0	OK
<b>Operating Profitability</b>					
Return on Investment	12.32%	12.07%	14.71%		
Operating Profit Margin	7.24%	6.89%	8.16%	10.6	POOR
Return on Assets	7%	7%	8%	1.11%	OK
Total Asset Turnover Ratio	1.70	1.75	1.80	1.5	OK
Receivables Turnover Ratio	5.00	5.00	5.00	10.9	POOR
Inventory Turnover Ratio	5.44	5.44	5.44	32.2	POOR
<b>Financing Decisions</b>					
Total Debt to Total Asset Ratio	65.96%	65.76%	65.61%		
Times Interest Earned Ratio	0.20	0.21	0.18	4.8	POOR
<b>Return on Equity</b>					
Return on Equity	20%	19%	25%		

## SUMMARY & RECOMMENDATION

### Summary

In the analysis has described four techniques (discounted payback, NPV, IRR, PI) that are used in capital budgeting analysis. When all the calculations are completed by using technique above, each approach provides a different piece of information, so we often look at all of them when evaluating the project. The key concepts covered are listed below:

1. Since the cost is \$3,502,387 the discounted payback is just under 3 years (less life of project), or, to be precise,  $2 + (\$11,033,723 / \$19,355,673) = 2.57$  years. So, using the discounted payback method we break even after 2.57 years and the project should be accepted.
2. NPV generated positive result \$3,502,387 then approve the project it shows that we are making more money on the investment than we are spending on required rate of return.
3. An IRR of this project is 25% which means we make 25% profit per year on the money invested in the project.
4. The PI for project, based on 10 percent required rate of return is 1.8 which means for every dollar borrowed and invested we get back \$1 8 cents. This project is acceptable if its PI is greater than 1.0. Therefore, this project would be accepted by the PI criterion.

Risk in capital budgeting really means the probability that the actual outcome will be worse than the expected outcome. For example if there were a high probability that the \$3,502,387 expected NPV as calculated in chapter 4 will actually turn out to be negative, then the project would be classified as relatively risky. The reason for a worse-than-expected outcome is, typically, because sales were lower than expected, COGS were higher than expected or the project turned out to have a higher than expected initial investment. In the other words, if the assumed inputs turn out to be worse than expected then the output will likewise be worse than expected. The followings are four key input variables as a scenario in using sensitivity analysis:

1. In the first scenario, if estimated the sales were to increase by roughly 30% and decrease 30% from the base, NPV is sensitive to change when the sales decreased by 15 percent and 30 percent.
2. Second, required rate of return ups and downs by 30 percent  
Required rate of return is not very sensitive to changes even the rate reached up to 13 percent from 10 percent, the NPV still generated positive with the result is \$2,646,697
3. Third, cost of goods sold (COGS). NPV is very sensitive to changes in COGS when the cost increased by 30 percent.
4. The last, expected growth rate ups and downs by 30 percent. Even the expected growth downs till 7 percent, NPV is not sensitive to change.

We also examined the financial ratios compare with other firms in the same industry.

Based on the trends, we can draw the following summarizes:

1. The firm's liquidity, as measured by current and quick ratios, has been relatively stable over time. Although there were a decline in these ratios from 2007 to 2009 the ratios has improved overall during the period.

2. Operating profit margin has shown improvement over the three-year period
3. LGEIN increased its use of debt somewhat over the three years. During this same time, the times interest earned has shown so poor.
4. The firm's return on equity has continued to improve over the five years reaching 25 percent in 2009, with the last year being on the high end of this range. Thus, for these three years, management has been able to consistently provide very attractive returns to the owners.

### **Recommendation**

As the results, generally, we recommend to accept this project with some considerations that this project meets the assumptions we used. In other case, accept or reject project decision could be changed in assumptions then the result of analysis couldn't be appropriate. And still the change in assumptions a very detailed analysis is required to the project. These are the points of our suggestions to the firm:

1. Analyze the project with considering the expenditure of tooling in the long run.
2. Keep production in fully capacity impact of capital tooling. The firm can anticipate of long waiting times for machinery, deterioration in the quality of the capital assets and an increase in costs.
3. Cost of goods sold (COGS) expense is directly related to sales revenue. In this case, COGS is very sensitive and if COGS is higher than expected the project would be classified as relatively risky, so the company should take a few percent reductions in raw material cost.
4. Inventory turnover is low. This suggests that LGEIN is holding too much inventory. Since the company must pay to finance and store raw materials and purchased parts, minimizing the size of these inventories in keeping with projected manufacturing demand is the first key to the process. To do so, LGEIN must work closely with suppliers in delivery of raw materials. (This approach to inventory management is called just in time).

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