INVESTMENT DECISION BASED ON INSOURCING/OUTSOURCING ANALYSIS IN MIDDLE-SIZE PRINTING COMPANY (CASE OF CV. REF GRAPHIKA)

THESIS

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UNIVERSITY OF INDONESIA
FACULTY OF ECONOMICS
MAGISTER OF MANAGEMENT
MASTER OF BUSINESS ADMINISTRATION
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Submitted to fulfill one of the requirements to obtain degree of Magister Management

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STATEMENT OF ORIGINALITY

This final paper represents my own effort,

any idea or excerpt from other writers in this final paper, either in form of publication or in other form of publication, if any, have been acknowledged in this paper in accordance to the academic standard or reference procedures

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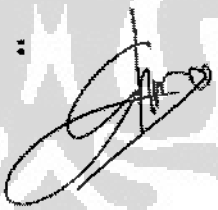

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Nothing that makes me happier if this thesis can be useful to the readers. However, this thesis is far from perfect; Therefore, any inputs and suggestion will be awaited and appreciated.

Jakarta, 6 March 2009

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EXECUTIVE SUMMARY

The market growth of printing industry in Indonesia is followed by the emerging of new companies in this business. This phenomenon forces Ref Graphika, as incumbents in a middle-size company in Jakarta, to create strategy that not only to make them survive, but also to gain more pieces of the market cake. In 2006, the company applies new strategy in the marketing section to focus on the targeted markets that still grow. Those new market are corporate and publisher. Apparently, the strategic changes that the company's brought in 2006 somehow are not only increase their profit, but also increase its cost, especially in outsourcing cost.

This company is outsourcing some of their processes to the suppliers. One way to decrease the outsourcing cost is by recalculating the possibility of this process to outsource or to insource. Just before, the decision to outsource or insource a production process is only based on the machine existence in the workshop. The company invests machines one by one as they gain the capital. Along the way, they reduce the number of process outsourced. And the question will be, is the investment decision at that time is really the best strategy? This question arose because the decision of insourcing in will lead to a long-term investment.

For a growth company that has only owner's wealth equity, the miscalculation regarding this decision might be a boomerang attack the company itself. Because once the decision of making investment has been made; those investments are hardly be liquid back. Even though there is possibility to liquid the investment, there will be lost that cannot be refundable. This thesis is try to bring up on how the decision of investments should be made through insourcing/outsourcing decision.

The methods that will be bringing up in this thesis is not only specific on cost calculation, but also will consider the qualitative methods. As the cost calculation will use the relevant cost on comparing the cost different among these two alternatives, the qualitative methods will include the analyzing the company's strategy combined with other risk consideration regarding to outsourcing/insourcing consideration, such as of quality, delivery, and continuity of the process.

Keywords: Investment, Outsourcing/insourcing decision, Printing industry.

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INTRODUCTION

1.1 Background

The printing industry is a sector in which the dominant players are small and medium-sized companies. In 2001, Kipphan, together with Heidelberg, one of the largest printing machine companies in the world made research that shows around 90% of all printing companies' in the world employed less than twenty people. And in Asia/Pacific, the number of this segment reached up to 95%.

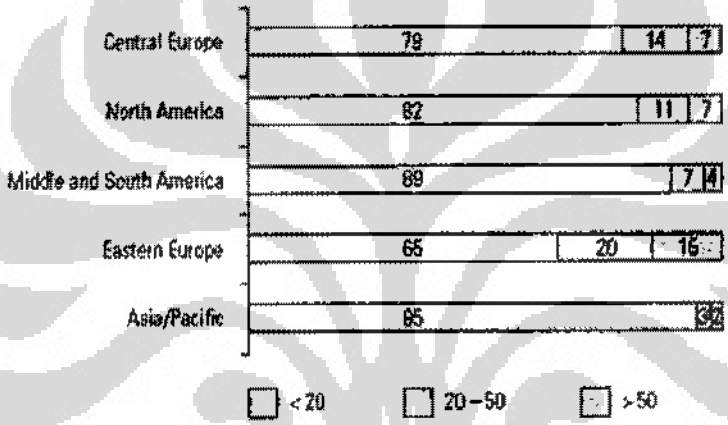


Figure 1.1 Printing companies segmentation by number of employees in 2001

Kipphan, Helmut, 2001. Handbook of Print Media: Technologies and Production Methods.

In Indonesia, the market growth of printing industry is followed by the emerging of new players in this business. Most of the new competitors come from small private companies. They usually build small workshops which can be found from streets to corners in the centre of the city to the sub-urban area. All of them try to gain a portion from printing job that still grow until today.

These phenomenon forces the incumbents to create strategy that make them not only survive, but also make them try to gain more pieces of the market cake. The strategy that they create must have a value added to increase their competitive advantage. To get a strategy that increase competitive advantage, the company have to know what the market wants.

In the theory of marketing mix, there are four main strategic areas that can be applied to gain the competitive advantage. Those strategic areas are

product, price, place, and promotion. The strategy that mentioned above are using *inside-out thinking* approach which focusing internally on sales, shares, and quarterly reports. A printing company uses a pull system manufacturer, a system that works based on the client order. In this kind of process, using *outside-in thinking* approach will be more suitable than *inside-out thinking*. The *outside-in-thinking* approach is focusing on customer's needs and wants. In this approach, the marketing strategy changes from the Four Ps to Four Cs which stands for customer, cost, convenience and communication. The Four Cs approach changes the thinking of how to price a product to what it cost the customer to own it. The shifting from place to convenience indicates a focus on how easy it is for customer to acquire it rather than on how easy it is for the company to distribute it (Duncan, 2002).

Ref Graphika is one of the incumbents of a printing industry in Jakarta. As a medium size company with only owner's wealth equity, Ref Graphika has some limitation to increase the competitive advantage in term of cost reduction.

PPGI (Persatuan Pengusaha Grafika Indonesia), the association of printing entrepreneur in Indonesia categorized the size of printing company into small, medium, and large. A medium sized company is the company who has minimum 2 unit of half plano-sized or 1 unit of plano-sized sheet-fed printing machine. The company that cannot fulfill the specification is considered as small sized company. If a company has more than 2 unit of plano-sized sheet-fed or 1 unit of web fed printing machine, they are considered as a large scale company (Information Media of PPGI, 2008). The categorization by PPGI classifies the printing company according to the company's capacity.

Small size companies do most of their production process outside the company. By outsourcing the process, they can have a small fixed cost. However, they cannot do a large quantity project. Whereas a large company gaining their profit advantage from the economies of scale due to the large capacity that they have. Those factors make the medium-sized company hard to compete in pricing.

1.2 The Research Problem

To compete with price, the company is forced to decrease its profit margin. The company data shows that last year, the profit margin has decrease to 22.28% from 26.79% in 2006. The research problem of this thesis is how the company increase profit by reducing its cost.

One of the strategies that can be implemented to make cost reduction is by recalculating process that is used by the company. Most of growth printing companies do not only use their asset to make the product. They also outsource some process to complete the services. The outsourced processes that they do are mostly the part of pre-press process and post-press process. In pre-press process, making film is the only part that can be outsourced. Whereas in post-press process; coating, embossing, hot printing, to name a few, are some of production process that can be done with outsourcing.

The decision to change from outsourcing to insourcing in some process will lead to a long-term investment. For a growth company, this decision is one of a development stage that has a major difficulty to do. A growth company has a limitation toward the capital to make a large investment. A slightly miscalculation can make the company financially decrease. Selecting the investment has to be linear with a strong point of analysis, because once the investment is made; those investments are hardly be liquid back. Even though there is possibility to liquid the investment, there will be lost that cannot be refundable.

Just before, the decision to outsource or insource a production process is only based on the machine existence in the workshop. The company invests machines one by one as they gain the capital. Along the way, they reduce the number of process outsourced.

Is the investment decision is really the best strategy to reduce the cost? And how significant this decision will affect the company's performance? This thesis will show the analysis of making the investment decision and its significance to the company's profit.

1.3 The Objective of the Study

To be able to analyze this thesis, writer has to understand the industry and characteristic of the process in printing company. Moreover, as the analysis implemented, it has to make a different on the whole picture of the company. By reducing the cost, the company will not only be able to increase its profit, but also increase the competitive advantage that affect on obtaining bigger cake in the market.

Therefore, the objectives that try to reach by making this thesis are:

1. Analyze the outsourced processes and deciding the best alternative between insourcing and outsourcing.
2. Provide the impact on the company's profit regarding the decision that has been made.

1.4 Methodology

To make the analysis, the sources which will be used to support the analysis are:

a. Literature Study

Literature Study will be done by collecting theories that is related to the analysis. The source study will be taken from books, journals and articles in order to execute the analysis.

b. Company Analysis

Company analysis will include collecting the real data of the company's internal documents. This analysis will be including interview the people that related to these processes, and not to forget doing direct observation to the industry.

1.5 The Systematic of Writing

Chapter 1: Introduction

This chapter will explain the background on why the writer tries to analyze the problem in this thesis. This chapter will also describe the objectives of the study, the methodologies that will be used, and the systematic of the writing.

Chapter 2: Theoretical Framework

In this chapter, writer will describe the basic theories that use as references to make the analysis of this thesis. The first theory is about the insourcing/outsourcing decision, and followed by the theory of investment decision.

Chapter 3: Company Background

This chapter will describe Ref Graphika, the company that will be analyzed in this thesis. This company background will describe from history of the company, to the clients and the products that produce by the company, and also the production process in the company. In this chapter, the writer will also describe about the company data that trigger this analysis to be made.

Chapter 4: Analysis

The analysis chapter will be started with the chosen outsourcing process that needs to be analyzed. It will be followed by analyzing those processes to reach the insource/outsource decision. This chapter will be ended with the general analysis of the company as the company implemented this analysis.

Chapter 5: Conclusion, and Recommendation

Based on analysis and discussion in the previous chapters, this chapter will give the conclusion of the whole strategy that has to be implemented by the company. It will also show provide the recommendation in the future analysis for the implication that might happen in the future.

CHAPTER 2
THEORITICAL FRAMEWORK

2.1 Sourcing in Supply Chain Management

Sourcing can be defined as a business process that is required when a company wants to purchase goods or services. It is the most significant decision in supply chain function (Chopra & Meindl, 2006). The theory above was strengthens by the theory of Monczka and Trent (1999) who published methodology of leveraging purchasing and supply management (Weele, 2002, p 143). In their theory, Monczka and Trent place the decision either to insource or to outsource in the first stage of leveraging supply chain management.

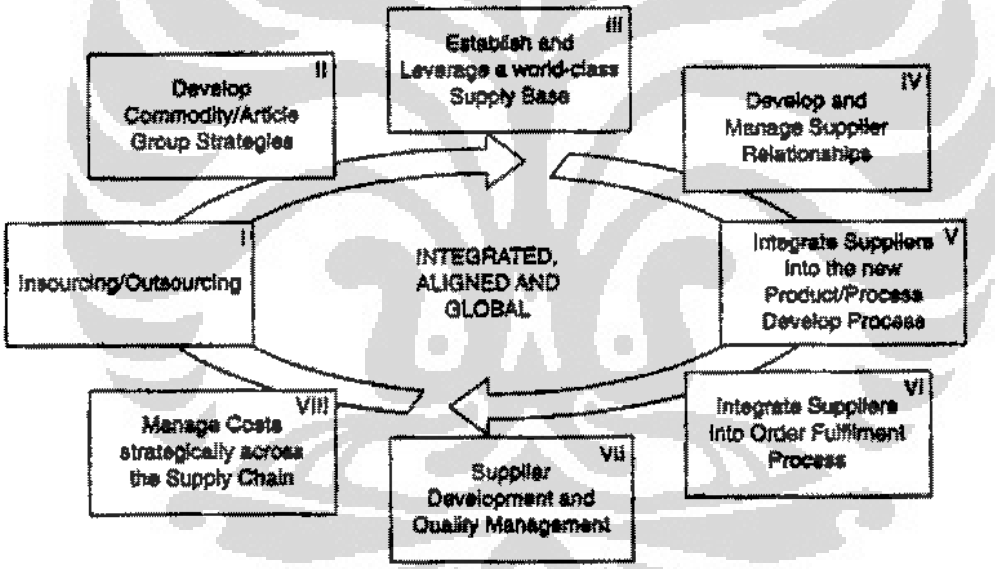


Figure 2.1 Cycle of leveraging purchasing and supply management.

Weele, Arjan J., 2002. Perchasing and Supply Chain Management.

The term outsourcing itself can be defined as the result of the supply chain function which contains a decision to subcontract some process to a third-party company. Not only doing particular part of work, the company can also hire the third-party to maintain their peak level of workload. It is why the companies that outsource usually formed long-term relationships with firms who have capabilities complement or supplement their own. The companies wish that the

supplier will be able to add value, so that they become not only supplier, but also business partner for the company.

2.1.1 Driving Forces for Outsourcing

Outsourcing can offers many potential benefits. Many books offer different approach to analyze the driven forces of the company to do outsourcing process. One of them generalizes the driven factors into strategic and tactical approach. On tactical approach, the outsourcing strategy is only maintained as a near term issue. The purposes of this approach are to make capital funds available, give cash infusion, or make process that the resource has available internally. And beyond all of those purposes, the most important purpose is to reduce and control operational cost.

The strategic approach views the outsourcing process as a long term issue. The main purpose is to improve the ability of the company by focusing on their core business. It also uses to accelerate re-engineering benefit, share risk, and free resource for other purpose. Moreover, doing the offshoring outsourcing might also give an access to the company to get the world class capability supplier. The strategy can give a great importance for the survival of the company.

Many previous studies of outsourcing argued the theoretical background at determining the driving forces for outsourcing. Those summarize of theoretical approach can be divided into two basic theoretical perspectives: resource-based theory (RBT) and transaction cost theory (TCT) (Nordigården, 2007).

Table 2.1 Compilation of a various theoretical approach to outsourcing

	Author:	Theoretical Approach:	Type of study:
TCT	Walker and Weber (1984)	Transaction cost theory	Survey
↑	Walker (1988); Augustsson (1998); Fill and Visser (2000); Ellram and Billington (2001); Lonsdale (2001)	Transaction cost theory	Case
	Cox (1996); Arnold (2000)	Transaction cost theory and core competence	Theoretical with empirical examples
	Brandes et al. (1997)	Transaction cost theory and core competence	Case
	McIvor (2000a)	Transaction cost theory and core competence	Theoretical
	Quinn and Hilmer (1994); Quinn (2000)	Core competence focus (but partly mentioning transaction cost theory)	Theoretical with empirical examples
↓ RBT	McIvor et al. (1997); Venkatesan (1992)	Core competence	Theoretical Empirical examples

Nordigården, Daniel, 2007. Outsourcing in the Wood Product Manufacturing Sector

Table 2.1 shows that the development of frameworks seems to evolve from a focus on transaction cost theory to the resource-based theory, or at least a mix among two theoretical approaches.

2.1.1.1 Resource-Based Theory

The resource-based theory approach comes from several research trends. The most dominant trend to be noticed is economic theory and strategic management. In 1983, Porter and Millar stated that the classical economy have a view that a high profit margin can be higher than the cost of capital if the company can built the competitive advantage among their rivals (Roy & Aubert, 2001, p.2). The strategic management analyzes the possibility to place interesting sectors and strategic groups to the environment of the industry. It also analyzes the strategy to counter the market force in this environment. Those two approaches are combined and give a solution that the positioning of the company in industry is determined by its competitive advantage that trigger by the free access resource inside the company.

Related to the hierarchy level of the company, this theory is considered as one of company strategic level. This theory is more focusing on exploiting the firm's assets and developing firm's competency based on that resource. With a resource-based theory view, a firm can provide a better match of internal strengths

and external opportunities as well as recognize resources that can work as a basis for competitive advantage.

Outsourcing strategy can provide better focus on the company's core competencies and at the same time, the company is also able to access the external resources. By gaining inside and outside resource, this strategy is proposed to gain competitiveness and maximize profitability. The most important consideration in resource-based theory is the core competencies of the company. Further explanation regarding the core competencies will be described later.

2.1.1.2 Transaction Cost Theory

According to Williamson (1995), the transaction cost theory has been developed to facilitate an analysis of the "comparative costs of planning, adapting, and monitoring task completion under alternative governance structures" (Aubert, & Weber, 2001). Using the basis of cost efficiency, transaction cost theory is considered as the most efficient approach from the company to make the decision under governance structure whether a firm should make or buy certain activities.

This theory traditionally has been used as a theoretical approach for the analyses of outsourcing using a cost perspective by looking at transaction costs and production costs. The transaction cost is associated with comparing a transaction within the organization (insourcing strategy), and the transaction in the market (outsourcing strategy). If the company chooses to use the market, the company has to determine the appropriate type of implementation.

2.1.2 Outsourcing/Incourcing Strategy

To be able to make the decision on insource/outsourced strategy, we have to know how the implementation in practice. Not only the practice of the decision making process, the implementation after the decision has been made is also important to get the maximum impact of supply chain management. One of the practice methods that we can use in making decision of insourcing/outsourcing is through the four-step process analysis (Trehan, 2008). This process consists of company strategy formulation, cost analysis, non-cost factors and implementation.

2.1.2.1 Company Strategy Formulation

The company strategy formulation is the first step of analyzing the insourding/outsourcing decision. This step focuses on identification of the company strategy conducting in insourcing/outsourcing decision. The analyses have to align with certain condition including:

- The organization's strategic long-term plans
- The determination of an organization's core competency and competitive advantages.
- The maturity of the technology that used in the process.

The conditions above are aligning with the theoretical background of outsourcings' driving forces, where the company strategy is not only using the basic of economic theory, but also the strategic management where the resource of the company can be used to analyze the outsourcing/insourcing decision.

a. Core Competency Analysis

One of a critical consideration in resource-based theory is called core competencies. A core activity is the central of the company strategy to successfully serve the needs of potential customers in each market. The activity is perceived by the customers as an adding value for choosing the company, and therefore the value become a major determinant of competitive advantage.

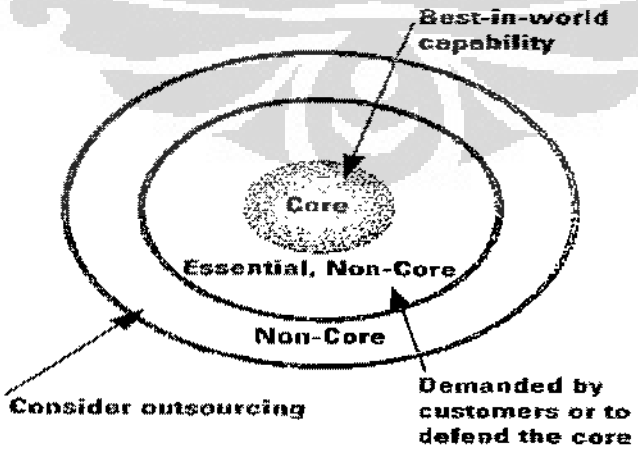


Figure 2.2 Core Competencies

Quinn, J.B., 1999. Strategic outsourcing: leveraging knowledge capabilities.

By using the core competencies analysis as the company's strategy, the company can be focus on their main activity to develop their competitiveness. In their Harvard Business Review, Prahalad and Hamel (1990) states that the core competencies have to meet these three criteria (Roy& Aubert, 2001):

- Provide access to markets,
- Provide customer value and
- Have to be difficult for competitors to imitate.

The activities of core competence have to be strategically important which gives the company advantages that can contribute to increased competitiveness and also facilitate the creation of core products. Core competency can take various forms. Those forms including:

- Technical or subject matter know-how
- Reliable process
- Close relationships with customers and suppliers
- Product development or culture

b. Technology Differentiation

Technology can create a competitive advantage for the company. That is why technology can be one of a key aspect when formulating outsourcing strategies. The outsourcing can also make the company able to have a broader knowledge base of technologies.

Evaluating the technology consideration was proposed by Welch and Nayak (1992) that stated the idea of considering strategic and technological factors together with a traditional cost analysis of an outsourcing decision. The technological position divided into three main elements of strategic variables that are needed to be considered when analyzing the outsourcing decision:

1. Process technology

This element is used as the foundation to analyze the significance of the process technology that can create competitive advantage for the company.

2. Competitive comparison

It will compare the process technology that the company uses to the process technology that is used by the competitors. To analyze it, the company

has to set the benchmark of their internal technology level/advantage with their competitors on the basis of several different parameters as costs per unit or other related metrics as quality.

3. The maturity of process technology

This element has to evaluate the whole industry. A mature technology can be considered to be one that is readily available for all companies. On the contrary, developing technology might develop the core competencies of the firm.

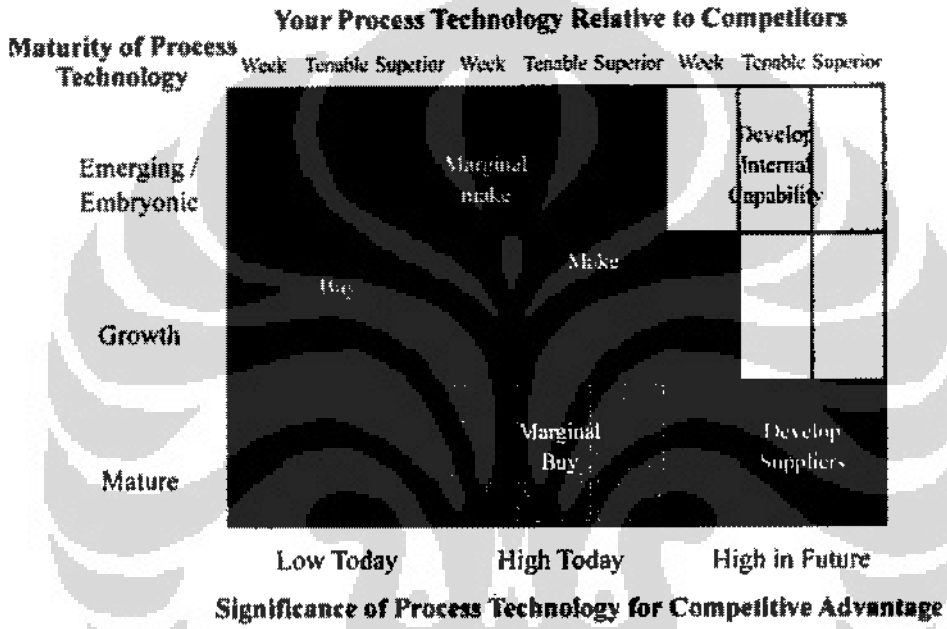


Figure 2.3 Process Technology Matrix

Adopted from Welch and Nayak, 1992. Strategic Sourcing: A progressive approach to make-or-buy decision.

2.1.2.2 Cost Analysis

One of the elements that have a great affect to the tactical approach in outsourcing is cost reduction. It means that cost calculation is an important consideration when deciding either the company should manufacture the product in its own factory or it will be more cost beneficial to purchase externally. The cost analysis in this thesis will use an accounting approach. It will deliberate the relevant cost on making the insourcing/outsourcing decision.

Theoretically, relevant cost can be described as the expected future costs that might be avoid as the decision has been made. There are two characteristic of

the data that can be included in identification of the relevant cost. The first characteristic focuses on time orientation of the cost. The cost must be future oriented. It means a sunk cost will be irrelevant and cannot be included in the analysis because it has no affect in the future. Examples of sunk cost that cannot be included are book value of the equipment and cost of inventory on hand.

The second characteristic focuses on how condition the relevant cost can be determined. The relevant cost can be analyzed if there are alternative among two actions. The differentiation of those actions can create the relevant cost to make desire decision.

The use of relevant cost is to determine the special decision of the finance manager. Following lists are several problems that may apply the concepts of relevant cost on analyzing the decision

- Replacement of Equipment, Services, or Department
- Special Order
- Outsourcing - Make or Buy Decisions

There are two way in calculating the costs among two alternatives. The first is by comparing the total cost of two alternatives, and the second is by focusing on total differential cost which favors the alternative option. In the second method, the data that will be used is only the relevant data, and the sunk cost becomes zero.

The relevant cost consists of two costs, which are variable and fixed cost. The variable cost is including labor, material, and all the overhead that change due to the demand. And in the fixed cost, the costs that are being included in this calculation are all costs that not change based on demand. The fixed cost that will be included is only cost that use for analyzed activity.

2.1.2.3 Non-cost Factor

In analyzing the insourcing/outsourcing decision that will involve the capital investment, price is not the only factor to analyze. Other than that, some serious problem that has to be questioning are quality, delivery and the guaranteeing continuity of supplies.

a. Quality

Quality is in the connection on how the supplier complies with the specification and conforms to requirements. These two aspects of quality are both important. A good specification means nothing if the suppliers fail to comply with it. However, the customers will not be satisfied if goods received comply in full with a specification that is not appropriate to requirements.

Getting the right quality does not necessarily having the best quality. The right quality must fit those two aspects above from the actual user. Analyzing the right quality is one of a fundamental consideration in sourcing strategy. The project that has a quality below the specification and requirement will definitely being rejected. However an over specification and requirement is not always a good consideration either. It will only cost the company more without give a significant result to the competitiveness. Ideally, the dynamic sourcing function aims to achieve improvement in quality without increases in cost.

b. Delivery

In this factor consideration, the company has to analyze the ability of the supplier to deliver the goods on the right time and at the right quantity. The problem regarding the issue above can lead the company taking over the work in order to ensure supplies at the time required.

In delivery of off shoring sourcing, the supplier usually produces a delivery documents. This document is known as a freight bill. When the shipment by the supplier does not match with the original order, the company may fill the complain form on the freight bill. In off shoring sourcing, the problem is not only in the on-time supplies, but also in identifying the shipping term regarding to the responsibility and payment that offer by supplier. Misidentification of this shipping term can lead a miscalculation in price, because it can create another cost.

c. Continuity of supplies

The possibility of the supplier to stop their supplies to the company can be an important consideration when the company is in bilateral oligopoly markets.

The problem can be created if somehow the supplier cannot be operating again, or worse, being take over by the competitor.

2.1.2.4 Implementation

After the decision has been made whether the company wants to insource or outsource, the next step is to implement the best strategy that has to be examine according to the decision. The strategy below will describe the implementation that we can do when we choose to do outsourcing.

a. Effective Supplier Selection

The first implementation to make a successful outsourcing in supply chain management is selecting the effective supplier. Selecting the effective supplier not only see from the budgeted price. The company also has to select according to the needs of the outsourced process itself. In 1997, Fisher published two supply chain approaches, which are efficient supply chain and responsive supply chain (Li, 2007).

Responsive supply chain focuses on how the supplier can react quickly to the market demand. The efficient supply chain focuses on coordinate the material flow and services. The purpose is to minimize inventories and maximize the efficiency.

Table 2.2 Environment that differentiates responsive and effective supplier

	Efficient supply chain	Responsive supply chain
Demand	Constant, based on forecasting	Fluctuate, based on customer orders
Product life cycle	Long	Short
Product variety	Low	High
Contribution Margin	Low	High
Order fulfill lead time	Allowed longer fulfillment lead time	Short or based on quoted due date
Supplier	Long-term	According to product life cycle
Production	Make-to-stock	Assemble-to-order
		Make-to-order
		Build-to-order
Capacity cushion	Low	High
Inventory	Finished goods inventory	Parts, components, subassembly
Supply selection	Low cost, consistent quality, and on-time delivery	Flexibility, fast delivery, high-performance design quality

Adopted from Li, Ling. 2007. Supply Chain Management: Concepts, Techniques and Practices.

b. Contract

Contract is one legal aspect of the supply chain management system. In developing the contract strategy there are two aspects that have to be decide. Regarding the price aspect, the company has to decide whether the price will charge as contract basis or on spot basis. In contract basis, the price did not depend on the market price, and vice versa in buying price in on spot basis. Another aspect is how detail the contract will be, whether it will only focus on the price or on it will include the supplier performance.

c. Information Sharing

To develop a long mutual relationship among the company and the supplier, they need to share the information needed. Sharing information from the supplier can give the company a legitimate access to the updated know-how that can lead to built competitive advantage to the company. Listening to the supplier can also increase the performance from the supplier itself, and as the consequence,

it will increase the performance of the company. Not to forget, that information might also build the interdependence relationship among both parties.

d. New resources allocation

The purpose of the strategic implementation on allocating internal resources is to make sure that the whole process is properly done as it planned. It can be implemented when the company wants to built long term relationship with the supplier. However, placing a person in charge to manage the process has to be balanced with the actual needs of the outsourced process.

2.2 Valuing the Investment

Firm investment can be divided into two sectors which are real assets and financial assets. The real assets can be described as physical or identifiable assets. The investment including gold, land, equipment, patents, etc. And financial assets or non-physical asset consist of stock, bond, etc.

The scientific area that discuss the investment evaluation is called capital budgeting. The decisions that appear through this evaluation have to consider the ability of the project to add the value of the firm. There are many ways of how the companies try to make valuation of their investment. Below description will explain the evaluation techniques that the company can do on their capital budgeting.

2.2.1 Net Present Value

Determining the Net Present Value (NPV) as an evaluation technique in company's investment is one of the most popular method. The NPV determine as the present value the change in operating cash flow together with the present value of the investment cash flow. Usually, the operating cash flow act as an inflow and the investment acts as an outflow. The basic idea of NPV is to synchronize the value of the investment in past or future, to the present value. In using the Nett Present Value technique, there are some elements that have to be considered:

- All expected future cash flow
- The time value of money
- The risk of the future cash flow

Equation below is the basic equation to calculating the NPV.

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+i)_t} \quad (2.1)$$

Where; CF = cash flow

t = time

i = cost of capital

In calculating cash inflow, the value of cash flow becomes positive. And it will be negative when we calculating cash outflow.

To make a valuable investment, the value of NPV has to be positive. When NPV is negative, it means that the investment cannot add the value of the company, than we should reject it.

2.2.2 Internal Rate of Return

The internal rate of return (IRR) is a technique which used to determine the compounded return rate when the amount of investment that company has invest is equal with the present value of the sum of the return. On in the other words, this method is calculating the discount rate that the company can get if the value of NPV is zero. Because the IRR is the determinant of NPV function, calculating the IRR can be used the same equation as NPV.

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+i)_t} = 0 \quad (2.2)$$

Where; CF = cash flow

t = time

i = internal rate of return

To add value to the company, the IRR of the project have to be greater than the company's cost of capital. And to compare among investment with the

same risk, a project with a greater rate of return will be considered as a good investment.

2.3 Weighted-Average-Cost-of Capital

To make a valuation for the firm under leverage, one of the methods that can be use at defining the cost of capital is by using the weighted-average-of-cost-of-capital method. WACC approach is used because there must be a different between the discount rate of the equity and debt. In this method, those rates are calculated based on the proportion of the equity and the debt. Calculating the WACC begins with the insight that project of leverage firm is simultaneously financed with both debt and equity.

WACC can be calculated by multiplying the cost of each capital component by its proportional weight. The equation below will describe the weighted average cost of capital.

$$r_{WACC} = \frac{S}{S+B} r_S + \frac{B}{S+B} r_B (1 - Tc) \qquad (2.3)$$

Where:

r_s = cost of equity

r_B = cost of debt

S = market value of the firm's equity

B = market value of the firm's debt

Tc = corporate tax rate

$S/(S+B)$ = weight for equity

$B/(S+B)$ = weight for debt

However, for the public company, the weight of equity has to be measured based on the market value, not the accounting value.

CHAPTER 3
COMPANY BACKGROUND

3.1 Industrial Background

In the theory of printing, there are many type of printing process. One type of process that has major development in technology is lithography. This technology uses a flat image carrier to transfer the image to the substrate. The most advance technology from lithography is offset printing where the technique is by using intermediate carrier to print the substrate. In this kind of process, we use paper as the material. This type of printing process dominates the printing industry.

Printing industry in Indonesia is dominated by the small to middle size company. According to the data from PPGI, the proportion of small printing company in Jakarta has reach 78%. This number increases day by day as new companies come in this business. In 2004, the rise of the new printing company reaches its highest number. The growth was about 7.6%. Unfortunately, at that time, the rise of these new competitors did not get along with the market growth.

The world of printing industry has a tight connection with two industry as their market, which are advertising and publishing industry. Make a project to the publisher means ready to produce a large scale of product. It is why most of the printing company in Indonesia which dominates by small-medium companies focuses on advertising industry. The new boundary of existed printing company to grow came as the new technology of printing has arisen. This new technology called digital printing. At that moment, the conventional printing has lost its market in this area.

An offset printing has a minimum quantity to produce. For an advertising industry that focusing on economies of scope, digital printing give them a fresh air, because it can produce small quantity with a small budget. This new technology has forced offset printing company to make some change in their strategic and make an adjustment to face the reality outside. The option can be either switch the business or to survive. For small companies which still have small investments might easy to move to a more profitable business. However, it

cannot be applicable for middle sized company simply because they already have amount of sunk cost. The most appropriate action is to strengthen themselves by increasing their competitive advantage and not forgetting to move to the bigger market.

3.2 Company Profile

3.2.1 History

Ref Graphika was established around 1980 by a joint equity of Mr. Sukirman, Mrs. Lely Martiwi, his wife, and his brother Mr. Rusida Effendie. At the first when the company built, it was only provide typing service on Guntur Street, in South Jakarta. As the revenue increased, the owners were trying to make it bigger. The first step was to try gaining market in a printing business. A simple printing shop with a stencil printing machine became their first investment in this business. The investment was a starting point at changing the company into a printing company. On 10th June 1981, the printing company named CV. Ref Graphika was legalized by W. Silitonga as the public notary.

The next big step was by inventing in a higher specification of printing machine which made by Heidelberg, gmbH. The first Heidelberg machine that the company has was one color printing machine GTO type. The investment was one of the company strategies to gain competitive advantage in this business. Along by the time, the investment is increasing with a higher specification of machine. Those investments have a bigger paper printed size and more colors. And not only investing on printing machine, the company started to make an investment in finishing machine. Table 3.1 will show the investment that has been made in Ref Graphika so far.

Table 3.1 Investment in Ref Graphika

Type of Machine	Type/Brand	Max Size (in cm)	Capacity
4 Color Printing Machine	SM 52/Heidelberg	36 x 52	13,000 cycle/hour
2 Color Printing Machine	SORM-Z/Heidelberg	74 x 52	8,000 cycle/hour
1 Color Printing Machine	SORS/Heidelberg	102 x 72	8,000 cycle/hour
1 Color Printing Machine	TOKO-820	35 x 23	5,000 cycle/hour
Perfect Binding Machine	Amigo Plus/Muller Martin	35 x 25 x 3	1,500 cycle/hour
Folding Machine	TH 82/Stahl Heidelberg	109/79	20,000 cycle/ hour
Cutting Machine	QZ 104	110 x 124	-
2 units of Computer Design	Macintosh/Apple	-	-
Plate Maker	Behe	104 x 80	12 exposure/hour
Plate Processor	Behe	104 x 80	30 cycle/ hour
Die Cutting Machine		48 x 65	2,500 cycle/hour
Wire-stitching Machine	Muller Martin	135 x 25	6,000 cycle/hour

Internal Data of Ref Graphika

3.2.2 Products

As an offset printing company, CV Ref Graphika produces almost everything that uses paper as the main materials. In this thesis, writer tries to groups them in five major groups. These groups were divided based on the process that might involve on making these products. Those groups are book and magazine, promotional item, packaging, office supplies, and invitation

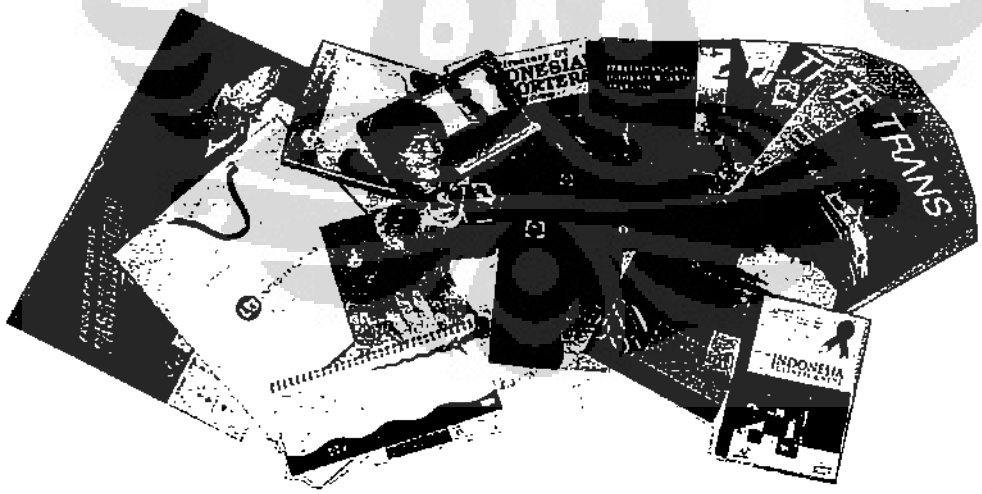


Figure 3.1 Products of Ref Graphika

Internal Data of Ref Graphika

3.2.2.1 Book and Magazine

For the publisher, books and magazines are produced in push system. The publisher must read the market well before it decides to print some books. To consider the buying power of the customer are very important. Therefore the publisher always orders books and magazines in large quantity (2500 units' minimum) to reduce the unit cost. Of course the total cost is still high and it makes the printings of books and magazines are the interesting projects for Ref Graphika.

The cover of the books and magazines are usually in color with varieties of coating (matt laminating, gloss laminating, UV coating, etc). However, the books' pages may be in full color, grayscale, or 2 colors while magazines are constantly in full color. The books and magazines may be banded in stitch binding or perfect binding. That depends on the number of pages and the thickness of the paper used as the materials for the books or the magazines.

Due to the number of pages of these products, producing books and magazines requires long production processes. Magazines' numbers of pages are usually from 20 to 100 pages while books' number of pages may hit 500 pages. It such a good prospects to full fill the machines capacities of Ref Graphika. Once a book or magazine project is ordered, the project can fill the printing machines of Ref Graphika for 2 days. SORMZ and SM machines for the full color project and SORS machine for the grayscale project. The project is able to give 2 more days for the finishing machines –the folding machine, the stitching machines etc- to work until the projects are ready to be delivered. Those times are not included the pre press process which may take 2 weeks or above. The pre press of the magazines and books are the other stories to tell and usually is the project of the publishers. Sometimes magazines are more interesting than books. Even though the magazine's pages are not as many as book, the magazines may be printed weekly, monthly etc. For the reasons above, books and magazines are the main products produced by Ref Graphika.

3.2.2.2 Promotional Item

Promotion is the one of the Marketing Mix items used by many company. Companies do many ways to promote. Some of the ways are using print materials such as brochures, catalogues, leaflets, posters, point of selling and point of purchase such as hanging mobile, shelf talker, banner etc. The quantity of promotional item may vary. It can be 500 to 100,000 exp per project. However, the promotional items do not require a long production process. Due to the size and material requirements, the promotional items are quite easy to produce. A project of leaflet sized 15 x 21 cm, full color, 200,000 units may only take 48 hours to be printed, trimmed and packed. Especially for the project that does not require complicated finishing projects such as coated or folded. The project only needs a printing machine, a trimming machine and labors to pack the leaflets. Compare to 15 x 21 cm sized books with 300 pages. Even the quantity of the books may only hit 5,000; the production takes longer than 200,000 units of leaflets. Some of the promotional items do take longer time than books or magazines, but that is only because the projects require many manual processes such as attachment process.

3.2.2.3 Packaging

In order to sell products a company uses many ways to attract the target market to buy the products. One way is by using the attractive packaging. Packaging project come in vary, but all of them come in large number (10,000 units and above). This project requires a long production process and the processes mostly be done manually. Therefore many labors are needed for packaging projects.

3.2.2.4 Office supplies

A company must have some symbols to represent itself. The symbols may come in logo, color, fonts, and shapes. The symbols of the company are usually visualized as the corporate identity in the offices supplies such as letterheads, envelopes, folders, memos, name cards, invoices and so on. The office supplies projects usually come in low quantity. Due to the quantity and the

work level, offices supplies are not very hard to produce and do not take not so many times either. The offices supplies are not the main products of Ref Graphika and usually been done for the clients whose books, magazines or packaging are being printed in Ref Graphika.

3.2.2.5 Invitations

Sending Invitations for several ceremonies are the tradition that is still held by the Indonesians. Electronic mail or short message services are considered rude for events such as wedding or exclusive parties. Invitations needs many accessories and hand job. Therefore it takes many labors. However, the numbers are never being so many, only 1000 units or less. The total project unit also not as many as books or magazines

3.2.3 Customers

The customers of CV Ref Graphika are varied. It can be categorized into four groups.

3.2.3.1 Advertising Agency and Creative Boutique

Advertising Agency and creative boutique are the companies whose core business are designing artwork for corporate. Corporate needs to promote, so they outsource the promotion activities. They give it to the advertising agency and creative boutiques because it takes a huge budget and complicated management to make it in source. The advertising agency and creative boutiques create concept, design and final artwork. Then the artwork will be executed. The executing process place will be divided into the media planned. Final art work for TV or radio promotion will be executed by production house and the printing promotion executors will be the printing company.

Advertising Agency and creative boutique are the hard-to-be-satisfied clients. They create detail design concept therefore they demand premiere quality and sharp delivery time. However, difficulty appears because sometimes they do not know some consequences of the executions. To reduce the loss from their

demands, the prices of the projects are set up to the highest level. Usually they do not really consider the price factors.

3.2.3.2 Publisher

As has been writing above, publisher's core business are creating interesting books and selling those to the market. Some publishers have their own printing company but some of them outsource the printing productions. Their projects are usually come in high quantity but do not ask many details. They are easy to be satisfied in quality and not very demand in the delivery time. These companies understand well the production process therefore they give the logic production time. However, price is very special issue for them. Usually it is hard to get the high margins in the projects from the publishers.

3.2.3.3 Corporate

This group of customers is including big corporation and institution. Some corporate may have direct channel to the printing company to fulfill their printing needs. Big companies usually get their printing supplier through public tender –usually they advertise the tender in the newspapers-, some of them have several frequent printing supplier. Their projects are varied –from the books to packaging- but all of them are quite easy to be produced. They are such a medium type of clients. They pay attention to the price elements but not as intense as the publishers, they also concern about the detail but not as much as the advertising agency.

3.2.3.4 Private

Some people usually come for their personal needs such as invitations. They come because the recommendations of the others type of clients.

3.2.4 Core Competencies

Ref Graphika tries to increase their competitiveness among the competitor by keeping strong their core competencies. In such tight competition environment nowadays, understanding the core competence will help the

company in increasing its competitiveness by focusing the main activity inside the company.

A year ago, the company made marketing survey to learn the actual competitive advantage of Ref Graphika according to the customer perspectives. The result shows that the core competency of Ref Graphika is on its service. The customer satisfied on how the company is able to give them a full service on printing process. Refer to the survey, the main elements that can boost up their competitiveness in service are

a. Consulting printing service

For people who are not familiar with this industry, to deal with printing product is not an easy thing to do. The specification is too wide to understand by common people. Big companies usually use creative agencies not only to provide the creative service, but also to act as the mediator to the printing service.

Ref Graphika tries to make their customers learn a printing experience as comfortable as possible. Not only providing the design service, the marketing staffs are also filled with basic technical skills which make them able to do consulting in printing service. The basic technical skill makes whoever come to this company have a better view about the product that they want to make so that the company can produce the product that the customers really needs. It makes the customers, even though they came with zero knowledge of printing service, feels comfortable and satisfied at trusting the company to produce their printing products.

b. Detail specification

For them who works in the creative business, dealing with creative item can be frustrating if the company that suppose to execute their idea have limitation to do the project exactly like they want.

Deep understanding on technical aspects combined with a creative culture among the employees allows the company to present the products exactly like in their customers mind. Those technical aspects are not only including the

technical skill on the process, but also deeply understanding on the specific character of material.

c. Quick feedback

Working in a service company that also producing the product desired have to be aware with all the possibility that comes in a process. Ref Graphika put communication as their basic culture among the employees to reduce the negative possibilities. Imagine there is one mistake in this particular product, let say, book, that is not detected and already done and ready to be sent to the customers. Covering mistakes in finished product will take a lot of time, effort, and money.

Although the mistake was come from the consumer's side, the company could help reduce the mistakes by check the subject from the clients and communicate it to the clients if there are some mistakes. Those early feedback from the company helps clients minimize their waste cost from their own mistakes.

3.3 Strategic Background

The change of industrial condition because of new competitors has forced the company to make an adjustment to survive. For years, Ref Graphika is the company that was having advertising companies as their main customer. And it means the company specialties is promotional items that usually brought by the agency.

During those years, the increase of the revenue annually is around 7% - based on average growth in revenue from 2000 to 2004-. Even in 2004, the company had degradation in revenue about 6%. Around these years, the company started to see the stagnation in market. Facing this reality, the company tries to find a way to survive. The company tries to change the marketing strategy to gain more market in this business.

The strategic change has boost up the sales, and as the result, the revenue of 2006 sharply increased compare to 2005. The significant increase has reached up to 53%. The company has changed the marketing strategy by switching to the

more profitable customers and product. Those two bases of change will be described below.

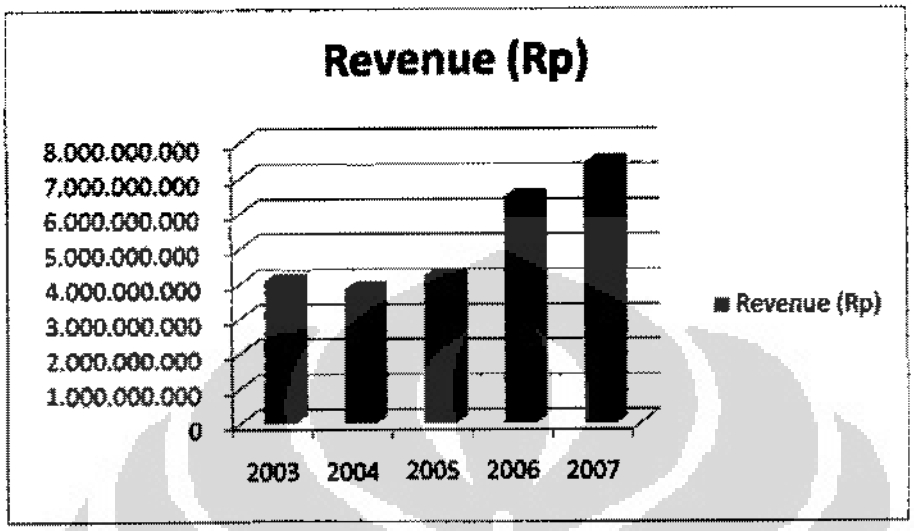


Figure 3.2. Revenue of Ref Graphika in the last 5 years

Internal Data of Ref Graphika

3.3.1 Customer Base Strategy

Doing project for an advertising agency is actually more profitable for the company because the margin is higher than to other customer. However, the level of uncertainty is very high. Like the printing company, the advertising agency also uses the pull system to produce their work. It makes them has a dependency to their client. And because this level of dependency, it is hard to predict "what to produce" from this kind of company. Although the projects from the agency tend to be seasonal, the other information such as quantity and specification is mostly unpredictable.

The switch of customer in Ref Graphika replaces an advertising agency to publisher and corporate. Before it was change, the proportion of advertising agency is about 75%. And after it was change, the proportion of this group of customer to the revenue is decreasing to 56% in 2006, and significantly drops to 36.7% in 2007. In 2007, corporate is a number one customer since the proportion is increased to 37% of the whole revenue.

a. Corporate

An advertising agency acts as the third party between the printing companies and corporate. The strategy of Ref Graphika entering the corporation, at the first place was simply to "cut" the line of an advertising agency. The purpose of this strategy is to get a bigger pie of the project.

More over, the big exploitation against the corruption in Indonesia lately has giving a little fresh air to the bidding participants. Before, the participant of bidding that is held by big companies and state-owned corporation was dominated by brokers. Broker is a term that is used to describe bidding participants that only have the name of the company, but do not have the actual company. Many of these brokers formed a cartel and using designed price to bid. This possibility happens because the decision was not transparent. With the positive condition applied, the actual printing companies have fair competitions because today, most of those corporations make an inspection to the participant's workshop.

The first big bidding that the company won was in 2006 from a state-owned company that supplied 12% of that year revenue. Although the product of the corporations also hard to predict, regarding to the production process, it is more easy to analyze because usually the contract can be valid for one year. The transition from the project was offer to the company, until the project was ready to be produce also takes time, it makes the company can prepare the possibility of the problem that might appear in the future.

b. Publisher

The early step that the company took to enter the world of publisher was started in the early of 2006. That opportunity came at February when the company got an invitation from IKAPI (Ikatan Penerbit Indonesia), the Indonesian publisher union, to attend the book fair held in Cairo, Egypt. That book fair is one statement that shows the positive increase of publishing industry in Indonesia. It came from the book called Ayat – Ayat Cinta that was written by Indonesian author who attended school in Cairo. At that time, the book that published by Indonesian publisher named Republika was sold 160,000 copies. It shows that Indonesian interest in local books has increase. Moreover, the government lately

is trying to increase reading culture among the nations. From that moment the company started to see that there is another market that has not been touched before.

Their first client on publishing company is Agromedia Group, a holding company that supervises 7 publishers. Although in 2006 this group of customer is only adding 25.7% of the revenue, while the proportion of project is only 4.9%.

Actually, the competition in this market is very high. The company is not only competing with the same size of company, but also big companies such as Gramedia, the largest printing company in Indonesia. The competition of large scale forces the company to decrease its margin to compete big printing company's price. However, the project came from publisher is predictable because of its longer production time and the project also tends to be repeated.

3.3.2 Product Base Strategy

Before 2006, the largest proportion for product that produces in Ref Graphika is the promotional item. Although it still been produced by the company, the level of signification is decreased than before. After the market was change, the product that gave the largest proportion for the company is also changing. In this last two years, the most products that produced by the company, is in the group books and magazine. Every month, this type of project can give 40% to 60% of the whole revenue.

3.3.3 Effect on Outsourcing

The different in product that has been chosen is automatically affected the other sections. In production department, the quality control was been put in each production line. In financial area, the change is affected the outsourcing expense that increase day by day. Before the strategy has change, the proportion of outsourcing in average is around 14.68% from whole expenses. After the strategy change in 2006, proportion of the outsourcing process increase to 16.64% from the operational expenses and keep increase each year. The figure 3.3 will show the increase in outsourcing area year by year.

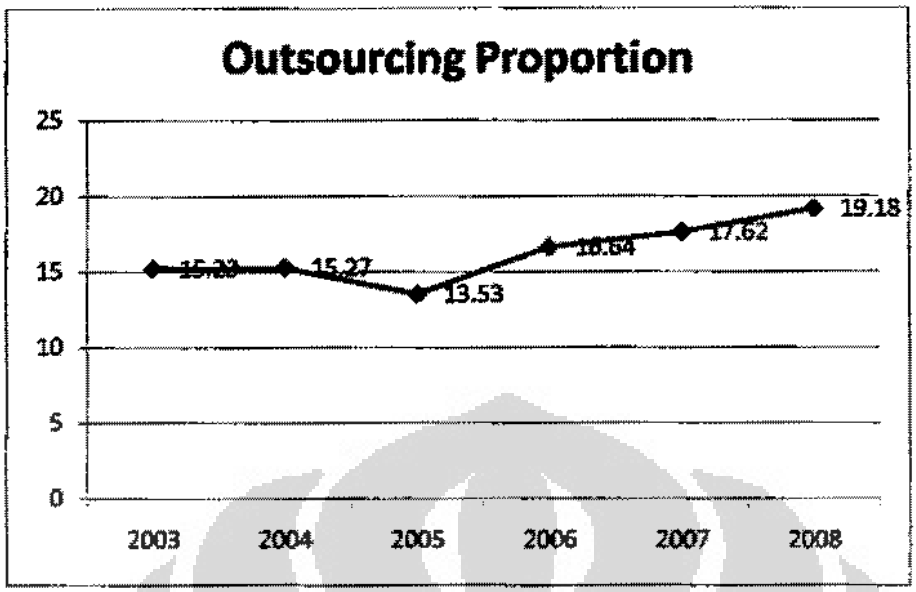


Figure 3.3 Outsourcing proportion per year

Internal Data of Ref Graphika

3.4 Production Process

In production process, Ref Graphika uses pull system, which means the production will be started after the project has been given by the customer. Every product that produces in the company is different. The differentiation is according to the specification from the customers' order. Figure below will show the flowchart of the production process in Ref Graphika.

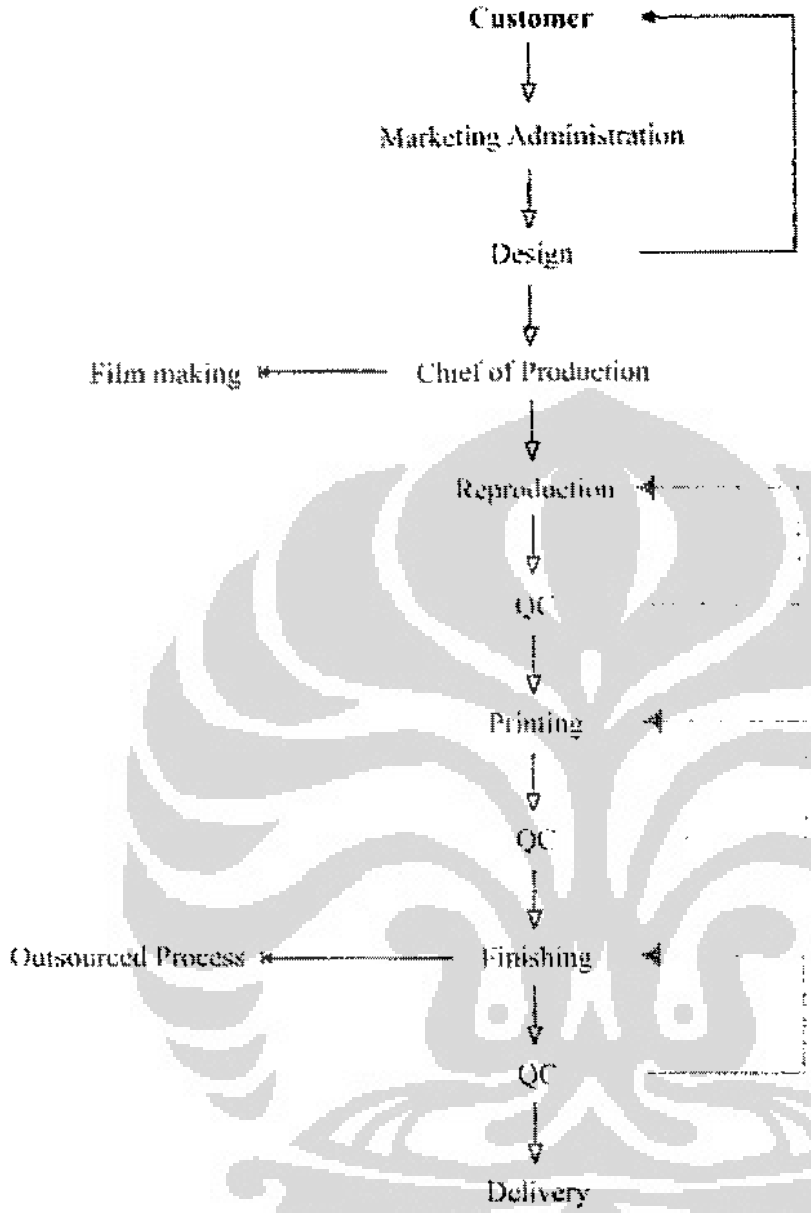


Figure 3.4 Production process in Ref Graphika

Internal Data of Ref Graphika

The production process in printing companies uses a media to describe the work that has to be done in each division. Ref Graphika uses media called "kantong job" –job bag. This bag has a description part that filled by the marketing administration and the chief of production. The description by marketing administration is only basic specifications which are; the actual size, quantity, paper that will be used and the color used in printing process. Next description which is a job description will be filled by the chief of production. The

chief of production will describe the machine that will be used, and another additional process. By knowing the machine that will be use, they will also count the cutting size of raw material. Other than the use of describing the process, the bag itself is also used to place the samples from the customer, including print out, sample of colors, proof-progressive and dummy for production guidance.

As in common printing companies, production process of Ref Graphika also divided into three sections. One section is the press section that charge for printing process. Another two sections, pre-press and post-press, can be categorized as non-press process.

3.4.1 Press

Printing process is the main process in a printing company. In Ref Graphika, printing process is become the main business of the company because the main quality aspects that the customer expected came from this area.

Categorize of the printing machine can be divided into web and sheet printing machine. The difference of those machines is in the raw material that will be used in the machine. While the web printing machine uses rolled paper as raw material, the sheet print using a cut paper as their material. Ref Graphika is a printing company whose main business is in the sheet fed printing machine.

The place where the image transferred is called printing station. The ink to print the paper put in the top of the station. Each color of ink will place in each station. Ink transfer was rolled by the ink cylinder inside the station to the printing plate. The image transferred to the paper using printing plate that had already been exposed in pre-press process. In the machine, those plates are attached in a plate cylinder in each color station. The ink will stay in the image in printing plate, and those inks will transfer by the blanket cylinder, so the blanket will transfer the image to the paper.

3.4.2 Non-press

A printing company that just started their business must have a printing machine because printing is considered as the main process in printing industry. Those started printing company usually outsource all their activity other than

printing. This activity called non-press activity. Non-press process consists of two sections, which are pre-press and post-press.

3.4.2.1 Pre-Press

Prepress is a part of production process that includes all the steps which are carried out before the actual printing process. Theoretically, the traditional prepress is divided into three areas:

- composition
- film making
- assembly and plate making

In Ref Graphika, those steps is break into two divisions. The first division is design, and the second is reproduction division. Reproduction consists of assembly and plate making process. Design division is under marketing section because it is directly related to the client. The designing process is not only consisting of making the concept of the design, but also consisting of recording and formatting the text, and pagination, which in the theory of printing production is called composition.

The second division is reproduction. This division is under the production section. This process includes the film making, assembly the film and plate making. Film making is the process where the design was transformed into positive film. The film divides the color that was going to be used to print. For full color printing, the film will break the color to four basic color which are cyan, magenta, yellow, and black.

After the film was made, the process moving into the assembly process or usually known as montage process. This process is assembly the film into complete pages and also from pages to print sheets. After the assembly process, the image in the film was transferred into the plate. Printing plate is a media to form the image to printing machine that covered by substrate. After the film is attached into a plate, that plate will be exposed with a light so that the part that is uncovered by the film removes and the image will stay.

Figure 3.5 Assembly process

Internal Data of Ref Graphika

Outsourced Process in Pre Press

Film making is one of process that uses third party to produce. The outsourcing method in this process is per job method. The relationship is not build based on a formal contract, but based on trust. About 5 years ago, Ref Graphika has many suppliers to do this process. As the time goes by, those suppliers are eliminated due to their incapability to provide the material right on time. For a service company, this kind of problem can create problems. Today, the supplier that is trusted to do this process is only two suppliers. They are Mentari Graphika and Repro One. These two companies have different advantage to the company.

- Mentari Graphika

This company has the best service in this business. Not only having after sales service, they are also able to work under time pressure. However, the price is higher than the other supplier. This company charge Rp12,5 per cm^2.

- Repro One

The advantage of using this supplier is in term of price. This company only charges the film making process for Rp10 per cm^2. However, they are not able to work under time pressure. This company will only be used in a project with a long period of work.

Actually, an outsourcing decision might not the only consideration to do in this process. These days, there is a new technology found in pre press area. The technology called CtP (Computer to Plate). Although this technology is already

known worldwide, in Indonesia, the term of CtP is only familiar inside the industry. It is not yet common for people outside the industry, including its customers. This technology did not include the film making as one of pre press process. In using CtP, the image from the computer was directly exposed to the printing plate.

However, to switch from conventional method to the new method did not come easy. Below is the consideration list why CtP is not applicable yet in Ref Graphika

- Switching to CtP means breakdown the production line, especially in pre press line. To connect to CtP, the data input has to be with a special kind of software. And because the montage process was done directly in the computer, the company will not need any montage part. More over the machine to expose and to wash the plate is special and integrated to one particular machine. It means the old machine cannot be used anymore. Although it is only need one machine, the price if we compare to the conventional process is 10 times higher.
- This technology is not common yet in the industry outside the printing industry. It is including publishing and advertising industry. They usually did not provide the content in a soft copy, but in film. With that kind of customer, the CtP will be a waste.
- Compare to the conventional method, this technology is very expensive. Because it is not common yet, this technology using the machine that only suitable for certain kind of printing plates. It means one machine can only use one special brand of printing plates. Not only consider the price that is way more expensive than the conventional printing plates, the company also has to consider the continuity of the printing plate procurement, since there is only one supplier for this item. For the company that focuses on cost reduction, this technology is not applicable yet.

3.4.2.2 Post-Press

Post-press is a steps where the printed material has to be processed after it was printed. This process can be considered as the largest and at the same time the most complex part of the production process because in this part the

differentiation of the product exists. After being printed, the printed material was divided into certain groups and was done according to the work that describe in job bag.

As an example, to produce one job of books, the printed material has to be divided whether it was the cover or the content. For cover of the books, it is processed according to the client specification, whether it has to be just binding with the content, or it is still has to be coating, punching, embossing, hot printing, or even mix of all the process before it has to be bind with the contents.

From the content side, it has to be folded according to the size required, and gather the folded content. The next step is to bind together the content and the cover. After the book that almost done was cut in a required size. The explanation above is only valid for soft cover book. If it was hard cover book, the process will be a lot different and not to forget more complicated.

Figure 3.6 Processes in finishing

Internal Data of Ref Graphika

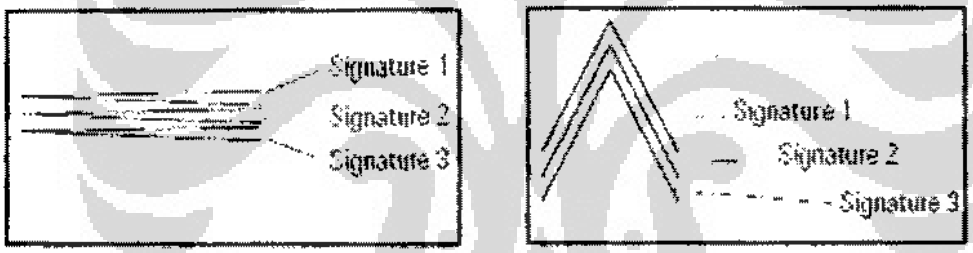
The most common finishing process are folding, cutting, gathering, and binding. Most of the processes using a machine execute it. Some of it still done by hand (manual). Those processes will describe below

a. Folding Process

Folding is the sharp-edged bending of paper under pressure at a prepared or unprepared bending point along a straight line according to specified dimensions and folding layouts. This process uses to make books, and folded brochure.

b. Gathering

Gathering is the process of gather together of folded sheets or leafs into a jointed block. There are two types of gathering process, which are collating and inserting.



Collating **Inserting**

Figure 3.7 Gathering process

Kipphan, Helmut, 2001. Handbook of Print Media: Technologies and Production Methods.

Collating process take place when after the gathering process, the next process is to make it perfect binding. And inserting is used when the next process is to wire-stitching the book. However it can also be binding if after the inserting process, the substrates are collating one to another. In Ref Grapika, this process is done manually.

c. Block Binding Process

Binding blocks is the production of a temporary or permanent connection of the collated book block by positive, non-positive, or bond jointing processes. Materials and partial products to be processed are:

- collated blocks,
- inserted blocks,
- folded sheets.

The explanation below will show the type of binding process that usually do in printing company.

1. Thread-stitching

The thread-stitching of books is a block binding process where the connection of the inner sheet sections and the sheets to one another is primarily achieved by fabric threads.

2. Wire-stitching

Wire-stitching is a form-fit jointing method. With wire-stitching binding, wire staples are pushed through the sheets of a block and closed on the underside.

3. Perfect Binding

Perfect binding is the dominant binding process in industrial book and brochure production today. This binding process uses a hot melt adhesive to join the collated content.

d. Cutting process

Cutting is a mechanical separation of a material by pressure where shearing strain is predominantly in force. The cutting procedure can be divided into three applications. Those applications are:

1. Trimming

The three-side trim of books and brochure blocks after block binding is referred to as trimming.

2. Cutting material to size

Boards, cardboard sheets, as well as sheets that has to be printed will be cut first according to the require size, before it came to the printing machine.

3. Die-cutting

In contrast to cutting and trimming where the material is cut in a straight line, die-cutting is a process in which materials are cut in a specific pattern. Normally these products are produced in a closed cutting line. Sometimes,

however, open cuts are produced, for instance, to round off corners on book blocks, playing cards, and so on.

Outsourced Process in Post Press

Another process other than processes describe above can be categorized as supporting process, because the work is really specific. There are hundreds of processes that might be done in finishing division outside those processes. That is why these processes usually outsourced by the printing company. Those process including coating, forwarding, loose leaf binding, punching, hot printing, wrapping, and any other process that cannot be describe one by one.

In this thesis, writer will explain two options from the post press process to analyze.

1. Laminating

Laminating process is one of the coating processes. The invention of coating printing material at the first time was to cover the material from dust and water. It also protecting the paper surface from markings such as fingerprints, scratches and the slightly come off from ink in heavy ink coverage areas that caused by everyday handling.

According to the techniques, the coating process can be divided into two types; those are UV varnish and laminating. UV varnish using the solvent to cover the printed material, and laminating is using a thin layer film. Although UV varnish is cheaper than laminating, the customer often use laminating because it provides a highly professional, extra smooth finish, as well as protecting the paper. Moreover, laminating add strength to paper so that the printed material tear-resistant and can give long term durability.

In the process of laminating, there are two common type of laminating film that we can use. The first is gloss laminating. It is used to highlight vivid colors and is particularly good at giving printed products a "quality" feels. It will give a shine result, although not as tacky as UV varnish. The second film laminating is matt film. Its added advantage is to give a smooth silky feel. To get a more sophisticated result, it is being combined with spot UV to highlight certain

aspects of design, to give a stunning 3D effect that often can't be portrayed otherwise.

There are many suppliers for this process in Jakarta. However, there are only two best suppliers that the company chooses as their main supplier. 80% of the suppliers charge the same price, which is Rp0,16 per cm^2 for gloss laminating and Rp0,2 per cm^2 for matt laminating. There are no specific contracts that attach the company to these suppliers. The work is done per project.

2. Wrapping

Wrapping process is one process that usually used for commercial books. The purpose from this process is to protect the cover from marking due to the soft nature. For magazine product, this process usually done if there is a bonuses such CD attach in the magazine.

This process is using plastic that is sealed to wrap the book. After that, the sealed book is rolled on the conveyor to heat up, so the plastic will shrink and vacuumed. However, the execution has to be careful, because if it is not sealed properly, it can create condensation inside the film, and can damage the book.

Similar with laminating, the supplier relation between Ref Graphika with the wrapping supplier is also project bases. There is no formal contract that bound one to another. The company has two suppliers which charge price for Rp9 per cm^2 in average. These suppliers have the similar characteristic in term of quality and service.

CHAPTER 4
ANALYSIS

4.1 Choosing the Analyzed Process

In the last chapter, it was already explained that the cost in outsourcing is increasing year by year. However, the increase cost in whole outsourcing process did not necessarily represent each of its process. The trend of each process is varying according on how the change in the strategy affects the use of that processes. Graphics below will show the cost of some outsourced process in the last four years.

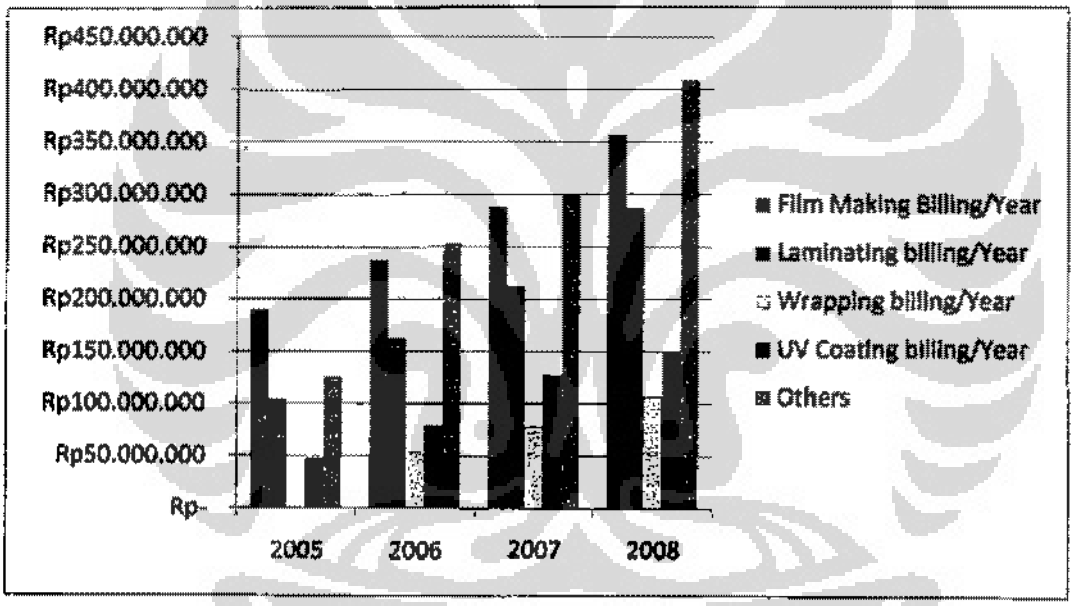


Figure 4.1 Proportion of outsourced process

Internal Data of Rof Graphika

In 2006, where the strategy of marketing started to change, most of dominant outsourcing process decrease its proportion as another outsourcing process emerge. One of the most significant increases in the new process is wrapping process. Other than those four processes in the figure 4.1 can reach more than 15 processes with the proportion of each process is less than 3%.

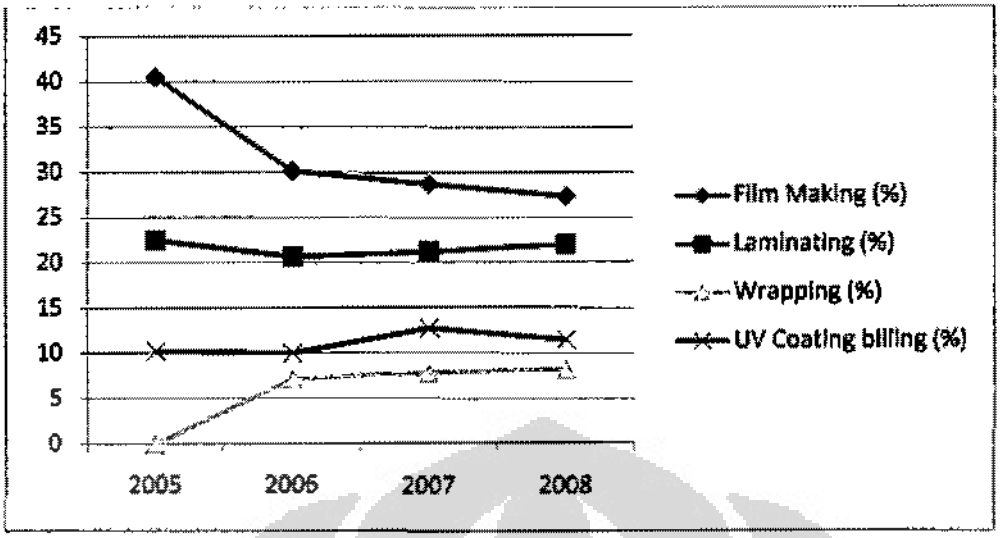


Figure 4.2 Trends of each process

Internal Data of Ref Graphika

The process that will be analyzed in this thesis will be chosen among three of processes in the figure 4.2 above. Two of them were chosen because those processes have the largest proportion. These processes dominate the outsourcing cost for about 50% in the last three years. Another process was chosen because it's significant increase in this last four years, as the effect of the change in strategic. The chosen processes will be described below.

4.1.1 Film Making

The strategic change in marketing has a negative impact to the proportion of film making. Film making, which used to be the largest outsourced cost for 40.51% per year, has decreased significantly in 2006 to 30.12%. The decrease of its proportion was not only caused by another process that emerge, but also by the customer changing from advertising agency to publisher. The data shows that only 10% to 20% of advertising agencies bring their own film. However the publisher, they always bring their own film. The company only makes film for them if there is some damage in the film that they brought.

Although the proportion declined, this process is still the largest proportion of the outsourced cost. It means that the process is still able to be analyzed in its possibility of make an investment to accommodate the insourcing decision.

4.1.2 Laminating

Based on the graphic above we can see that after 2006, the change in company's strategy increase the cost of laminating process gradually. The price per unit (in cm^2) of laminating process never increased in the last four years; it means that the increasing is simply based on the use of this process. An increasing cost is happened because books, as the main product of the company, require long lasting quality. In making a book, combination of certain binding process together with the strength of its cover will increase the strength of the book itself. Moreover, for those who are trying to sell the book, the good quality of printing combined with the laminating process will make the book stands up more among the crowd.

4.1.3 Wrapping

Although the proportion of wrapping process is only about 7.13%, it has significant impact compare to years before. The use of wrapping process itself has just begun at the moment the company entering the publisher market. Wrapping process replaced the plastic seal to avoid books from dust and dirt. Wrapping is more likely because the price is cheaper than the plastic seal while the quality is better. Even if in the future, the proportion will stay at that number, because the overall cost increases, the cost of wrapping will also increase.

4.2 Insourcing/Outsourcing Analysis

In analyzing of each process, writer will use three methods that already explained in chapter two. Those methods are including company strategy formulation, cost analysis, and non-cost factors.

4.2.1 Company Strategy

4.2.1.1 Core Competencies

The theory of resourced-based stated that the core a competency of the firm is developed based on the firm's asset. Learning from the core competencies of Ref Graphika that already been explained in the previous chapter, the resource

that acts as the main asset to reach the competitive advantage is the organization culture.

Although the production process itself did not have a direct connection with the company's main resource, it doesn't mean that it cannot hold or encourage the company to maximize their core competencies. In this consideration, the only process that might hold the company's competitiveness is film making. Laminating and wrapping process is not be included in the core competency consideration because although this process is not include the main resource of the organization, it doesn't give an effect on any elements of core competencies whether this process is insource or outsource.

One of the elements of the company's core competency of making good services is the feedback that company gave to the clients. Film making process is the most crucial process since the film will be the master to be executed into print material. Feedback in this process is including the soft copy material that might be having trouble in the process. Imagine if the mistakes were not detected and being produced. Even if the mistakes were created by the client, it will take a lot of time and energy to fix it. Insourcing this process will allow the company to check it properly and as the result give quick feedback to the consumer.

4.2.1.2 Technology Consideration

a. Film Making

The technology of making film has already been found since decades. This technology had been regenerate in several times. Film making process can be done using repro cameras, contact copiers, and image setter. Today, although those previous technologies still exist, there are only several companies who still use this kind of technology. Another regeneration of the film making is in the image setter machine itself. These technologies divide the way of each machine transfer the image in to the film. The technology move from flat-bed system, to capstan system, internal drum system and the last is external drum system.

The latest technology is considered as the technology that can give highest quality among all. This is the technology that is use in the company's supplier. Technology of making the film can be considered of a mature

technology because another development in making film would be a waste where today there is another technology that might replace the technology of film making in the future called CtP.

However, although this technology in Indonesia starts to develop, the reality is, the companies that use CtP technology still maintain their production line which allow them to use film making technology. In term of investment analysis, it cannot be avoided that the demand of film making in printing industry has already been decreased.

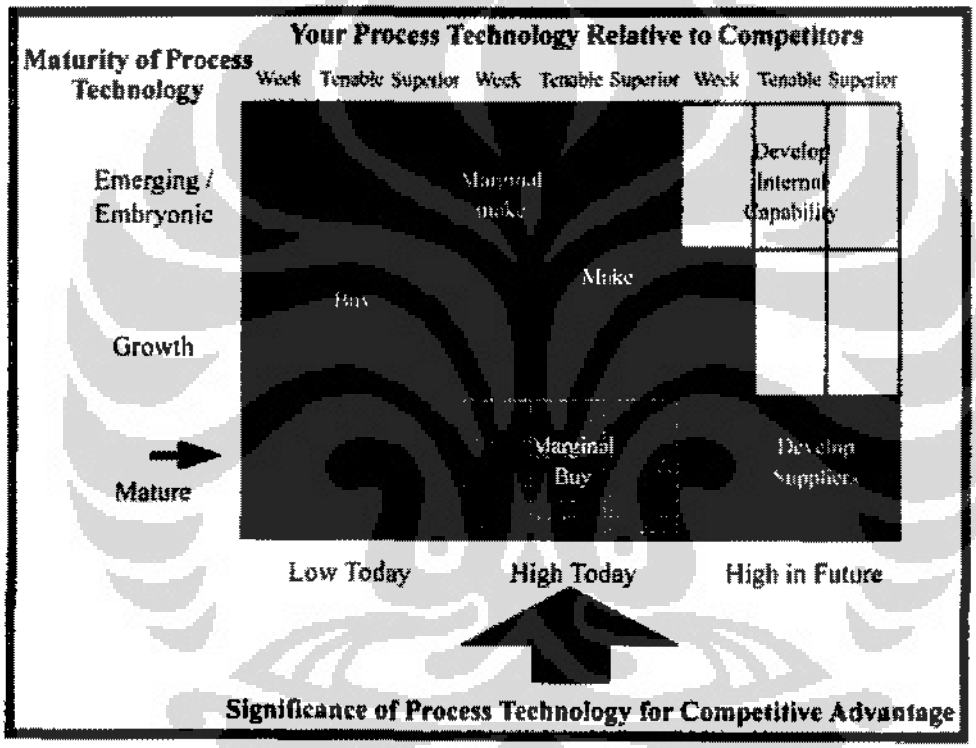


Figure 4.3 Technology analysis of film making

b. Laminating

Laminating process has no effect to the Ref Graphika's core competencies. As Ref Graphika is a printing company that gives full services to the customer, the customers will not be affected by the outsourced or insourced process. The customers just have to sit and relax, and let the company do the job.

The booming of laminating process among the printing company was start in Indonesia around year 2000. The basic technique of this process is really simple. It is basically only attaching a specific plastic film to the printed paper.

The old technology was used additional glue to attach those films. When the technology was improved, the glue that usually separated become attached on the material. This is basically the only improvement that we can get because the simple technique did not allow the technology to grow. It is why this technology can be considered as a mature technology where there is no another improvement that can be created at making this process.

Although the technology that is used by the outsourced company is the latest technology, it has the same technology with most of the printing company in Indonesia. In term of its significance for competitive advantage, this process is still high today and might still be high in the future, since there is no other alternative that can replace this technology yet.

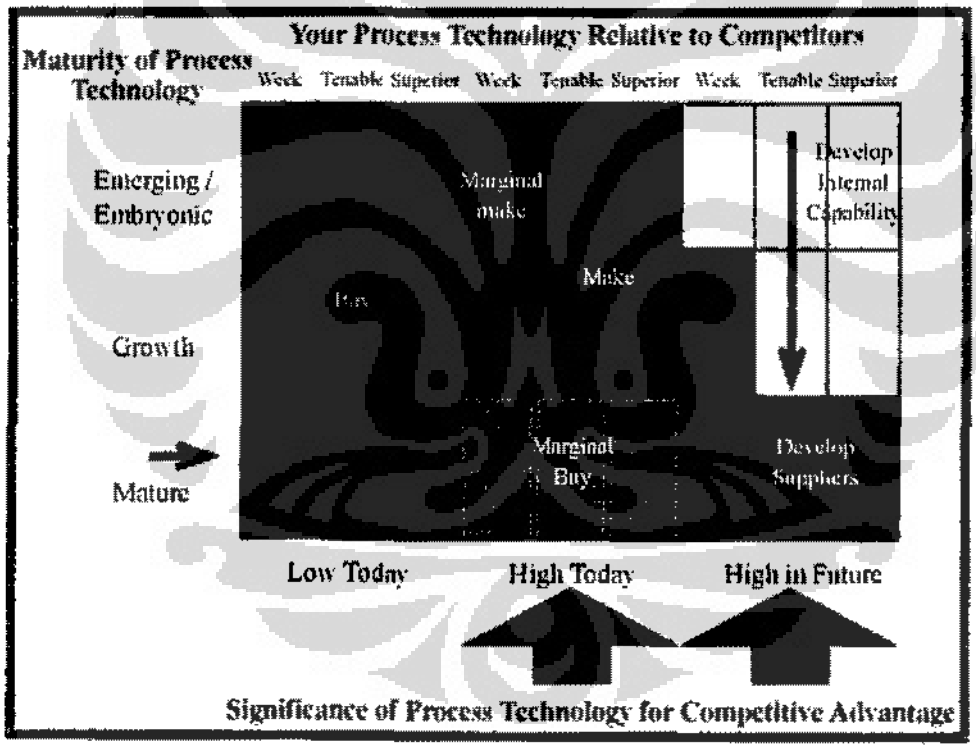


Figure 4.4 Technology analysis of laminating

e. Wrapping

Like the laminating process, wrapping process will not make any affect in core competency of the company. The service that company offer to the customer will not change due to the decision to insource or outsource the process.

The wrapping process is actually can be classified as one part of packaging industry. The technology was used in printing industry as one consideration where the clients want their products to be packed one by one to avoid dash and dirt. For years, the printing industry use sealed plastic to cover the products. By using this particular machine called shrink machine, the industry is able to pack their products with less cost.

However, the printing companies that use wrapping process are very segmented. The companies that use this process only a printing company that produces commercial books. Their biggest clients usually are publisher. It is why the growth of this technology seems to be ignored by the printing industry. For instance, we hardly see this type of machine appear in the printing exhibition; this machine might only appear in the packaging exhibition.

Regarding to the use in printing industry, this technology still has capability to grow. It is happened because printing product has different characteristic than other product. Printing product, especially soft copy book is easily to bend. If the level of heat is higher that it should, the plastic wrap will shrink tightly and might cause to bending the book. Another improvisation that today already appears came from its automatic system.

In term of the level competency to the competitors, although the technology that use in the company is not the latest technology, it still can be compete, because most of printing company in Jakarta uses this kind of machine to wrap their product. For manual machine, the technology is still high today. However, with the level of technology getting high in the future, the manual wrapping process might be degrades in the future although the automatic one will be still high together with technology regeneration of this process.

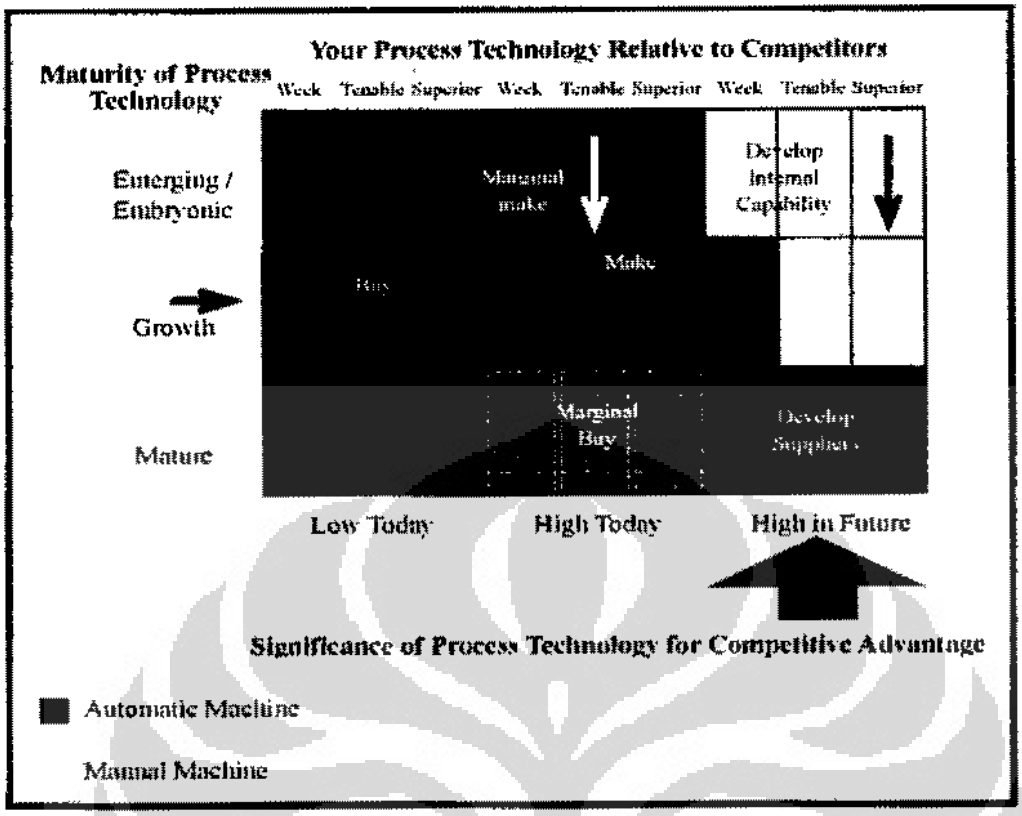


Figure 4.5 Technology analysis of wrapping

4.2.2 Cost Analysis

Cost analysis is one important consideration in deciding whether a process should do incource or outsource, because the main reason to make this analysis is to minimize the cost that is caused by these processes. Cost analysis will take the lowest cost among the alternatives existed.

Because these analyses involve machine investments, the cost analysis will not only use one time projection. It will use the certain period which will be determined by investment lifetime or book value period. Those projections costs then will be seen in its present value. To determine the present value, the cost of capital will use these assumptions below:

- For leveraged investment, the counted cost of capital will use the weighted average cost of capital which involve the debt rate in the calculation.
- For investment that using the company's equity, the cost of capital will use the equity rate.

The data that is used to count the cost of capital will be based on the 2008 balance sheet and income statement.

- Equity = Rp7.219.022.745
- Debt = Rp1.398.242.852
- Tax rate = 30%

Since the company is a private company, the equity rate will be counted based on the expectation rate of the company's owner. Calculation of the equity rate using the capital asset pricing model would be not relevant considering that the beta value of the printing industry in Indonesia did not stand alone. It counts together with the media and advertising. Moreover, in Indonesia, there is no printing company listed in the stock exchange.

The value of the equity rate will use 20%. This value is used because the dividend proportion of the equity that the owner received in the last three years is around 15% to 18%. By making another investment this year, the expected return from the owner will increase at least to 20%.

The debt rate of the company will use the average debt rate that is charged to the company until the end of 2008 which is 14.03%.

Using those data, we can calculate the cost of capital of the company using weighted average cost of capital.

- Weight for equity

$$\frac{S}{S+B} = \frac{\text{Rp7.219.022.745}}{\text{Rp7.219.022.745} + \text{Rp1.398.242.852}} = 0.84$$

- Weight for debt

$$\frac{B}{S+B} = \frac{\text{Rp1.398.242.852}}{\text{Rp7.219.022.745} + \text{Rp1.398.242.852}} = 0.16$$

- Cost of capital

$$r_{WACC} = \frac{S}{S+B} r_S + \frac{B}{S+B} r_B (1 - Tc)$$

$= 0.84(0.2) + 0.16(0.1403)^*(0.7)$

$= 0.1837 = 18.37\%$

4.2.2.1 Revenue Analysis

In the previous chapter, it was already explained that since the strategy was change, there are some significant growth in the revenue. However, the growth in revenue might be varying according to the project. This analysis will divide the project according to the group of customer. (Appendix A, Table A.1)

1. Corporate

In group of corporate, there is no certain pattern of the executed project. The projects that are executed by Ref Graphika in average are about 874 projects per year. The data also shows that the revenue per project is increasing. The reason of this pattern is because each customers increase their quantity per project either due to their needs of printing products or due to their strategy to decrease cost per quantity of their printing products. However, the actual number of customers is increasing. The increase of quantity per project make the number of project per customer is decreasing while the revenue per project is increasing.

The growth of revenue per project will not be linear, it will move gradually to zero. The reason is because there will be a point where no matter how high quantity they have, the price per quantity will not be decreased. At that point, this is the point where this group of customer is considered will order their printed products.

2. Publisher

For publishing group, the growth in revenue is reflected by the growth of project since that revenue per project is pretty much the same each year. This industry's fact shows that:

- Level of interest in writing has increase since the booming of chick lit (Anhar, 2005). This phenomenon allows everyone to write despite their experience in literature.
- Moreover, two recent successful Indonesian writers, Habbiburahman Elshirazy who wrote Ayat-ayat Cinta and Andrea Hirata who wrote tetralogy of Laskar Pelangi have an important role to the increasing of commercial books in Indonesia (Khoiri & Suwarna 2009).

The data also shows that in 2008, when the company adding another publisher called Hikmah -the subsidiary of Mizan, one of the largest publishing

companies in Indonesia- as their customer, the project is increased to 14.67%. Since the company has only serving two major publishers, it can be assumed that the market in this group of customer is still high. From this data, we can assume that:

- As the number of customer increase, the number of project is increase to 14.67% per year.
- Since the opportunity to adding customer is high, it is predict that each year the company might add one customer.

3. Agency

There is one particular reason why the project from agency is decreasing, which is the raise of digital technology that allows a low quantity project for having a lower unit cost. This reason also explained why the revenue per project is increasing.

However, the negative growth in project did not move linear because there will be a point where those projects must have large quantity. It can be assumed as the lowest point where the agency will print their project in offset printing company instead of digital.

As for the increase in revenue per project, the pattern and the reason is pretty much the same with the group of corporate. The different is from the data existed, it seems like the pattern of growth in revenue per project is already near to zero.

4. Private

There is no certain pattern that can define the project and billing from this type of customer. However, the total amount is also not significant, never more than 1%. Based on those data, the total billing from this customer will only uses the average billing per year.

4.2.2.2 Capacity Analysis

In printing company, the production capacity is depend on the capacity of its printing machine. In 2008, since the company just replaced one of their machines to the machine that has four times larger size, the capacity of printing machine only reaches 42% of maximum capacity. Assuming that the revenue is

reflect the company's capacity, in the year 2008, where the revenue is Rp8.796.391.203 the maximum revenue that the company can get is Rp20.943.788.579.

In two years from 2008, the company planned to replace one existed printing machine with a higher specification machine. The replaced machine is SORMZ 72 to be replaced with SM 74. The affect of the replacement will add the maximum capacity for 30%. It means that in the third year, the maximum revenue will be Rp27.226.925.152. And compare to the company's capacity, the demand in the next five years will never be higher than the capacity existed.

Table 4.1 Demand and capacity comparison

Year	Projection Revenue	Maximum Revenue based on Capacity
1	Rp11.014.091.329	Rp20.943.788.579
2	Rp13.035.843.911	Rp20.943.788.579
3	Rp15.040.504.906	Rp27.226.925.152
4	Rp16.919.490.293	Rp27.226.925.152
5	Rp18.641.228.760	Rp27.226.925.152

4.2.2.3 Outsourcing Analysis

Normally, the outsourcing cost behavior will get along with the whole cost, because the whole cost reflected the total demand. However, the data shows that in Ref Graphika, the outsourcing proportion from the revenue is increasing year by year. It might happen because there are many processes that had been outsourced by the company. And the reality shows that not all of the projects have a minimum quantity in their outsourcing process. Since the quantity is below the minimum order, the cost is charged higher than it should.

The data shows that in 2008, the outsourcing cost has reach about 14.90% from the revenue and the growth of the proportion is decrease for 12. 31%. The decreasing in growth proportion to zero is assumed because the quantities of the projects in the company have a tendency to increase. When the growth is zero, the proportion of outsourcing to revenue will remain the same. It might happen because in that point, all of the outsourced process has reach more

than minimum order (Appendix A, Table A.2). Using this assumption, we can calculate the outsourced cost prediction (Table 4.2)

Table 4.2 Outsourcing cost prediction

Year	Outsourcing
1	Rp1.784.395.912
2	Rp2.273.146.951
3	Rp2.798.259.239
4	Rp3.332.595.041
5	Rp3.860.691.209

Due to the outsourcing cost limitation, the analysis of each process will be done based on the proportion of each process to make the outsourcing billing.

Film Making

Since the company applies the new strategy, the cost proportions of film decrease gradually each year. It will not linearly decrease, because as long as the company has not change their prepress system to CtP, the company still needs to make film. At the lowest point of proportion, the growth of proportion will be zero. Further calculation can be seen in appendix A, table A.3.

Table 4.3 Billing and project prediction of film making

Year	Film Making Billing	Number of Project
1	Rp464.246.290	560
2	Rp566.733.689	537
3	Rp670.399.069	522
4	Rp769.205.460	511
5	Rp860.569.306	504

The outsourcing cost analysis for film making process will use this assumption (Appendix B, Table B.1):

- Since the supplier existed give a delivery facility, the transport cost will not be included.
- The communication cost will be added based on the number of project that using this kind of process.

- As the growth billing projection is decrease, the growth of the number of project will also decrease. In a certain point, the growth will be zero where the number of project will be the same each year.

Using those assumption, the communication cost will be equal to the price per call times the number of project. The complete calculation can be seen in table B.2 to B.6 on appendix B. Based on those data, the annual cost of outsourcing can be seen in the table below.

Table 4.4 Cost analysis of outsourcing – film making

Year	Outsourcing Cost	PV
1	(Rp464.806.734)	(Rp392.672.750)
2	(Rp567.270.909)	(Rp404.862.188)
3	(Rp670.920.828)	(Rp404.525.899)
4	(Rp769.716.788)	(Rp392.070.683)
5	(Rp861.073.534)	(Rp370.537.360)

NPV cost of outsoucing = (Rp1.964.668.879)

Laminating

The growth of this process is pretty significant every year since there is a tendency that the type of project that using this process is increasing. For books, magazines, and promotional items, this process can make those products stand out among the crowds. Especially for commercial books and magazine, this process can increase product competitiveness since this process is able to make the product stay longer. The data also shows that from 2006 to 2008, the proportion of this process is gradually increased. The growth of proportion is 3.01% in average. Using this assumption, the billing projection can be calculated (Appendix A, Table A.3).

Table 4.5 Billing and project prediction of laminating

Year	Laminating Billing	Number of Project
1	Rp402.722.349	423
2	Rp528.462.480	467
3	Rp670.110.968	516
4	Rp822.078.818	570
5	Rp980.997.984	630

The prediction of number of project that is using this process will be calculated using the average growth on number of project. The average growth of number of project is 10.47% (Appendix C, Table C.1).

Similar as film making supplier, the laminating supplier also provide delivery service. It means the additional cost in outsourcing analysis is only communication cost to pick and drop the material. The communication cost will also count based on the number of project in the future. The complete calculation of outsourcing process can be seen in appendix C, table C.2 to C.6. The whole cost of outsourcing can be seen in the list below.

Table 4.6 Cost analysis of outsourcing – laminating

Year	Outsourcing Cost	PV
1	(Rp403.144.360)	(Rp340.579.843)
2	(Rp528.928.693)	(Rp377.497.284)
3	(Rp600.264.362)	(Rp361.924.195)
4	(Rp736.329.533)	(Rp375.064.215)
5	(Rp980.997.984)	(Rp422.143.277)

NPV cost of outsoucing = (Rp1.877.208.813)

Wrapping

Because the entire product of this process is usually commercial book and magazine that has a high quantity, there will be no minimum order apply in analyzing this process. It is why, analyzing this process will not using the proportion from the outsourcing cost, however using average billing per year and growth of project per year.

The number of project that using this kind of process increase about 35% per year, with an average billing is about Rp12.163.001. Using this assumption, projection billing in the next five year can be described in the table below (Appendix A, Table A.3).

Table 4.7 Billing prediction of wrapping

Year	Wrapping Billing
1	Rp147.780.466
2	Rp199.503.629
3	Rp269.329.898
4	Rp363.595.363
5	Rp490.853.740

The outsourcing cost calculation will also count the transportation cost since the supplier did not provide the delivery service. The transportation cost will be counted on two times per project–one time to drop, and the other one to pick the material-. From the calculation in appendix D, on table D2 to D6, the cost analysis of outsourcing in five years ahead can be seen in the table below:

Table 4.8 Cost analysis of outsourcing – wrapping

Year	Outsourcing Cost	PV
1	(Rp148.144.966)	(Rp125.154.148)
2	(Rp199.995.704)	(Rp142.737.265)
3	(Rp269.994.200)	(Rp162.790.663)
4	(Rp364.492.170)	(Rp185.661.396)
5	(Rp492.064.429)	(Rp211.745.278)

NPV cost of outsoucing = (Rp828.088.750)

4.2.2.4 Insourcing Analysis

General Assumption

- Adding machine means adding labor. For finishing division, one labor might be responsible for two machines if each of those machines has working hour less than 50% in one shift.

- Pre press and press division works in two shifts. In finishing division, until today, only four machines that work in two shifts. Another machine existed and the manual process only works in one shift. Adding shift might happen if the demand affect the working hour to more than 10 hours.
- For each shift, each worker has to work five days of seven hours works and one days of five hours work. And if it is needed, the overtime will be applied with maximum of 3 hours. Based on the government rules, the cost of overtime will be counted 1/173 from salary.
- The salary will be increase each year for 10%. Bonuses will be given two times a year with an average onetime salary per bonus.
- As long as the machine being use in its lifetime, the needs of maintenance can be reduced because minor maintenance can be handled by the maintenance crew existed. During the machine lifetime, it is predicted that each machine will only have one time general check that need a special technician.
- The depreciation will be replaced by counting the initial investment. Because the company is under leverage, the investments occurred will gives some additional income to the company as the depreciation tax shield. The depreciation amount will be counted using straight line method. And the depreciation period will be counted using expected lifetime of the machines which is 5 years.
- It is assumed that after the lifetime is ended, the company will sold the machine that is used to insource the process.

Film Making

There will be a difference from the billing and actual cost based on demand. It happens because sometimes there is a project that charged at minimum charge. From the previous data, it can be assumed that the minimum order of film making is about 5.2%. Mentari charge price Rp12,5 with average of work 80%, and Repro One charge Rp10 with average work 20% per year. It makes the average price that is used in this calculation is of Rp12/cm. From the data, we can get the expected demand in the list below (Appendix B, Table B.1):

- 1st year : 36,752,831 cm^2
- 2nd year : 44,866,417 cm^2

- 3rd year : 53,073,260 cm^2
- 4th year : 60,895,432 cm^2
- 5th year : 68,128,403 cm^2

The main material that is needed to make the printing film is a film with coating that later will be exposed in the image setter. After the film exposed, the coating on image desired will stay and the other part have to get rid by slide the film into a developer and other chemical. The raw material was sold Rp7,50 per cm^2. The waste of this process is assumed 2.5% from the actual production.

To build this process insource, this process ideally has to operate with minimum of four workers. Two workers will be needed for operating the computer which do some design work and two other workers will be needed to operate the machine. Since in the company already have workers that responsible for design, the number of relevant worker to add in the cost analysis is only two persons. One person is responsible for inputting data and operate the machine, another person have to responsible to the quality control of the final result.

In the production process, film making will fed the plate making process, and plate making will fed the printing process. Since the printing process in the company is working in two shifts, the film making process will also have to work in two shifts. It makes the whole additional workers is four people.

The salary for operators of these machines will be higher than the regional minimum wages because operating these machines needs some special skill and education. The person has to understand the basic work of designing, combined with color separation knowledge and reproduction skill.

The initial investment for this process will not only include the machine. Initial investment also has to consider the additional space to build the process inside the company. The price of the machine is $20,000 or equal to Rp234.000.000 with Rp11.700 exchange rate.

Although the machine itself is not very big, these machines need a special space to operate property. The space has to be isolated and adjusted with a certain temperature due to the chemical work inside. The initial investment for renovation other equipment is predicted Rp10.000.000. All those investment will

use leverage fund. The value of the machine as the lifetime ended is expected 30% of the actual investment (Appendix B, Table B.2 to B.6):

Table 4.9 Cost analysis for film making - insourcing

Insourcing				
Year	Initial Investment	Operational Cash Flow	Depreciation Tax Shield	Terminal Cash Flow
0	(Rp244.000.000)			
1		(Rp417.403.217)	Rp14.040.000	
2		(Rp489.759.369)	Rp14.040.000	
3		(Rp563.814.535)	Rp14.040.000	
4		(Rp635.981.878)	Rp14.040.000	
5		(Rp704.792.247)	Rp14.040.000	Rp70.200.000

NPV cost of insoucing = (Rp1.839.602.981)

Laminating

Laminating machine can produce two type of laminating process, which are matt and gloss laminating. The difference from these two processes is only from its raw material. Although gloss film is cheaper than matt film, the fact shows that the use of matt laminating is larger than gloss laminating. The data shows that the work proportion is 32% for gloss and 68% for matt laminating.

Price of laminating that is charge by the supplier is Rp0.16/cm for gloss and Rp0.2/cm for matt laminating. With an average minimum order of 10%, we can count five year projection capacity (Appendix C, Table C.1).

Table 4.10 Demand projection of laminating

Year	Matt (cm2)	Gloss (cm2)	Quantity (exemplar)
1	1,225,484.108	720,873,005	860,964
2	1,608,111.325	945,947,838	1,014,517
3	2,039,147.676	1,199,498,633	1,195,456
4	2,501,585.842	1,471,521,083	1,408,665
5	2,985,176.867	1,755,986,392	1,659,900

Similar with the predicted billing counting, count the quantity will also using the average growth. The average growth of is 17.83%.

To count the use of raw material, the calculation will add the demand prediction together with 2.5% of demand that assumed as a waste.

There will be minimum of two workers be needed to operate this machine. One person will be act as the operator and the other as an assistant. Because operating this machine did not need certain of skill, the direct labor will be around regional minimum wages with a certain different between operator and assistant.

The overtime will be needed in the third and fourth year. Since the company regulation in working hours is maximum 10 hours per shift, in the fifth year, the company has to add another shift that cause adding another two workers.

The initial investment will only add machine investment because the machine still can be fit inside the building existed; it means that there will be no need to add another space to place the machine. The price of investment is Rp150.000.000. The investment itself will use leverage fund and the value of the machine that will be sold is expected 30% of the actual investment (Appendix C, Table C.2 to C.6). The table 4.11 below will show summarize of calculation in five years.

Table 4.11 Cost analysis for laminating – insourcing

Insourcing				
Year	Initial Investment	Operational Cash Flow	Depreciation Tax Shield	Terminal Cash Flow
0	(Rp150.000.000)			
1		(Rp329.246.081)	Rp9.000.000	
2		(Rp420.746.197)	Rp9.000.000	
3		(Rp525.034.750)	Rp9.000.000	
4		(Rp638.152.585)	Rp9.000.000	
5		(Rp801.108.469)	Rp9.000.000	Rp45.000.000

NPV cost of insoucing = (Rp1.667.516.656)

Wrapping

In this process, insourcing cost analysis will calculate two different kind of investment. Those investments options are manual wrapping machine and automatic wrapping machine.

The advantage in using automatic machine is not only from the speed that can make the company increase its capacity, but also from the labor cost that allow the company using less workers in operating the machine. However, these advantages come with more expensive investments that can reach six times larger than the investment in manual machine.

To operate properly the manual machine, the number of worker that will be needed is many. Those workers consist of two workers who responsible for the sealing machine, one worker for shrink machine, and minimum of five workers to input the material –in this case is books- to the wrap plastic.

However, not all the workers are relevant to count. The company use contract labor to do manual process, such as making envelopes, attaching sticker to the packaging, or even put an invitation or book to the sealed plastic. The company pays these labors per weeks. Those labors usually came from residences around the workshop, who are unemployed or housewives searching for extra income. Based on data above, for manual machine, the labor that will be needed in this analysis is three workers.

The automatic machine needs fewer workers than the manual machine. This machine only needs two workers to input the material and another worker to set the machine and gather the result.

The supplier existed charge Rp9/cm. It means that demand in the next five years can be count using the billing amount divided by the price charged. The machine speed is defined in exemplar. And to get the actual quantity, it can be use the number of project for an average number of quantities per project.

Table 4.12 Demand projection of wrapping

Year	Demand (cm2)	Quantity (exemplar)
1	16,420,052	45,255
2	22,167,070	61,094
3	29,925,544	82,477
4	40,399,485	111,344
5	54,539,304	150,314

The material needed in this process is a wrap plastic as the main material and a special thin wire to seal the product before it is input to the shrink machine. The use of wrap plastic will be count with a 5% waste. The wire will be change every two weeks.

No additional spaces will be needed in investing the shrink machine; it means that the initial investment will only count on the price of the machine itself. All of the machine investment will be use five years of depreciation

The price of manual machine is Rp20.0000.000 for the shrink machine and Rp600.000 for sealing machine with the needs of sealing machine is two machines. The price of automatic machine is Rp120.000.000.

Due to the price, manual machines will use fund from the company equity and the automatic machine will use a leverage fund. For manual machine, it is expected that the value of the investment after five years is only 10% from the actual investment, and for automatic machine is about 25%.

The cost of capital will be different among these two considerations. For manual machine, since it will not using the leverage fund, the cost of capital will use the equity rate. And for automatic machine, the cost of capital will use the weighted-average-cost-of-capital (WACC). Further calculation can be seen in the appendix D, table D.7 to D.11 for manual machine, and table D.12 to D.16 for automatic machine.

Table 4.13 Cost analysis for wrapping – insourcing with manual machine

Insourcing with Manual Machine				
Year	Initial Investment	Operational Cash Flow	Depreciation Tax Shield	Terminal Cash Flow
0	(Rp21.200.000)			
1		(Rp151.198.826)	Rp1.272.000	
2		(Rp189.748.416)	Rp1.272.000	
3		(Rp240.570.361)	Rp1.272.000	
4		(Rp308.008.602)	Rp1.272.000	
5		(Rp499.994.163)	Rp1.272.000	Rp2.120.000

Table 4.14 Cost analysis for wrapping – insourcing with automatic machine

Insourcing with Automatic Machine				
Year	Initial Investment	Operational Cash Flow	Depreciation Tax Shield	Terminal Cash Flow
0	(Rp120.000.000)			
1		(Rp132.659.778)	Rp7.200.000	
2		(Rp155.845.701)	Rp7.200.000	
3		(Rp217.396.696)	Rp7.200.000	
4		(Rp308.008.602)	Rp7.200.000	
5		(Rp350.298.879)	Rp7.200.000	Rp30.000.000

NPV cost of insoucing with manual machine = (Rp796.598.678)

NPV cost of insoucing with automatic machine = (Rp733.432.254)

4.2.3 Non-cost Consideration

4.2.3.1 Quality

Quality consideration in this analysis is referring to the ability of the supplier to provide the qualified product. To make the qualified product, it has to be matched with specification that is needed, and the physical result of the product itself.

(1) Film Making

In film making process, although the specification will not be matter, the quality risk of physical result might be happen when we outsourced the process. Operating this process need a special skills and knowledge in film separation. Image setter is like a printer. If the picture is not placed in the right format, it might distract the pixel. And since there will be separation color in this type of

work, the operator also has to be careful when the raster of the color is not placed at the right place.

The quality regarding the physical result is actually can be avoid using the quality control. However, all of the film making company in Jakarta is not providing the quality control system. Although they usually assure the customer that the broken film can be returned, it will cost a lot of useless time.

(2) Laminating

The specification aspect of quality will not be matter in this process. And for the quality of physical risk, it will also can be avoid in this process because, as already told before, laminating process has a simple technique. It takes only one week training to learn to operate the machine and of course: some experience. The more time the operator handles the machine, the more ability they have. The experienced operator can change the setting of the machine from one job to another in just 10 minutes. There will be no risk cause by human error.

(3) Wrapping

With similar reason like the laminating process, this process is also has no quality risk regarding to the insourcing/outsourcing decision. The qualified product can be gain using both system, insourcing and outsourcing. The operator is learning by doing. The more experience they have, the more time they can reduce to handle one project, and also the less waste they might cause.

4.2.3.2 Delivery

Printing companies have wide range of delivery time depended on the request from the client. It can be within a month, weeks, days, and hours. The degree of lateness tolerance is also depends on the negotiations with the clients. However for a printing product that will be used in an event –such as brochures, books, etc- the lateness is not acceptable. That is why, although the distance between the company's and supplier's workshop is not too far, the risk of lateness in delivery is pretty high. The factors above, combined with the uncertainty of traffic jam in Jakarta can change one hour late in one process become one day late in product delivery.

4.2.3.3 Continuity of Supplies

Printing industry can be considered as a saturated industry. It is basically affecting the supplier of this industry. In Indonesia suppliers that can provide those kind of service is everywhere. It means that the risk in continuity of the supplies will be irrelevant to be analyzed in this kind of industry.

4.3 Insourcing/Outsourcing Decision

Based on the explanation above, we can see that decision of insourcng/outsourcing have to be balance between qualitative and quantitative analysis.

4.3.1 Film Making

Table 4.15 Insourcing/outsourcing analysis description for film making process

Elements of Analysis	Description
Core Competencies	The process is affecting the core competency
Technology	- Mature technology - Significancy for competitive advantage = high today - Process technology relatove to competitor = tenable
Cost	- Cost of outsourcing = (Rp1.964.668.879) - Cost of insoucing = (Rp1.839.602.981)
Quality	There is a risk in outsourcing regarding to the physical result of this process
Delivery	There is a risk of delivery in outsourcing regarding to the high level of uncertainty
Continuity of the Supply	Did not relevant to considered since there is large number of supplier

Table 4.16 Insourcing/outsourcing result for film making process

Elements of Analysis	Insourcing	Outsourcing
Core Competencies	X	-
Technology		X
Cost	X	
Quality	X	
Delivery	X	
Continuity of the Supply	-	-

Because most of the element analysis referring to insourcing, the company should insource the film making process.

4.3.2 Laminating

Table 4.17 Insourcing/outsourcing analysis description for laminating process

Elements of Analysis	Description
Core Competencies	The process is not affecting the core competency
Technology	- Mature technology - Significancy for competitive advantage = high today & high in future - Process technology relatove to competitor = tenable
Cost	- Cost of outsourcing = (Rp1.877.208.813) - Cost of insoucing = (Rp1.667.516.656)
Quality	There is no risk in quality whether this process is doing insouce or outsource
Delivery	There is a risk of delivery in outsourcing regarding to the high level of uncertainty
Continuity of the Supply	Did not relevant to considered since there is large number of supplier

Table 4.18 Insourcing/outsourcing result for laminating process

Elements of Analysis	Insourcing	Outsourcing
Core Competencies	-	-
Technology		X
Cost	X	
Quality	X	X
Delivery	X	
Continuity of the Supply	-	-

Because most of the element analysis referring to insourcing, the company should insource the laminating process.

4.3.3 Wrapping

Table 4.19 Insourcing/outsourcing analysis description for wrapping process

Elements of Analysis	Description
Core Competencies	The process is not affecting the core competency
Technology	Manual Machine : - Growth technology - Significance for competitive advantage = high today - Process technology relative to competitor = tenable Automatic Machine : - Growth technology - Significance for competitive advantage = high today - Process technology relative to competitor = tenable
Cost	- Cost of outsourcing = (Rp828.088.750) - Cost of insoucing w/ manual machine = (Rp796.598.678) - Cost of insoucing w/ automatic machine = (Rp733.432.254)
Quality	There is no risk in quality whether this process is doing insouce or outsource
Delivery	There is a risk of delivery in outsourcing regarding to the high level of uncertainty
Continuity of the Supply	Did not relevant to considered since there is large number of supplier

Table 4.20 Insourcing/outsourcing result for wrapping process

Elements of Analysis	Insourcing with Manual Machine	Insourcing with Automatic Machine	Outsourcing
Core Competencies	-	-	-
Technology	X	X	
Cost	X		
Quality	X	X	X
Delivery	X	X	
Continuity of the Supply	-	-	-

Because most of the element analysis referring to insourcing, the company should insource the wrapping process. And because the lowest cost of the investment is in manual machine, the company has to invest the machine in automatic machine.

4.4 Company Analysis

4.4.1 Company's Performance

As already explained that the change in marketing strategy has increase the revenue, and not to forget, the profit. Data shows that the profit margin before 2006 was always under the owner's expected return, which is 20%. As the strategy change, the profit margin is increase significantly to 26.95%. However as the time goes by, the increase in outsourcing cost, has decrease the profit margin. Although the decrease is gradually, in the future it might be significant.

The result of this thesis shows that it will be better for the company to insource all of those three analyzed processes. Using that conclusion, we can see that if the investment is applied, the company might gain more profit in the future. Table 4.18 will show the comparison of expected profit with the existing condition where the process is outsource (Appendix A, Table A.2), and the expected profit when the result of this analysis has been implemented (Appendix A, Table A.5), with an assumption that other than analyzed cost will be static, within five years.

Table 4.21 Profit comparison

Year	Profit with existing condition	Profit with insourcing decision
2009	Rp2.464.993.699	Rp2.624.966.590
2010	Rp2.778.964.958	Rp3.052.560.432
2011	Rp3.045.800.647	Rp3.412.195.795
2012	Rp3.251.286.188	Rp3.727.665.025
2013	Rp3.399.353.236	Rp3.965.222.024

The figure 4.7 will show the trend of those profits. And from the graphics, we can see the decision to change the process from outsourcing to insourcing can gave a significant increase in profit. In the fifth year, it is predicted that the increase of profit reach to 16%. And the profit with insourcing decision will be still increase in the future.

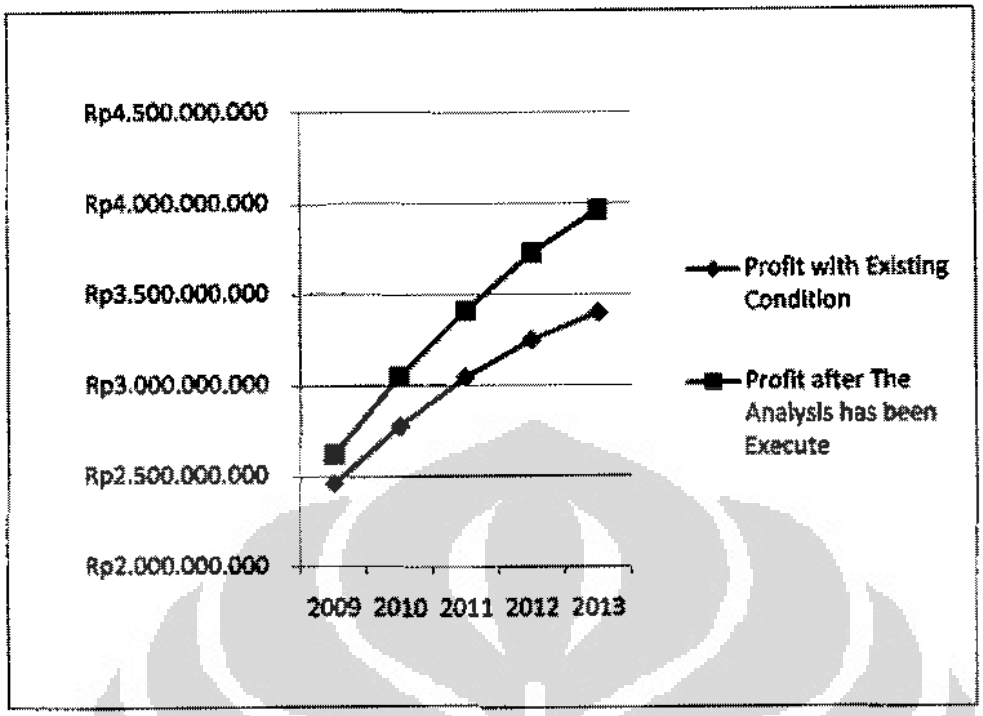


Figure 4.6 Trends of the profits

4.4.2 Future Implication

Every action has their consequences. This quote is also applied for this kind of decision. When it comes to the asset investment, adding the assets means adding the sunk cost to the company. Although the investment still can be liquid back, the value will be decreased compare the actual value of the investment. The threads that might happen in the future after the company makes an investment will be described below.

In the film making process, the thread that might occurs in the future is connected with the CtP technology. Although at this time there are still many considerations not to using this process, if in the future this process can evolve and cover the weakness, the use of film making process might be decreased drastically.

In finishing process, the thread that might be occurred is regarding to the trends that might happen in the future. For example, when the coating process emerged, the trend of coating process was to make the color looks bright. It is why, at that time, the use UV coating and hot printing was very high. Lately, as

the trend of finishing processes was moving into soft and sophisticated result, it boosted the use of laminating.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 Conclusion

For a growing printing company, most of analysis regarding the investment decision is adding machine that can support the production activity. The activity that they usually outsourced in some point might be interesting to do insource. To analyze the insourcing/outsourcing decision, this thesis is written using analysis that combines qualitative and quantitative methods.

The qualitative methods will include the company strategy that consists of resource-based theory to analyze the company's core competencies, combined with the technology that is used in those processes. Other analysis regarding to the qualitative methods is the risk factor that usually come when the company is outsourcing the process. Those risk analysis consists of quality, delivery, and continuity of the process.

The quantitative methods will use the transaction cost theory to analyze the projection cost in a certain time. This analysis is using the relevant cost approach to compare some options that might be done in those processes, whether it is to insource, to outsource, or even choosing between two investments in the future.

Ref Graphika, a growing company being the object of this thesis, uses those analysis approaches and combines it with the company strategy. The purpose is to analyze some processes to decide whether those particular processes are able to be invested in a long term. The conclusion of the analysis can be described below:

Film Making

The final decision of this process is to do inside the company because most of the entire indicators suggest that the company should insouce this process. The only consideration that suggests the company to outsource is technology consideration.

Laminating

In qualitative analysis, the number of elements that indicates this process being insourced or be outsourced is equal. However, since the cost of insourcing is less than cost of outsourcing, the company is suggested to insource the process.

Wrapping

This process is not only analyzed to decide whether the process should be done inside or outside the company. It is also analyzed the type of investment that the company should do in the future. Insourcing/outsourcing analyses suggest that the company should insource the project. However, due to the lowest NPV, this analysis suggests that the company should invest on automatic machine.

Company Analysis

To see how effective the decision to the company's performance, it has to be analyzed in a big picture by looking at the effect in whole profit. The data shows, by insourcing this process, the company is able to increase its profit about 6.49% in the first year, up to 16,65% in the fifth year.

Although this analysis makes a decision to insource all of those processes, the company has also consider the future implication that might happen after the company makes an investment in these types of processes.

The thread for film making is the CtP technology. That means the company must pay high attention to the technology development of pre press in the future.

5.2 Recommendation

Using the conclusion above, the company is recommended to insource all of the analyzed processes. This analysis also proves that the decision of investment in these processes is able to make cost reduction. And by reducing the cost, this analysis is able to increase the profit margin of the company significantly.

However, considering the implications above, there is some future consideration that has to be added by the company to execute this analysis. In film making, the company is recommended to be alert in 2012. That is 2012 is the year where the biggest printing exhibition will be held. Usually the new technology

emerges in that time. The company should consider if the breakthrough of the CtP technology is emerged in that year, because the emerging of CtP technology might make the cost consideration can not be applicable anymore.

As for the finishing processes, the company should consider on how long usually the trends works, because trend usually has its own cycle. After the trend emerges, it will be hanging in one spot for the certain period before it decreasing. By considering the cycle of process trend, the company will be able to make the accurate analysis of the demand.

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Appendix A

Table A.1 Revenue Prediction

	New Strategy Data			Analyzed Year				
	2006	2007	2008	2009	2010	2011	2012	2013
Total Revenue	Rp 6.464.013.288	Rp 7.429.332.150	Rp 8.796.391.203					
		14,93	18,40	25,21	18,36	15,38	12,49	10,18
Number of Project	2231	1666	1.430	1.394	1.383	1.390	1.408	1.433
Corporate								
Project/Year	868	923	831	874	874	874	874	874
Average Project/Year		874						
Revenue/Year	Rp 1.402.635.052	Rp 2.743.386.102	Rp 3.931.986.868	Rp 5.864.647.567	Rp 7.595.273.275	Rp 9.177.392.603	Rp 10.526.820.680	Rp 11.619.423.347
Revenue/Project	Rp 1.615.939	Rp 2.971.698	Rp 4.731.633	Rp 6.709.685	Rp 8.689.676	Rp 10.499.763	Rp 12.043.630	Rp 13.293.666
Revenue Growth (%)		83,90	59,22	41,80	29,51	20,83	14,70	10,38
Decrease of Revenue Growth (%)		-29,41		-29,41	-29,41	-29,41	-29,41	-29,41
Publisher								
Project/Year	65	82	126	144	164	187	213	243
Project Growth (%)		5,67	14,67	14,67	14,67	14,67	14,67	14,67
Revenue/Year	Rp 1.422.082.923	Rp 1.909.338.363	Rp 2.580.739.671	Rp 3.143.322.033	Rp 3.583.387.118	Rp 4.085.061.314	Rp 4.656.969.898	Rp 5.308.945.684
Revenue/Project	Rp 21.878.199	Rp 23.284.614	Rp 20.482.053	Rp 21.883.334	Rp 21.883.334	Rp 21.883.334	Rp 21.883.334	Rp 21.883.334
Average Billing/Project		Rp	21.883.334	Rp 21.883.334	Rp 21.883.334	Rp 21.883.334	Rp 21.883.334	Rp 21.883.334
Agency								
Project/Year	1250	615	444	376	345	329	321	317
Project Growth (%)		-50,80	-27,80	-15,22	-8,33	-4,56	-2,50	-1,37
Decrease of Project Growth (%)			-45,27	-45,27	-45,27	-45,27	-45,27	-45,27
Revenue/Year	Rp 3.582.300.497	Rp 2.732.087.685	Rp 2.235.163.005	Rp 1.956.115.904	Rp 1.807.177.694	Rp 1.728.045.164	Rp 1.685.693.889	Rp 1.662.853.904
Revenue/Project	Rp 2.865.840	Rp 4.442.419	Rp 5.034.151	Rp 5.196.509	Rp 5.237.088	Rp 5.246.990	Rp 5.249.592	Rp 5.249.974
Revenue Growth (%)		55,01	13,32	3,23	0,78	0,19	0,05	0,01
Decrease of Revenue Growth (%)		-75,79		-75,79	-75,79	-75,79	-75,79	-75,79
Privat								
Project/Year	48	46	29					
Revenue/Year	Rp 56.994.816	Rp 44.520.000	Rp 48.502.659	Rp 50.005.825	Rp 50.005.825	Rp 50.005.825	Rp 50.005.825	Rp 50.005.825
Revenue/Project	Rp 1.187.392	Rp 967.826	Rp 1.672.505					

Appendix A

Table A.2 Outsourcing Cost Prediction

		New Strategy Data			Analyzed Year				
	2005	2006	2007	2008	2009	2010	2011	2012	2013
Revenue	Rp 4.207.352.898	Rp 6.464.013.288	Rp 7.429.332.159	Rp 8.796.391.203	Rp 11.014.091.329	Rp 13.035.843.911	Rp 13.640.504.906	Rp 16.919.490.293	Rp 18.641.228.760
Outsourcing	Rp 468.397.018	Rp 787.253.820	Rp 1.007.253.804	Rp 1.310.986.565	Rp 1.784.395.912	Rp 2.273.146.951	Rp 2.798.259.239	Rp 3.332.595.041	Rp 3.860.691.209
Material	Rp 1.709.061.166	Rp 2.269.055.984	Rp 2.854.244.318	Rp 3.378.086.172	Rp 4.109.158.300	Rp 4.863.439.628	Rp 5.611.340.394	Rp 6.313.355.863	Rp 6.954.795.349
Other Expenses	Rp 1.283.544.661	Rp 1.675.774.056	Rp 1.833.991.865	2147684677	Rp 2.655.543.418	Rp 3.120.294.374	Rp 3.585.704.627	Rp 4.023.253.201	Rp 4.426.478.966
Material Proportion (%)	40,62	35,10	38,42	38,40	37,31	37,31	37,31	37,31	37,31
Average Material Proportion (%)			37,31		37,31	37,31	37,31	37,31	37,31
Other Expenses Proportion (%)	30,51	23,92	24,96	24,42	24,11	23,94	23,84	23,78	23,75
Proportion Growth (%)			-3,74	-2,16	-1,25	-0,72	-0,42	-0,24	-0,14
Decrease in Proportion Growth (%)			-42,20		-42,20	-42,20	-42,20	-42,20	-42,20
Outsourcing Proportion(%)	11,13	12,18	13,56	14,90	16,20	17,44	18,60	19,70	20,71
Proportion Growth (%)			11,32	9,93	8,70	7,63	6,69	5,87	5,15
Decrease in Proportion Growth (%)			-12,31		-12,31	-12,31	-12,31	-12,31	-12,31
Profit	Rp 746.350.033	Rp 1.731.929.428	Rp 1.713.842.163	Rp 1.959.633.789	Rp 2.464.993.699	Rp 2.778.964.958	Rp 3.045.800.647	Rp 3.251.286.188	Rp 3.399.353.236
Percentage of Profit/Rev	17,74	26,79	23,07	22,28	22,38	21,32	20,25	19,22	18,24

Appendix C

Table C.1 Laminating Analysis

	2006	2007	2008	2009	2010	2011	2012	2013
Laminating Billing/Year				Rp 402.722.349	Rp 528.462.480	Rp 670.110.968	Rp 822.078.818	Rp 980.997.984
Minimum Order				Rp 42.285.847	Rp 55.488.560	Rp 70.361.652	Rp 86.318.276	Rp 103.004.788
Actual Cost/Year				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Demand/Year (pcs)	526.251	625.342	730.652	860.964	1.014.517	1.195.456	1.408.665	1.659.900
Growth of Demand (%)		18,83	16,84	17,83	17,83	17,83	17,83	17,83
Average Growth (%)		17,83		17,83	17,83	17,83	17,83	17,83
Demand/Day (pcs)				2870	3382	3985	4696	5533
Working Hour/Day				5,74	6,76	7,97	9,39	11,07
Peak Load Hour				0,00	0,00	0,00	1,39	3,07
Non-Peak Load Hour				5,74	6,76	7,97	8,00	8,00
Number of project/Year	313	345	382	422	466	515	569	629
Growth of project (%)		10,22	10,72	10,47	10,47	10,47	10,47	10,47
Average Growth (%)		10,47		10,47	10,47	10,47	10,47	10,47
Matt Laminating								
Billing/Year				[illegible]				
Demand/Year (cm2)				[illegible]				
Gloss Laminating								
Billing/Year				[illegible]				
Demand/Year (cm2)				[illegible]				

Note :

Machine speed = 500 pcs/hour
1st shift = 08.00 - 16.00
2nd shift = 16.00 - 01.00
Peak Load Hour = 17.00 - 22.00

Matt laminating proportion = 68%
Gloss laminating proportion = 32%
Matt laminating price = Rp0,2/cm
Gloss laminating price = Rp0,16/cm

Appendix C

Table C.2 Cost Analysis of Laminating - Year 1

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 402.722.349
Raw Material - Matt	cm2	1.249.993.790	Rp 0,180		Rp 224.998.882			
Raw Material - Gloss	cm2	735.290.465	Rp 0,080		Rp 58.823.237			
FIXED COST								
Direct Labor								
Machine Operator	person	1	Rp 1.200.000	Rp 1.200.000	Rp 14.400.000			
Assistant	person	1	Rp 1.000.000	Rp 1.000.000	Rp 12.000.000			
Indirect Labor/Overtime								
Machine Operator	hours/person	0,00	Rp 6.936	Rp -	Rp -			
Assistant	hours/person	0,00	Rp 5.780	Rp -	Rp -			
Indirect Material								
Cutter	contain	3	Rp 50.000	Rp 150.000	Rp 1.800.000			
Overhead								
Bonus								
Machine Operator	person	1	Rp 2.400.000		Rp 2.400.000			
Assistant	person	1	Rp 2.000.000		Rp 2.000.000			
Maintenance								
Daily Maintenance				Rp 500.000	Rp 6.000.000			
Technician	person	1	Rp 4.000.000		Rp 4.000.000			
Electricity								
Peak Time	hours/day	0,00	3.280	Rp -	Rp -			
Non-Peak Time	hours/day	5,74	1.640	Rp 235.330	Rp 2.823.961			
Communication	# of calls/year					422	Rp 1.000	Rp 422.011
TOTAL COST /YEAR					Rp 329.246.081			Rp 403.144.360

Demand of Matt Laminating	1.225.484.108
Demand of Gloss Laminating	720.873.005
Number of Project	422

Appendix C

Table C.3 Cost Analysis of Laminating - Year 2

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 528.462.480
Raw Material - Matt	cm2	1.640.273.552	Rp 0,180		Rp 295.249.239			
Raw Material - Gloss	cm2	964.866.795	Rp 0,080		Rp 77.189.344			
FIXED COST								
Direct Labor								
Machine Operator	person	1	Rp 1.320.000	Rp 1.320.000	Rp 13.840.000			
Assistant	person	1	Rp 1.100.000	Rp 1.100.000	Rp 13.200.000			
Indirect Labor/Overtime								
Machine Operator	hours/person	0,00	Rp 7.630	Rp -	Rp -			
Assistant	hours/person	0,00	Rp 6.358	Rp -	Rp -			
Indirect Material								
Cutter	contain	3,5	Rp 50.000	Rp 175.000	Rp 2.100.000			
Overhead								
Bonus								
Machine Operator	person	1	Rp 2.640.000		Rp 2.640.000			
Assistant	person	1	Rp 2.200.000		Rp 2.200.000			
Maintenance								
Daily Maintenance				Rp 500.000	Rp 6.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours/day	0,00	3.280	Rp -	Rp -			
Non-Peak Time	hours/day	6,76	1.640	Rp 277.301	Rp 3.327.614			
Communication	# of calls/year					466	Rp 1.000	Rp 466.213
TOTAL COST /YEAR					Rp 420.746.197,428			Rp 528.928.693

Demand of Matt Laminating	1.608.111.325
Demand of Gloss Laminating	945.947,838
Number of Project	466

Appendix A

Table A.3 Outsourced Process Proportions

		New Strategy Data			Analyzed Year				
	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Outsourcing Cost	Rp 468.397.018	Rp 787.253.820	Rp 1.057.253.804	Rp 1.310.986.565	Rp 1.784.395.912	Rp 2.273.146.951	Rp 2.798.259.239	Rp 3.392.595.041	Rp 3.860.691.209
Film Making (%)	40,51	30,12	28,59	27,23	26,02	24,93	23,96	23,08	22,29
Proportion Growth (%)			-5,08	-4,76	-4,45	-4,17	-3,91	-3,66	-3,43
Decrease in Proportion Growth (%)				-6,35	-6,35	-6,35	-6,35	-6,35	-6,35
Film Making Billing/Year	Rp 189.767.632	Rp 237.120.851	Rp 287.973.863	Rp 336.981.642					
Laminating (%)	22,45	20,65	21,12	21,91	22,57	23,25	23,93	24,67	25,41
Proportion Growth (%)			2,28	3,74	3,01	3,01	3,01	3,01	3,01
Average Proportion Growth (%)				3,01	3,01	3,01	3,01	3,01	3,01
Lamination billing/Year	Rp 105.155.131	Rp 162.567.914	Rp 212.732.003	Rp 287.237.156					
Wrapping (%)	0	7,13	7,89	8,23	8,28	8,78	9,62	10,91	12,71
Number of Project	0	5	6	9	12	16	22	30	40
Project Growth (%)			20,00	50,00	35,00	35,00	35,00	35,00	35,00
Average Growth (%)				35,00	35,00	35,00	35,00	35,00	35,00
Billing/Project/Year		Rp11.226.239	Rp13.745.388	Rp12.017.377	12163001,28	12163001,28	12163001,28	12163001,28	12163001,28
Average Billing/Project/Year			12163001		12163001,28	12163001,28	12163001,28	12163001,28	12163001,28
Wrapping billing/Year	Rp -	Rp 56.131.197	Rp 79.472.325	Rp 108.156.392					
UV Coating billing (%)	10,21	10,00	12,70	11,40	11,08	11,08	11,08	11,08	11,08
Proportion Growth (%)			11,08		11,08	11,08	11,08	11,08	11,08
UV Coating billing/Year	Rp 47.823.736	Rp 78.725.382	Rp 127.921.233	Rp 149.452.464	Rp 197.666.457	Rp 251.807.853	Rp 309.977.167	Rp 369.168.216	Rp 427.668.069
Others billing (%)	26,83	32,10	29,70	31,21	32,05	31,97	31,39	30,26	28,51
Others	Rp 125.670.920	Rp 252.708.476	Rp 299.134.380	Rp 409.158.907	Rp 571.980.350	Rp 726.639.301	Rp 878.442.136	Rp 1.026.547.184	Rp 1.100.602.110

Table A.4 Outsourcing Cost Comparison after Analysis

Outsourcing cost in existing condition										
Total Outsourcing Cost	Rp	1.784.395.912	Rp	2.273.146.951	Rp	2.798.259.239	Rp	3.332.595.041	Rp	3.860.691.209
Film Making Billing/Year	Rp	464.246.290	Rp	566.733.689	Rp	670.399.069	Rp	769.205.460	Rp	860.569.306
Laminating billing/Year	Rp	402.722.349	Rp	528.462.480	Rp	670.110.968	Rp	822.078.818	Rp	980.997.984
Wrapping billing/Year	Rp	147.780.466	Rp	199.503.629	Rp	269.329.898	Rp	363.595.363	Rp	490.853.740
UV Coating billing/Year	Rp	197.666.457	Rp	251.807.853	Rp	309.977.167	Rp	369.168.216	Rp	427.668.069
Other billing/Year	Rp	571.980.350	Rp	726.639.301	Rp	878.442.136	Rp	1.008.547.184	Rp	1.100.602.110
Outsourcing cost after analysis has been execute										
		2009		**2010**		**2011**		**2012**		**2013**
Total Outsourcing Cost	Rp	1.648.955.883	Rp	2.044.798.421	Rp	2.494.665.285	Rp	2.933.673.403	Rp	3.384.469.773
Film Making Billing/Year	Rp	417.403.217	Rp	489.759.369	Rp	563.814.535	Rp	635.981.878	Rp	704.792.247
Laminating billing/Year	Rp	329.246.081	Rp	420.746.197	Rp	525.034.750	Rp	638.152.585	Rp	801.108.469
Wrapping billing/Year	Rp	132.659.778	Rp	155.845.701	Rp	217.396.696	Rp	281.823.540	Rp	350.298.879
UV Coating billing/Year	Rp	197.666.457	Rp	251.807.853	Rp	309.977.167	Rp	369.168.216	Rp	427.668.069
Other billing/Year	Rp	571.980.350	Rp	726.639.301	Rp	878.442.136	Rp	1.008.547.184	Rp	1.100.602.110

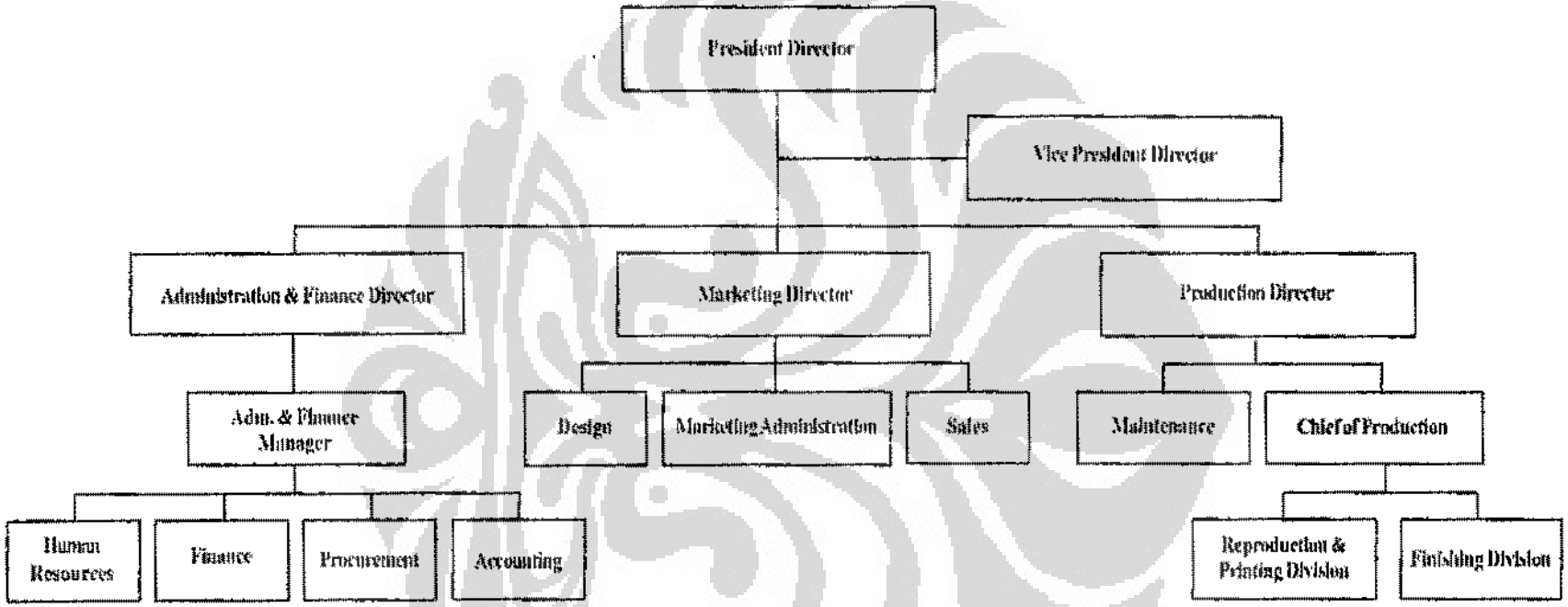
Appendix A

Table A.5 Profit after the Analysis had been Execute

	2009	2010	2011	2012	2013
Revenue	Rp 11.014.091.329	Rp 13.035.843.911	Rp 15.040.504.906	Rp 16.919.490.293	Rp 18.641.228.760
Outourcing	Rp 1.648.955.883	Rp 2.044.798.421	Rp 2.494.665.285	Rp 2.933.673.403	Rp 3.384.469.773
Material	Rp 4.109.158.300	Rp 4.863.437.628	Rp 5.611.340.394	Rp 6.312.355.863	Rp 6.954.705.349
Other Expenses	Rp 2.631.010.555	Rp 3.075.047.430	Rp 3.522.303.433	Rp 3.945.796.002	Rp 4.336.831.613
Profit	Rp 2.624.966.590	Rp 3.052.560.432	Rp 3.412.195.795	Rp 3.727.665.025	Rp 3.965.222.024

Appendix A

Figure A.1 Organizational Structure



Appendix B

Table B.1 Film Making Analysis

	2006	2007	2008	2009	2010	2011	2012	2013
Billing/Year								
Minimum Order								
Actual Cost/Year								
Demand (cm2)								
Demand/Day (cm2)								
Demand/Shift (cm2)								
Working Hour/Shift								
Peak Load Hour								
Non-Peak Load Hour								
Number of project/Year	744	652	596	550	527	520	509	503
Growth of project (%)		-12,37	-8,59	-5,97	-4,14	-2,88	-2,00	-1,39
Decrease in Growth (%)		-30,54		-30,54	-30,54	-30,54	-30,54	-30,54

Note :
Average Minimum Order = 5%
1st shift = 08.00 - 16.00
2nd shift = 16.00 - 01.00
Peak Load Hour = 17.00-22.00
Machine speed = 45000 cm2/hour
Outsourced price/cm2 = Rp12/cm

Appendix B

Table B.2 Cost Analysis of Film Making - Year 1

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 464.246.290
Raw Material	cm2	37.671.652	Rp 7,500		Rp 282.537.391			
FIXED COST								
Direct Labor								
Machine Operator	person	4	Rp 1.750.000	Rp 7.000.000	Rp 84.000.000			
Indirect Material								
Developer Chemical	gallon	3	Rp 560.000	Rp 1.680.000	Rp 20.160.000			
Other Chemical	gallon	2	Rp 420.000	Rp 840.000	Rp 10.080.000			
Overhead								
Bonus								
Machine Operator	person	4	Rp 3.500.000		Rp 14.000.000			
Maintenance								
Daily Maintenance				Rp 250.000	Rp 3.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours/day	0,36	1.353	Rp 12.218	Rp 146.618			
Non-Peak Time	hours/day	2,36	677	Rp 39.934	Rp 479.209			
Communication	# of calls/year					560	Rp 1.000	Rp 560.444
TOTAL COST /YEAR					Rp 417.403.217			Rp 464.806.734

Demand	36,752,831
# of Project	560

Appendix B

Table B.3 Cost Analysis of Film Making - Year 2

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 566.733.689
Raw Material	cm2	45.988.077	Rp 7,500		Rp 344.910.581			
FIXED COST								
Direct Labor								
Machine Operator	person	4	Rp 1.925.000	Rp 7.700.000	Rp 92.400.000			
Indirect Material								
Developer Chemical	gallon	3	Rp 560.000	Rp 1.680.000	Rp 20.160.000			
Other Chemical	gallon	2	Rp 420.000	Rp 840.000	Rp 10.080.000			
Overhead								
Bonus								
Machine Operator	person	4	Rp 3.850.000		Rp 15.400.000			
Maintenance								
Daily Maintenance				Rp 250.000	Rp 3.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours	0,66	1.353	Rp 22.383	Rp 268.592			
Non-Peak Time	hours	2,66	677	Rp 45.016	Rp 540.196			
Communication	# of calls/year					537	Rp 1.000	Rp 537.221
TOTAL COST /YEAR					Rp 489.759.369			Rp 567.270.909

Demand 44.866.417
# of Project 537

Table B.4 Cost Analysis of Film Making - Year 3

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 670.399.069
Raw Material	cm2	54.400.091	Rp 7,500		Rp 408.000.683			
FIXED COST								
Direct Labor								
Machine Operator	person	4	Rp 2.117.500	Rp 8.470.000	Rp 101.640.000			
Indirect Material								
Developer Chemical	gallon	3	Rp 560.000	Rp 1.680.000	Rp 20.160.000			
Other Chemical	gallon	2	Rp 420.000	Rp 840.000	Rp 10.080.000			
Overhead								
Bonus								
Machine Operator	person	4	Rp 4.235.000		Rp 16.940.000			
Maintenance								
Daily Maintenance				Rp 250.000	Rp 3.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours	0,97	1.353	Rp 32.664	Rp 391.968			
Non-Peak Time	hours	2,97	677	Rp 50.157	Rp 601.884			
Communication	# of calls/year					522	Rp 1.000	Rp 521.759
TOTAL COST /YEAR					Rp 563.814.535			Rp 670.920.828

Demand	53.073.260
# of Project	522

Appendix B

Table B.5 Cost Analysis of Film Making - Year 4

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 769.205.460
Raw Material	cm2	62.417.818	Rp 7,500		Rp 468.133.636			
FIXED COST								
Direct Labor								
Machine Operator	person	4	Rp 2.329.250	Rp 9.317.000	Rp 111.804.000			
Indirect Material								
Developer Chemical	gallon	3	Rp 560.000	Rp 1.680.000	Rp 20.160.000			
Other Chemical	gallon	2	Rp 420.000	Rp 840.000	Rp 10.080.000			
Overhead								
Bonus								
Machine Operator	person	4	Rp 4.658.500		Rp 18.634.000			
Maintenance								
Daily Maintenance				Rp 250.000	Rp 3.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours	1,26	1.353	Rp 42.463	Rp 509.561			
Non-Peak Time	hours	3,26	677	Rp 55.057	Rp 660.681			
Communication	# of calls/year					511	Rp 1.000	Rp 511.328
TOTAL COST /YEAR					Rp 635.981.878			Rp 769.716.788

Demand	60.895.432
# of Project	511

Appendix B

Table B.6 Cost Analysis of Film Making - Year 5

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 860.569.306
Raw Material	cm2	69.831.613	Rp 7,500		Rp 523.737.101			
FIXED COST								
Direct Labor								
Machine Operator	person	4	Rp 2.562.175	Rp 10.248.700	Rp 122.984.400			
Indirect Material								
Developer Chemical	gallon	3	Rp 560.000	Rp 1.680.000	Rp 20.160.000			
Other Chemical	gallon	2	Rp 420.000	Rp 840.000	Rp 10.080.000			
Overhead								
Bonus								
Machine Operator	person	4	Rp 5.124.350		Rp 20.497.400			
Maintenance								
Daily Maintenance				Rp 250.000	Rp 3.000.000			
Technician	person	1	Rp 3,000,000		Rp 3.000.000			
Electricity								
Peak Time	hours	1,52	1.353	Rp 51.525	Rp 618.297			
Non-Peak Time	hours	3,52	677	Rp 59.587	Rp 715.048			
Communication	# of calls/year					504	Rp 1.000	Rp 504.228
TOTAL COST /YEAR					Rp 704.792.247			Rp 861.073.534

Demand	68.128.403
# of Project	504

Appendix C

Table C.4 Cost Analysis of Laminating - Year 3

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 599.749.317
Raw Material - Matt	cm2	2.079.930.630	Rp 0,180		Rp 374.387.513			
Raw Materinl - Gloss	cm2	1.223.488.606	Rp 0,080		Rp 97.879.088			
FIXED COST								
Direct Labor								
Machine Operator	person	1	Rp 1.452.000	Rp 1.452.000	Rp 17.424.000			
Assistant	person	1	Rp 1.210.000	Rp 1.210.000	Rp 14.520.000			
Indirect Labor/Overtime								
Machine Operator	hours/person	0,97	Rp 8.393	Rp 8.139	Rp 97.665			
Assistant	hours/person	0,97	Rp 6.994	Rp 6.782	Rp 81.388			
Indirect Material								
Cutter	contain	4	Rp 50.000	Rp 200.000	Rp 2.400.000			
Overhead								
Bonus								
Machine Operator	person	1	Rp 2.904.000		Rp 2.904.000			
Assistant	person	1	Rp 2.420.000		Rp 2.420.000			
Maintenance								
Daily Maintenance				Rp 500.000	Rp 6.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours/day	0,00	3.280	Rp -	Rp -			
Non-Peak Time	hours/day	7,97	1.640	Rp 326.758	Rp 3.921.094			
Communication	# of calls/year					515	Rp 1.000	Rp 515.045
TOTAL COST /YEAR					Rp $25.034.749.579			Rp 600.264.362

Demand of Matt Laminating	2,039.147.676
Demand of Gloss Laminating	1,199.498.633
Number of Project	515

Appendix C

Table C.5 Cost Analysis of Laminating - Year 4

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 735.760.542
Raw Material - Matt	cm2	2.551.617.559	Rp 0,180		Rp 459.291.161			
Raw Material - Gloss	cm2	1.500.951.505	Rp 0,080		Rp 120.076.120			
FIXED COST								
Direct Labor								
Machine Operator	person	1	Rp 1.597.200	Rp 1.597.200	Rp 19.166.400			
Assistant	person	1	Rp 1.331.000	Rp 1.331.000	Rp 15.972.000			
Indirect Labor/Overtime								
Machine Operator	hours/person	2,39	Rp 9.232	Rp 22.076	Rp 264.906			
Assistant	hours/person	2,39	Rp 7.694	Rp 18.396	Rp 220.755			
Indirect Material								
Cutter	contain	5	Rp 50.000	Rp 250.000	Rp 3.000.000			
Overhead								
Bonus								
Machine Operator	person	1	Rp 3.194.400		Rp 3.194.400			
Assistant	person	1	Rp 2.662.000		Rp 2.662.000			
Maintenance								
Daily Maintenance				Rp 500.000	Rp 6.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours/day	1,39	3.280	Rp 114.070	Rp 1.368.843			
Non-Peak Time	hours/day	8,00	1.640	Rp 328.000	Rp 3.936.000			
Communication	# of calls/year					569	Rp 1.000	Rp 568.992
TOTAL COST /YEAR					Rp 638.152.585.436			Rp 736.329.533

Demand of Matt Laminating	2.501.585.842
Demand of Gloss Laminating	1.471.521.083
Number of Project	569

Appendix C

Table C.6 Cost Analysis of Laminating - Year 5

	Quantity Measurements	Insource				Outsource		
		Quantity	Price/ Quantity	/Month	/Year	Quantity	Price/ Quantity	/Year
VARIABLE COST								
Direct Material								Rp 402.722.349
Raw Material - Matt	cm2	3.044.880.404	Rp 0,180		Rp 548.078.473			
Raw Material - Gloss	cm2	1.791.106.120	Rp 0,080		Rp 143.288.490			
FIXED COST								
Direct Labor								
Machine Operator	person	2	Rp 1.756.920	Rp 3.513.840	Rp 42.166.080			
Assistant	person	2	Rp 1.464.100	Rp 2.928.200	Rp 35.138.400			
Indirect Labor/Overtime								
Machine Operator	hours/person	0,00	Rp 10.156	Rp -	Rp -			
Assistant	hours/person	0,00	Rp 8.463	Rp -	Rp -			
Indirect Material								
Cutter	contain	6	Rp 50.000	Rp 300.000	Rp 3.600.000			
Overhead								
Bonus								
Machine Operator	person	2	Rp 3.513.840		Rp 7.027.680			
Assistant	person	2	Rp 2.928.200		Rp 5.856.400			
Maintenance								
Daily Maintenance				Rp 500.000	Rp 6.000.000			
Technician	person	1	Rp 3.000.000		Rp 3.000.000			
Electricity								
Peak Time	hours/day	3,07	3.280	Rp 251.412	Rp 3.016.947			
Non-Peak Time	hours/day	8,00	1.640	Rp 328.000	Rp 3.936.000			
Communication	# of calls/year					629	Rp 1.000	Rp 628.589
TOTAL COST /YEAR					Rp 801.108.469,260			Rp 980.997.984

Demand of Matt Laminating	2.985.176.867
Demand of Gloss Laminating	1.755.986.392
Number of Project	629

Appendix D

Table D.1 Wrapping Analysis

	2006	2007	2008	2009	2010	2011	2012	2013
Billing/Year				Rp 147.780.466	Rp 199.503.629	Rp 269.329.898	Rp 363.595.363	Rp 490.853.740
Demand (cm2)				16420052	22167070	29925544	40399485	54539304
Project/Year	5	6	9	12	16	22	30	40
Quantity/Project (exp)	3497	3880	3797	3725	3725	3725	3725	3725
Average quantity/Project (exp)	3725			3725	3725	3725	3725	3725
Total quantity/Year	17485	23280	34173	45255	61094	82477	111344	150314
Manual Machine								
Working Hour				3,02	4,07	5,50	7,42	10,02
Peak Load Hour				0,00	0,00	0,00	0,00	2,02
Non-Peak Load Hour				3,02	4,07	5,50	7,42	8,00
Automatic Machine								
Working Hour				0,60	0,81	1,10	1,48	2,00
Peak Load Hour				0,00	0,00	0,00	0,00	0,00
Non-Peak Load Hour				0,60	0,81	1,10	1,48	2,00

Note :
1st shift = 08.00 - 16.00
2nd shift = 16.00 - 01.00
Peak Load Hour = 17.00-22.00
Outsourced price/cm2 = Rp9/cm
Manual Machine speed = 50 books/hour
Automatic Machine speed = 250 books/hour
Exp = exemplar

Table D.2 Cost Analysis of Wrapping – Outsourcing Year 1

	Quantity Measurements	Outsource		
		Quantity	Price/ Quantity	/Year
VARIABLE COST				
Direct Material				Rp 147.780.466
Raw Material	cm2			
FIXED COST				
Direct Labor				
Sealing Machine	person			
Shrink Machine	person			
Indirect Material				
Wire	roll			
Indirect Labor/Overtime				
Sealing Machine	hours			
Shrink Machine	hours			
Overhead				
Bonus				
Sealing Machine	person			
Shrink Machine	person			
Maintenance				
Daily Maintenance				
Technician	person			
Electricity				
Peak Time	hours/day			
Non-Peak Time	hours/day			
Transportation cost	# of trip	24	Rp 15.000	Rp 364.500
TOTAL COST /YEAR				Rp 148.144.966
Demand	16.420.052			
# of Project	12			

Table D.3 Cost Analysis of Wrapping – Outsourcing Year 2

	Quantity Measurements	Outsource		
		Quantity	Price/ Quantity	/Year
VARIABLE COST				
Direct Material				Rp 199.503.629
Raw Material	cm2			
FIXED COST				
Direct Labor				
Sealing Machine	person			
Shrink Machine	person			
Indirect Material				
Wire	roll			
Indirect Labor/Overtime				
Sealing Machine	hours			
Shrink Machine	hours			
Overhead				
Bonus				
Sealing Machine	person			
Shrink Machine	person			
Maintenance				
Daily Maintenance				
Technician	person			
Electricity				
Peak Time	hours/day			
Non-Peak Time	hours/day			
Transportation cost	# of trip	33	Rp 15.000	Rp 492.075
TOTAL COST /YEAR				Rp 199.995.704
Demand	22.167.070			
# of Project	16			

Table D.4 Cost Analysis of Wrapping – Outsourcing Year 3

	Quantity Measurements	Outsource		
		Quantity	Price/ Quantity	/Year
VARIABLE COST				
Direct Material				Rp 269.329.898
Raw Material	cm2			
FIXED COST				
Direct Labor				
Sealing Machine	person			
Shrink Machine	person			
Indirect Material				
Wire	roll			
Indirect Labor/Overtime				
Sealing Machine	hours			
Shrink Machine	hours			
Overhead				
Bonus				
Sealing Machine	person			
Shrink Machine	person			
Maintenance				
Daily Maintenance				
Technician	person			
Electricity				
Peak Time	hours/day			
Non-Peak Time	hours/day			
Transportation cost	# of trip	44	Rp 15.000	Rp 664.301
TOTAL COST /YEAR				Rp 269.994.200
Demand	29.925.544			
# of Project	22			

Table D.5 Cost Analysis of Wrapping – Outsourcing Year 4

	Quantity Measurements	Outsource		
		Quantity	Price/ Quantity	/Year
VARIABLE COST				
Direct Material				Rp 363.595.363
Raw Material	cm2			
FIXED COST				
Direct Labor				
Sealing Machine	person			
Shrink Machine	person			
Indirect Material				
Wire	roll			
Indirect Labor/Overtime				
Sealing Machine	hours			
Shrink Machine	hours			
Overhead				
Bonus				
Sealing Machine	person			
Shrink Machine	person			
Maintenance				
Daily Maintenance				
Technician	person			
Electricity				
Peak Time	hours/day			
Non-Peak Time	hours/day			
Transportation cost	# of trip	60	Rp 15.000	Rp 896.807
TOTAL COST /YEAR				Rp 364.492.170
Demand	40.399.485			
# of Project	30			

Table D.6 Cost Analysis of Wrapping – Outsourcing Year 5

	Quantity Measurements	Outsource		
		Quantity	Price/ Quantity	/Year
VARIABLE COST				
Direct Material				Rp 490,853,740
Raw Material	cm2			
FIXED COST				
Direct Labor				
Sealing Machine	person			
Shrink Machine	person			
Indirect Material				
Wire	roll			
Indirect Labor/Overtime				
Sealing Machine	hours			
Shrink Machine	hours			
Overhead				
Bonus				
Sealing Machine	person			
Shrink Machine	person			
Maintenance				
Daily Maintenance				
Technician	person			
Electricity				
Peak Time	hours/day			
Non-Peak Time	hours/day			
Transportation cost	# of trip	81	Rp 15,000	Rp 1,210,689
TOTAL COST /YEAR				Rp 492,064,429
Demand	54,539,304			
# of Project	40			

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Table D.7 Cost Analysis of Wrapping -- Insourcing with Manual Machine Year 1

	Quantity Measurements	Insource in Manual Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	17.241.054	Rp 5,500		Rp 94.825.799
FIXED COST					
Direct Labor					
Sealing Machine	person	2	Rp 1.000.000	Rp 2.000.000	Rp 24.000.000
Shrink Machine	person	1	Rp 1.200.000	Rp 1.200.000	Rp 14.400.000
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours	0	Rp 11.561	Rp -	Rp -
Shrink Machine	hours	0	Rp 13.873	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	2	Rp 4.000.000		Rp 8.000.000
Shrink Machine	person	1	Rp 2.400.000		Rp 2,400.000
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.000.000		Rp 2.000.000
Electricity					
Peak Time	hours/day	0,00	3.034	Rp -	Rp -
Non-Peak Time	hours/day	3,02	1.517	Rp 114.419	Rp 1.373.028
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 151.198.826,331
Demand	16.420.052				
# of Project	12				

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Table D.8 Cost Analysis of Wrapping – Insourcing with Manual Machine Year 2

	Quantity Measurements	Insource in Manual Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	23,275,423	Rp 5,500		Rp 128,014,828
FIXED COST					
Direct Labor					
Sealing Machine	person	2	Rp 1,100,000	Rp 2,200,000	Rp 26,400,000
Shrink Machine	person	1	Rp 1,320,000	Rp 1,320,000	Rp 15,840,000
Indirect Material					
Wire	roll	2	Rp 50,000	Rp 100,000	Rp 1,200,000
Indirect Labor/Overtime					
Sealing Machine	hours	0,00	Rp 12,717	Rp -	Rp -
Shrink Machine	hours	0,00	Rp 15,260	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	2	Rp 4,400,000		Rp 8,800,000
Shrink Machine	person	1	Rp 2,640,000		Rp 2,640,000
Maintenance					
Daily Maintenance				Rp 250,000	Rp 3,000,000
Technician	person	1	Rp 2,000,000		Rp 2,000,000
Electricity					
Peak Time	hours/day	0,00	3,034	Rp -	Rp -
Non-Peak Time	hours/day	4,07	1,517	Rp 154,466	Rp 1,853,587
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 189,748,415,547
Demand	22,167,070				
# of Project	16				

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Table D.9 Cost Analysis of Wrapping – Insourcing with Manual Machine Year 3

	Quantity Measurements	Insource in Manual Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	31,421,821	Rp 5,500		Rp 172,820,018
FIXED COST					
Direct Labor					
Sealing Machine	person	2	Rp 1,210,000	Rp 2,420,000	Rp 29,040,000
Shrink Machine	person	1	Rp 1,452,000	Rp 1,452,000	Rp 17,424,000
Indirect Material					
Wire	roll	2	Rp 50,000	Rp 100,000	Rp 1,200,000
Indirect Labor/Overtime					
Sealing Machine	hours	0,00	Rp 13,988	Rp -	Rp -
Shrink Machine	hours	0,00	Rp 16,786	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	2	Rp 4,840,000		Rp 9,680,000
Shrink Machine	person	1	Rp 2,904,000		Rp 2,904,000
Maintenance					
Daily Maintenance				Rp 250,000	Rp 3,000,000
Technician	person	1	Rp 2,000,000		Rp 2,000,000
Electricity					
Peak Time	hours/day	0,00	3,034	Rp -	Rp -
Non-Peak Time	hours/day	5,50	1,517	Rp 208,529	Rp 2,502,343
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 240,570,360,989

Demand	29,925,544
# of Project	22

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Table D.10 Cost Analysis of Wrapping – Insourcing with Manual Machine Year 4

	Quantity Measurements	Insource in Manual Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	42.419.459	Rp 5,500		Rp 233.307.025
FIXED COST					
Direct Labor					
Sealing Machine	person	2	Rp 1.331.000	Rp 2.662.000	Rp 31.944.000
Shrink Machine	person	1	Rp 1.597.200	Rp 1.597.200	Rp 19.166.400
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours	0,42	Rp 15.387	Rp 6.463	Rp 77.552
Shrink Machine	hours	0,42	Rp 18.465	Rp 7.755	Rp 93.062
Overhead					
Bonus					
Sealing Machine	person	2	Rp 5.324.000		Rp 10.648.000
Shrink Machine	person	1	Rp 3.194.400		Rp 3.194.400
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.000.000		Rp 2.000.000
Electricity					
Peak Time	hours/day	0,00	3.034	Rp -	Rp -
Non-Peak Time	hours/day	7,42	1.517	Rp 281.514	Rp 3.378.163
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 308.008.601,532
Demand	40.399.485				
# of Project	30				

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Table D.11 Cost Analysis of Wrapping – Insourcing with Manual Machine Year 5

	Quantity Measurements	Insource in Manual Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	57.266.270	Rp 5,500		Rp 314.964.483
FIXED COST					
Direct Labor					
Sealing Machine	person	4	Rp 1.464.100	Rp 5.856.400	Rp 70.276.800
Shrink Machine	person	2	Rp 1.756.920	Rp 3.513.840	Rp 42.166.080
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours	0,00	Rp 16.926	Rp -	Rp -
Shrink Machine	hours	0,00	Rp 20.311	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	4	Rp 11.712.800		Rp 46.851.200
Shrink Machine	person	2	Rp 7.027.680		Rp 14.055.360
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.000.000		Rp 2.000.000
Electricity					
Peak Time	hours/day	2,02	3.034	Rp 153.287	Rp 1.839.439
Non-Peak Time	hours/day	8,00	1.517	Rp 303.400	Rp 3.640.800
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 499.994.162,651
Demand	54.539.304				
# of Project	40				

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Table D.12 Cost Analysis of Wrapping – Insourcing with Automatic Machine Year 1

	Quantity Measurements	Insource in Automatic Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	17.241.054	Rp 5,500		Rp 94.825.799
FIXED COST					
Direct Labor					
Operator	person	1	Rp 1.000.000	Rp 1.000.000	Rp 12.000.000
Assistant	person	1	Rp 1.200.000	Rp 1.200.000	Rp 14.400.000
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours				
Shrink Machine	hours	0	Rp 13.873	Rp -	Rp -
Overhead					
Bonus					
Operator	person	1	Rp 2.000.000		Rp 2.000.000
Assistant	person	1	Rp 2.400.000		Rp 2.400.000
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.500.000		Rp 2.500.000
Electricity					
Peak Time	hours/day	0,00	3.690	Rp -	Rp -
Non-Peak Time	hours/day	0,60	1.845	Rp 27.832	Rp 333.980
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 132.659.778,419
Demand	16.420.052				
# of Project	12				

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Table D.13 Cost Analysis of Wrapping – Insourcing with Automatic Machine Year 2

	Quantity Measurements	Insource in Automatic Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	23.275.423	Rp 5,500		Rp 128.014.828
FIXED COST					
Direct Labor					
Operator	person	1	Rp 1.100.000		
Assistant	person	1	Rp 1.320.000	Rp 1.320.000	Rp 15.840.000
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours				
Shrink Machine	hours	0,00	Rp 15.260	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	1	Rp 2.200.000		Rp 2.200.000
Shrink Machine	person	1	Rp 2.640.000		Rp 2.640.000
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.500.000		Rp 2.500.000
Electricity					
Peak Time	hours/day	0,00	3.690	Rp -	Rp -
Non-Peak Time	hours/day	0,81	1.845	Rp 37.573	Rp 450.873
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 155.845.700,866
Demand	22.167.070				
# of Project	16				

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Table D.14 Cost Analysis of Wrapping – Insourcing with Automatic Machine Year 3

	Quantity Measurements	Insource in Automatic Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	31.421.821	Rp 5,500		Rp 172.820.018
FIXED COST					
Direct Labor					
Operator	person	1	Rp 1.210.000	Rp 1.210.000	Rp 14.520.000
Assistant	person	1	Rp 1.452.000	Rp 1.452.000	Rp 17.424.000
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours				
Shrink Machine	hours	0	Rp 16.786	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	1	Rp 2.420.000		Rp 2.420.000
Shrink Machine	person	1	Rp 2.904.000		Rp 2.904.000
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.500.000		Rp 2.500.000
Electricity					
Peak Time	hours/day	0,00	3.690	Rp -	Rp -
Non-Peak Time	hours/day	1,10	1.845	Rp 50.723	Rp 608.678
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 217.396.696,169
Demand	29.925.544				
# of Project	22				

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Table D.15 Cost Analysis of Wrapping – Insourcing with Automatic Machine Year 4

	Quantity Measurements	Insource in Automatic Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	42.419.459	Rp 5,500		Rp 233.307.025
FIXED COST					
Direct Labor					
Operator	person	1	Rp 1.331.000	Rp 1.331.000	Rp 15.972.000
Assistant	person	1	Rp 1.597.200	Rp 1.597.200	Rp 19.166.400
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours				
Shrink Machine	hours	0	Rp 18.465	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	1	Rp 2.662.000		Rp 2.662.000
Shrink Machine	person	1	Rp 3.194.400		Rp 3.194.400
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.500.000		Rp 2.500.000
Electricity					
Peak Time	hours/day	0,00	3.690	Rp -	Rp -
Non-Peak Time	hours/day	1,48	1.845	Rp 68.476	Rp 821.715
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 281.823.539.829
Demand	40.399.485				
# of Project	30				

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Table D.16 Cost Analysis of Wrapping – Insourcing with Automatic Machine Year 5

	Quantity Measurements	Insource in Automatic Machine			
		Quantity	Price/ Quantity	/Month	/Year
VARIABLE COST					
Direct Material					
Raw Material	cm2	57.266.270	Rp 5,500		Rp 314.964.483
FIXED COST					
Direct Labor					
Operator	person	1	Rp 1.464.100		
Assistant	person	1	Rp 1.756.920	Rp 1.756.920	Rp 21.083.040
Indirect Material					
Wire	roll	2	Rp 50.000	Rp 100.000	Rp 1.200.000
Indirect Labor/Overtime					
Sealing Machine	hours				
Shrink Machine	hours	0	Rp 20.311	Rp -	Rp -
Overhead					
Bonus					
Sealing Machine	person	1	Rp 2.928.200		Rp 2.928.200
Shrink Machine	person	1	Rp 3.513.840		Rp 3.513.840
Maintenance					
Daily Maintenance				Rp 250.000	Rp 3.000.000
Technician	person	1	Rp 2.500.000		Rp 2.500.000
Electricity					
Peak Time	hours/day	0,00	3.690	Rp -	Rp -
Non-Peak Time	hours/day	2,00	1.845	Rp 92.443	Rp 1.109.316
Transportation cost	# of trip				
TOTAL COST /YEAR					Rp 350.298.878,769
Demand	54.539.304				
# of Project	40				