# Supporting Small Medium Enterprises planning through the use of a step-by-step System Dynamics model building process
# A Case Study from Leather Handicraft at Tanggulangin, Sidoharjo, East Java, Indonesia[1]

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**Abstract**
*This paper aims to support small medium enterprises (SMEs) in business planning through the use of system dynamics models. In particular, it has been hypothesized that through the use of a step-by-step system dynamics model building process SMEs' entrepreneurs can better understand the net of cause-and-effect relationships underlying company financial and non-financial results. Such an approach also enables decision makers to improve their understanding about the figures portrayed in a balance sheet. In order to reach such a goal, this study has been carried out through the use of a case-study. The small company investigated is a leather handcraft operating in Indonesia. The paper makes explicit main feedback mechanisms underlying company customer base dynamics adoption process, production and inventory management policies, human resource management practice and machineries production capacity acquisition policy.*

***Key words: System dynamics, Small medium enterprises, Accounting, Financial Report***

[1] This case study based on cases available in the Central Bank of Indonesia (BI)'s website: www.bi.go.id with some necessary adjustments needed.

## Introduction

As far, Small and Medium Enterprises (SMEs) in a region associated with the very important economic development in the area. According to the data (SME Statistics, 2008) said that the Gross Domestic Product (GDP) Indonesia in 2007 grew 6.3 percent against the year 2006. When each scale, GDP growth reached 6.4 percent of SMEs and Large Business (UB) grew 6.2 percent. Compared to year 2006 GDP growth of only 5.7 percent of SMEs, and the GDP is only 5.2 percent of UB. In 2007 total value of Indonesian GDP reached Rp 3,957.4 trillion, in which SMEs contribute to Rp 2,121.3 trillion, or 53.6 percent of the total GDP of Indonesia. GDP growth of SMEs in 2007 occurred in all sectors of the economy. The highest growth occurred in the building sector was 9.3 percent, followed by the trade sector, hotels and restaurants, 8.5 percent, and mining and excavation of 7.8 percent. SME population in 2007 reached 49.8 million units or 99.99 percent of the business to the total business units in Indonesia, while the number of staff working to reach 91.8 million people or 97.3 percent of the entire labor force of Indonesia. SME export production during 2007 reached Rp 142.8 trillion, or 20 percent of the total national export nonmigas of Rp 713.4 trillion. Physical investment of SMEs stated that the numbers Gross Fixed Capital Formation (PMTB) equivalent in 2007 to Rp 462.01 billion or 46.96 percent of the total PMTB Indonesia.

In general, all data above reflects the importance of SMEs' role in economic growth. But factually, as Brusa (Brusa, 1986) pointed out that business planning and control systems currently used in small firms are mainly based on accounting models and may not allow entrepreneurs to properly capture the dynamics relationships between day-to-day policies and consequent future outcomes. Meanwhile, Bianchi and Bivona (2000) emphasized that matching SD methodology with the accounting approach may allow entrepreneurs to better understand the strategic relevance of their current decisions and in fact, SD allows policy makers to understand managerial processes underlying accounting information.

Based on mentioned arguments, this case study of SMEs is made to develop a business plan simulation through the System Dynamics approach. With the approach we can see what was happening behind the staticness of financial reports, such as balance sheets, income reports, and cashflow reports.

The same approach has been used several times by previous researchers to explain the financial reports using the system dynamic approach. In this case in Yamaguchi has extensively explained from the corporation point of view (Yamaguchi, 2003). Likewise with Melse (Melse, 2006) ensure that the dynamic model of accounting can be associated with strategic planning and control that is integrated with the system dynamics model. Related to the application in SMEs, Bianchi (2002) reveals the importance of learning-oriented perspective to plan and manage the growth of SMEs. On this concern, researches conducted by Bianchi and Bivona (2002) demonstrated the effectiveness of the System Dynamics approach to support entrepreneurs to understand and manage the process of accumulation and depletion on strategic assets underlying e-commerce strategy.

This paper aims to make financial reports like Balance Sheet, Income reports, and Cashflow reports for Leather Handicraft SMEs. From these financial reports, we can see the impact of policy lever[2] that the SMEs take during the period of the simulation, so that the development of SMEs from time to time can be observed.

This paper prepared with the following order; after the goal and the contribution this research's aim to achieve is disclosed, in the first section will be discussed the profile of

[2] In this paper policy lever assumed at a certain level, number, or percentage but it may change depend on the situation simulator might be faced.

SMEs in the leather industry from the case study briefly[3]. In the next section discussed the business operations of SMEs as the underlying dynamic activities and assumptions related to the special section is illustrated through the Stock Flow Diagram (SFD). Those, among other activities such as production, inventory planning, sales, human resources planning, and machines capacity planning.
Then, the discussion will be related to the financial reports generated from this simulation, such as Balance Sheet, Income statement, and Cashflow statement. Will then be displayed and described the performance indicators of financial reports that have been generated as the financial-ratio. In this section are also described on investment criterion such as Payback period, NPV, and IRR. At the conclusion will be disclosed the weaknesses, limitations from this paper, and the suggestion of the next studies.

## Paper Purposes

This paper aims to:

1. *support small medium enterprises (SMEs) in business planning through the use of system dynamics models*;
2. *support SMEs' entrepreneurs to better understand the net of cause-and-effect relationships underlying company financial and non-financial results*
3. develop a step-by-step system dynamics model building process;
4. integrate system dynamics models with financial report, such as Balance sheet, Income statement, and Cashflow statement

## Paper Contribution

With the goals above achieved then this paper is expected to provide a detailed description to young entrepreneurs on how to build a step-by-step system dynamics building process to better understand company performance.
In the long term, a better understanding of the net of cause-and-effect relationships underlying company financial and non-financial results is also likely to foster SMEs sustainable growth and then to create more employment.

## Brief Leather Industry Profile at Tanggulangin[4]

In Tanggulangin district which is located about 20 km to the south of Surabaya, the capital city of East Java province, there are 340 outlets large and small. Five of them are categorized as big; each has revenue worth of Rp 1 billion per month. In addition, there are 20 outlets with middle turnover Rp 300 million per month. However, in general, such as leather bags business in this area is a business in small and very small or micro scale industries, the monthly turnover of Rp 20 million to Rp 100 million. Where each SMEs, generally has employees as many as 10 to 40 craftsmen who are experts in making various kinds of products made from leather.
The Tanggulangin craftsmen are specialized in various leather products not only on the leather bag. Almost all of the leather products can be made in this leather industry centers,

[3] For further detail, readers can see in the attachment of this paper or directly open the link: http://www.bi.go.id/sipuk/en/index.asp?id=4&no=51101&idrb=45301
[4] Cited from the case and Magazine 'GATRA' ed. 33/2007

ranging from leather bags, luggage, shoes, wallets, belts, jackets, and even some others little accessories which is made from the leather remnants/scraps.
In this district also established a cooperative called the **In**dustry **Ta**s and **Ko**per (INTAKO). One the purposes of INTAKO are to make better cooperation and communication between the craftsmen. In addition to the existence of this cooperative also support to make marketing efforts better.

## Company Customers

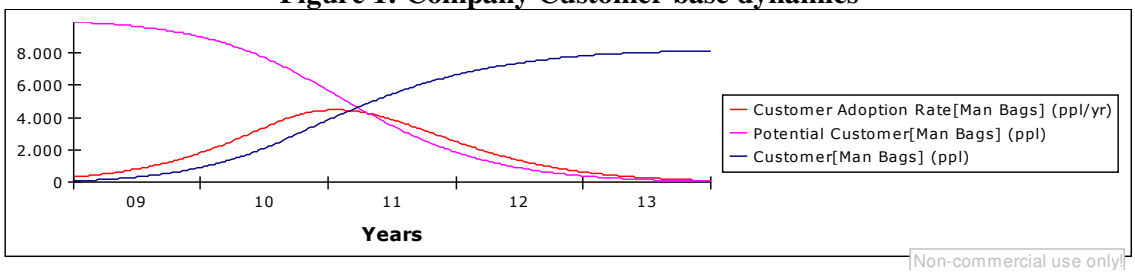
During the simulation it is assumed that this particular SME has an initial customer base of 360 people who want to buy a leather product. A detailed analysis of company customer can be seen in **Table 1**.

**Table 1:**
**Customer**

| Product (unit) | People likely to buy (ppl) | Initial Customer (ppl) |
|---|---|---|
| Man Bag | 10.000 | 100 |
| Woman Bag | 15.000 | 100 |
| Suitcase | 5.000 | 10 |
| Accessories | 20.000 | 150 |

People who are likely to buy a leather product constitute leather SMEs potential market. It has been assumed that the company to gain customers it has to compete with other SMEs operating in the same area. As soon as a potential customer buys a leather product he/she becomes a customer. However people who decide to purchase a leather product not always they become customers, as the purchase occurs when the desired good is available. Here customers are those people who bought a leather product, and it does not imply that customers can be considered as *repeated buyers*. **Figure 1** portrays the expected customer base behavior (for man bags) over a period of 5 years, from 2009 to 2013.

**Figure 1: Company Customer base dynamics**




It has been assumed that the customer adoption process is influenced by several factors. Among them, two are very important: the worth of mouth effect (Gilmore et al., 2001; Sterman, 2000; Morecroft, 2007), e.g. the interaction between customers and potential customers or the impact of promotion activities such as exhibitions.
In general, SMEs operating in the analyzed industry do not advertise their products; they periodically take place in some exhibitions and fairs organized by local government in their respective regions **(GATRA, 2007)**.

**Figure 2: Positive and negative feedbacks underlying customer base behavior**

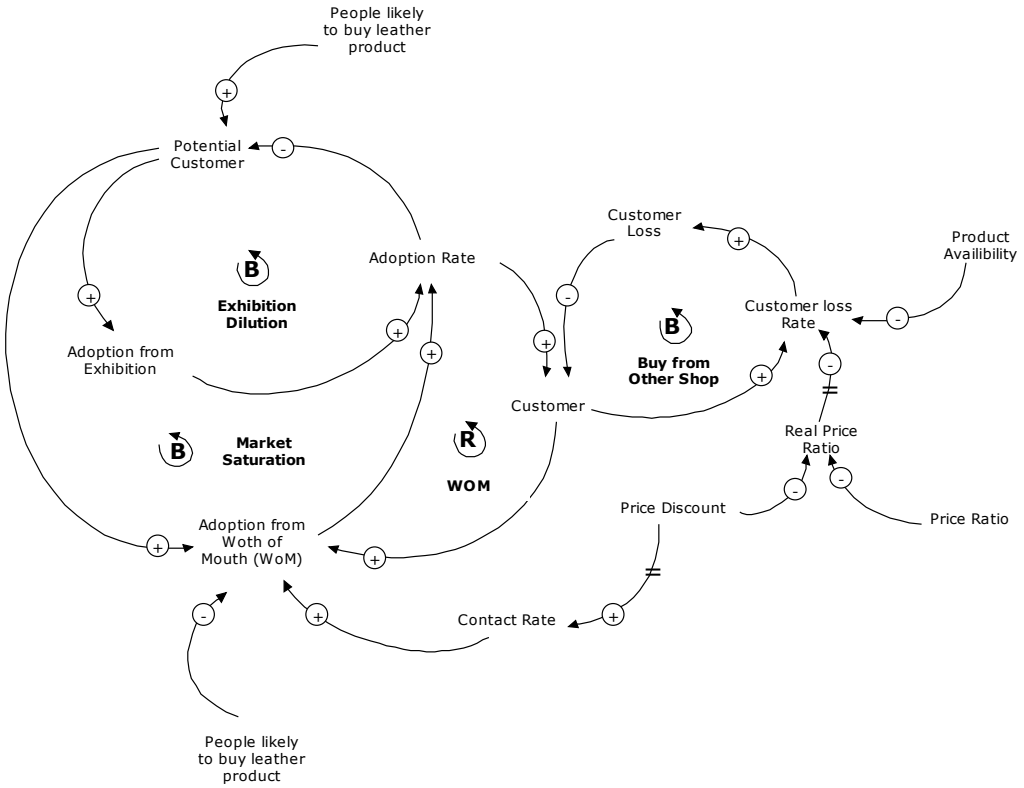
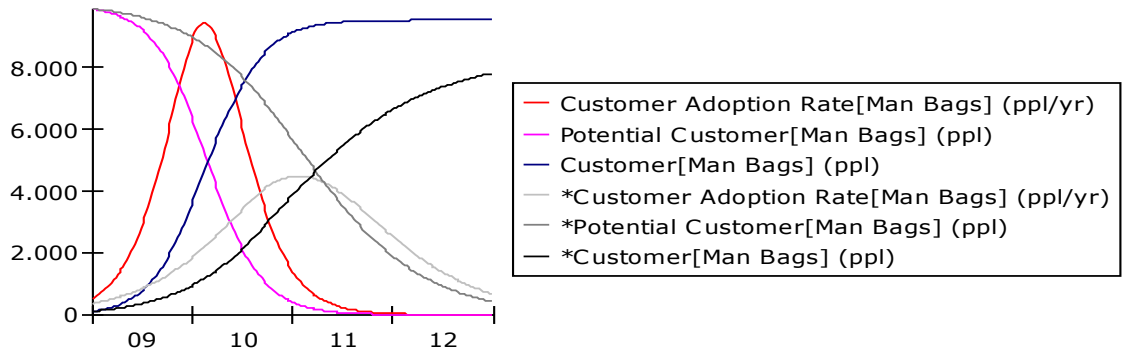



**Figure 3: Company Customer base dynamics as consequence of a 30% product price discount**




*reference: normal condition without price discount (30%)

A part the participation to fairs and exhibitions, the investigated company can increase customers by adopting aggressive commercial policies, such as strong reduction in product price (see figure 3). These results may occur, in particular, if competitors do not take immediate response to company policy. Before buying a leather product it has been assumed that a potential customer conducts a "survey" of the current product price policies adopted by such SMEs. One of the main drivers which allow the company to translate the potential buyer in a customer is the availability of the product in the store. Furthermore, the product

price/quality ratio has affect company sales. In fact, if the company product price/quality ratio is more than 1, it means that the product price/quality offered by this particular SME is more expensive than others SMEs stores operating in the same area.

**Price**

Product unit price is determined by increasing the product unit costs by a given percentage. Company product price is reported in **Table 2** here below:

**Table 2:**
**Product Price**

| Product (unit) | Price (Rp) |
|---|---|
| Man Bag | 350.000,- |
| Woman Bag | 250.000,- |
| Suitcase | 800.000,- |
| Accessories | 70.000,- |

The impact of fixed and overhead costs on product cost vary from a product to another according to the percentage reported in **Table 3**:

**Table 3:**
**Fixed and Overhead Costs Impact on product cost**

| Product (unit) | (%) |
|---|---|
| Man Bag | 20 |
| Woman Bag | 33 |
| Suitcase | 37 |
| Accessories | 10 |

**Production**

In order to produce the four products, (i.e., bag for man and woman, suitcase, and accessories such as wallet, belt, and gloves) different quantities of raw materials are needed.

**Table 4:**
**Expected raw material usage per unit product**

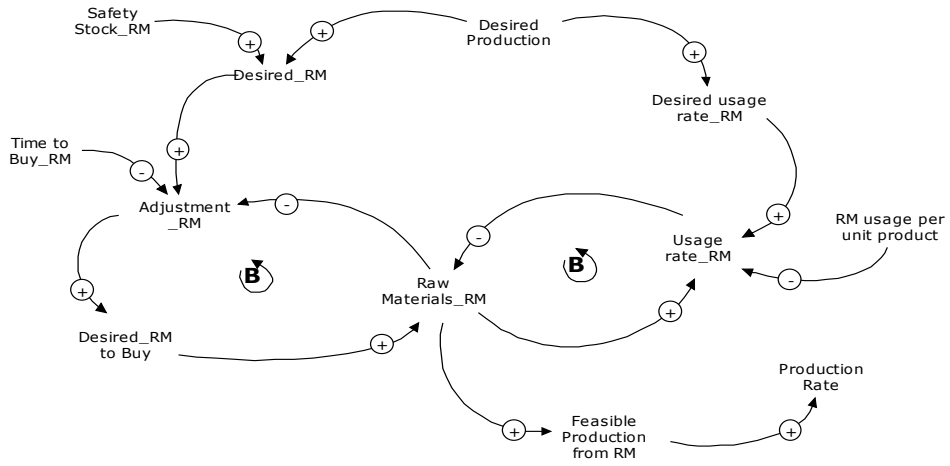
| Raw material Product (unit) | Leather (ms) | Imitation Leather (ms) | Accessories (unit) | Supporting Material (unit) |
|---|---|---|---|---|
| Man Bag | 3 | 0,15 | 2 | 0,2 |
| Woman Bag | 2 | 0,15 | 3 | 0,3 |
| Suitcase | 4 | 0,01 | 4 | 0,5 |
| Accessories | 0,3 | 0,1 | 1 | 0,1 |

Remarks:
1. **ms** means *square meter*, 1 feet=0.3048 m
2. Supporting material measure by **unit**,

Production uses some machine tools such as *Seset machines, Postbed sewing machine, Flatbed sewing machine, and Stamping machines*. Equipment is also used in the production

process such as scissors, hammer, knife, etc. Raw materials used are genuine leather, imitation leather, accessories such as buttons, zipper, etc., and other supporting materials such as cardboard, glue, etc. (see table 4).
Production planning **(see Figure 4)** is based on an expected demand mechanism, which in turn affects raw materials inventory policy.

**Figure 4: Production Planning**




Initial company products demand is reported in **Table 5**.

**Table 5: Initial Demand**

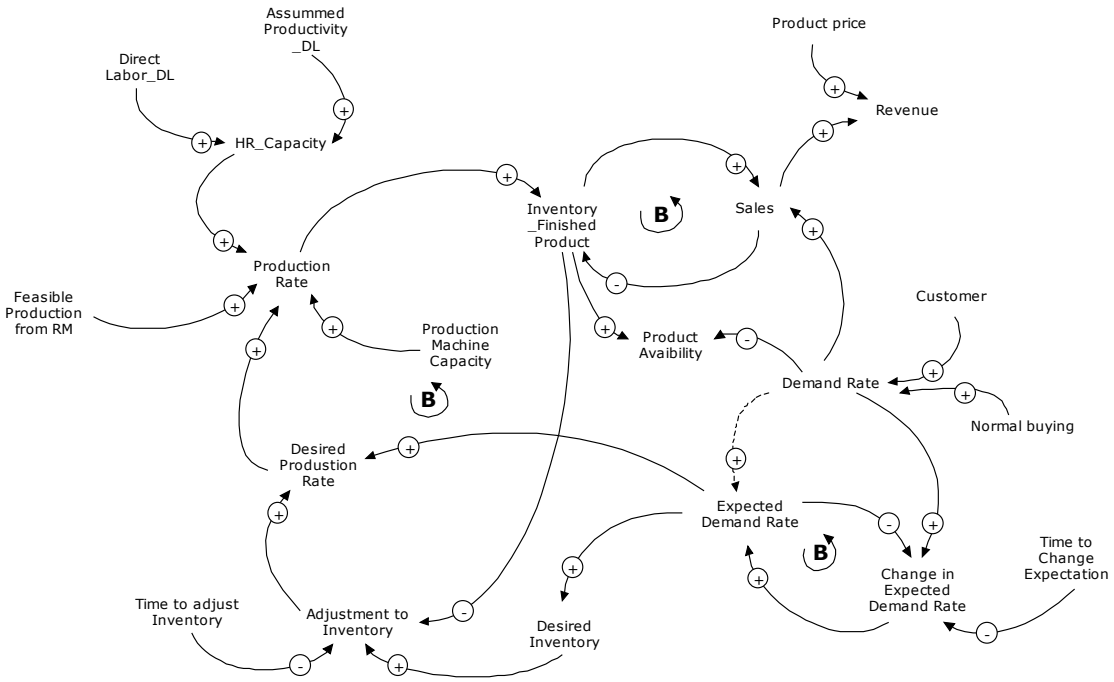
| Product (unit) | Initial demand (unit/month) |
|---|---|
| Man Bag | 50 |
| Woman Bag | 50 |
| Suitcase | 5 |
| Accessories | 75 |

Demand expectations change over time and it is also influenced by past data **(Sterman, 2000; Morecroft, 2007).** Demand expectations also become the basis for determining the desired production which is adjusted also on the basis of the gap between desired and existing finished products inventory.
The desired production then determines the purchase of raw materials, on the basis of the company raw materials inventory policy.
In general, inventory coverage at least equals to the average time to obtain the raw material

**Planning the number of production**

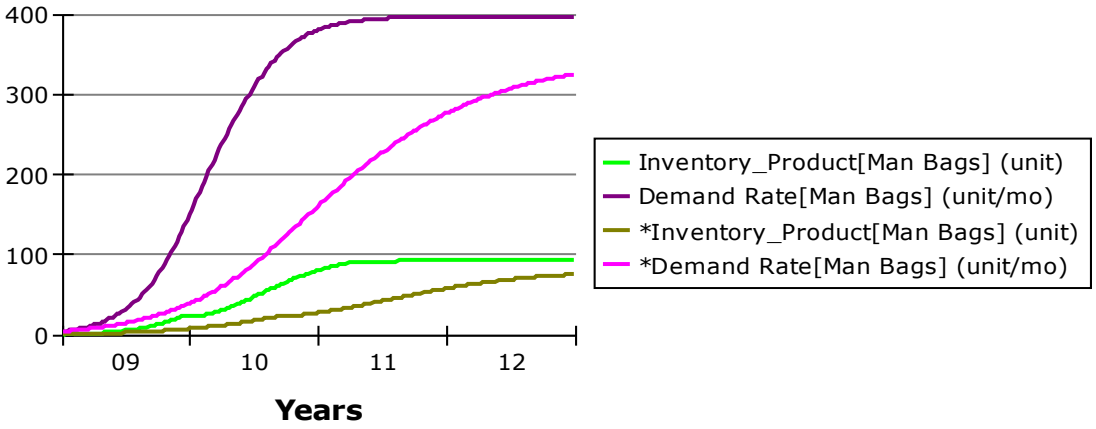
The desired production **(refer to Figure 5)** is highly influenced by entrepreneur's sales expectations and inventory coverage is generally longer than the time needed to correct product inventory level.

**Figure 5: Production planning policy**




The product production is limited by the level of production capacity available. Company production capacity is determined on the basis of three main elements: raw materials inventory, human resources capacity and machinery capacity. **Figure 6** shows the dynamics of finished products inventory, which is influenced by product demand.

**Figure 6: The dynamics of finished products inventory**




*reference: normal condition without price discount (30%)

## Machinery Production Capacity policy

The production process is carried out by SMEs with some machines such as flatbed sewing machine, postbed sewing machine, seset machine, and stamping machine. Each machine has a capacity, as reported in Table 6 below:

**Table 6:**
**Machinery Capacity**

| Machine (unit) | Capacity (unit/hr) |
|---|---|
| Sewing Flatbed | 0,27 m |
| Sewing Postbed | 0,27 m |
| Seset | 0,39 ms |
| Stamping | 6 times |

Legend:

1. **m** means meter
2. **ms** means square meter

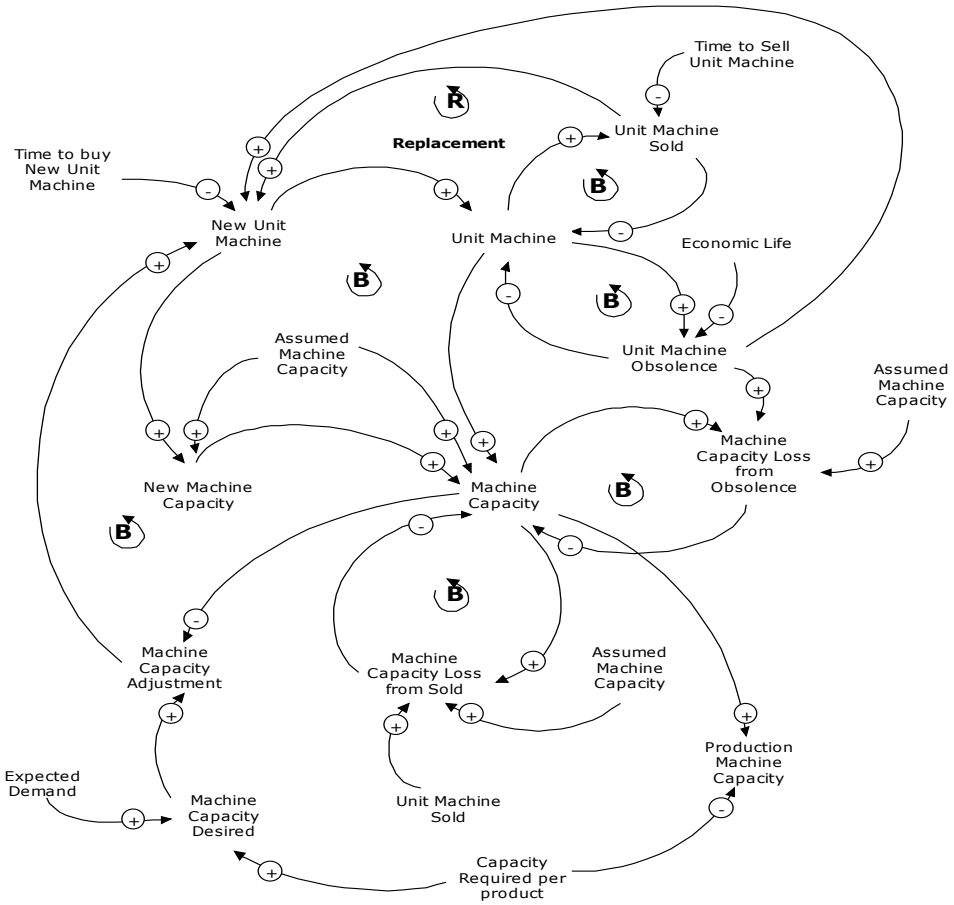
While every product requires some of the capacity of each machine, in this case each product is estimated to require a number of machine capacities, as appears in **Table 7 here** below:

**Table 7:**
**Machine capacity requirement per product**

| Machine<br>Product (unit) | Sewing Flatbed (m) | Sewing Postbed (m) | Seset (ms) | Stamping (kali) |
|---|---|---|---|---|
| Man Bag | 10 | 10 | 2 | 1 |
| Woman Bag | 20 | 20 | 3 | 1 |
| Suitcase | 50 | 50 | 5 | 2 |
| Accessories | 2 | 2 | 0,3 | 1 |

The desired machinery production capacity **(refer to figure 7)** is based on sales expectations. It follows that the entrepreneur may purchase a number of machines to meet the desired production capacity. The machine production capacity is reduced over time on the basis of the average life length of the machine.

**Figure 7: Production capacity policy**

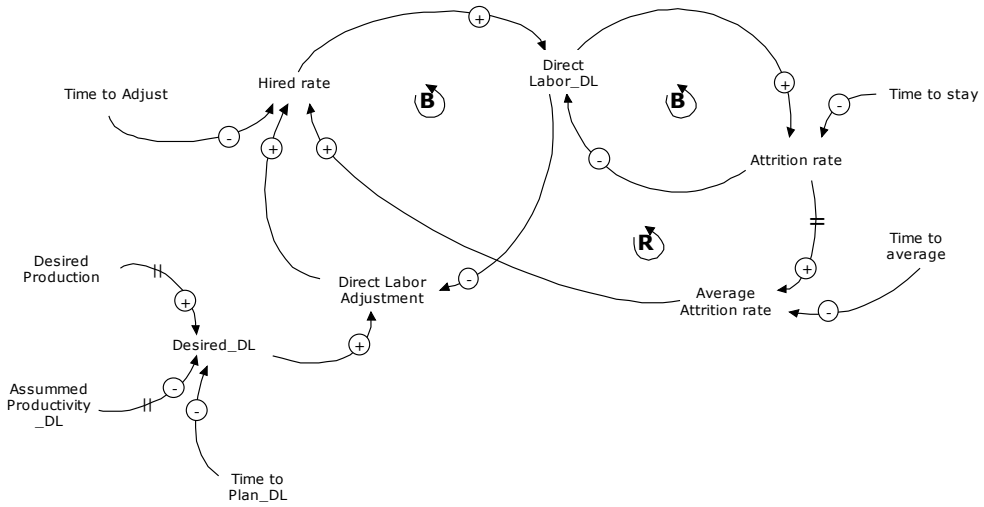



Machines production capacity adjustment is made by the difference between the desired and the installed capacity. The machinery obsolescence is also replaced annually. Because each product requires some percentage capacity from the four machines, it is assumed that the production of products system is parallel. In the system dynamics model it has been assumed that the maximum production capacity is depended on the capacity of the smallest production capacity machine and, consequently, it creates a bottleneck.

## Human resource planning

Before production process begins, the SMEs must have initial labor. This amount is continuously corrected by the human resources planning policy, which is defined on the basis of the desired production level (**see Figure 8**). Planning will determine the recruitment policy adjustments. The time needed in this adjustment is the minimum for the contract work, in this paper for three months. During that will be determined how many people must be hired. Entrepreneur takes policy not to fired employees until they decide to resign.

**Figure 8: Human resource planning policy**




Planning is done after getting information about the amount of production desired and the estimated productivity of each employee, such as appear in **Table 8.** The average employee who resigned, of course this information is not immediately available, so that there is a delay of information.

**Table 8:**
**Estimated employee productivity**

| Product (unit) | Productivity (unit/people/month) |
|---|---|
| Man Bag | 6,7 |
| Woman Bag | 13,3 |
| Suitcase | 1,7 |
| Accessories | 6,7 |

**Financial Reports**

On the basis the relationships between company strategic assets accumulation and depletion processes mainly related to customers and production capacity policies (finished products and raw materials inventories, machinery, human resources) a Balance Sheet, an Income Statement, and a Cashflow statement have been built with seven (7) days of time step.

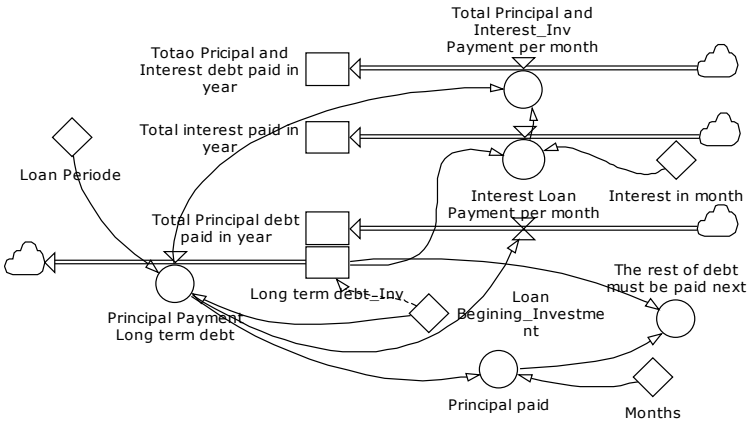
**Balance Sheet**

In the early stage, entrepreneurs have to make an early-purchase, to buy machineries, raw materials and to hire employees. Such investments can be done through the use of entrepreneurs' own assets (i.e., equity) or through bank loans.

In the case analyzed in this paper the company finances the initial investment by using only the 27.26% or Rp. 122,556,000,- of equity, and a bank's loan of 72.74% or Rp. 327,044,000,- As a consequence, the total funds invested are equal to Rp. 449,600,000, -. We assumed that

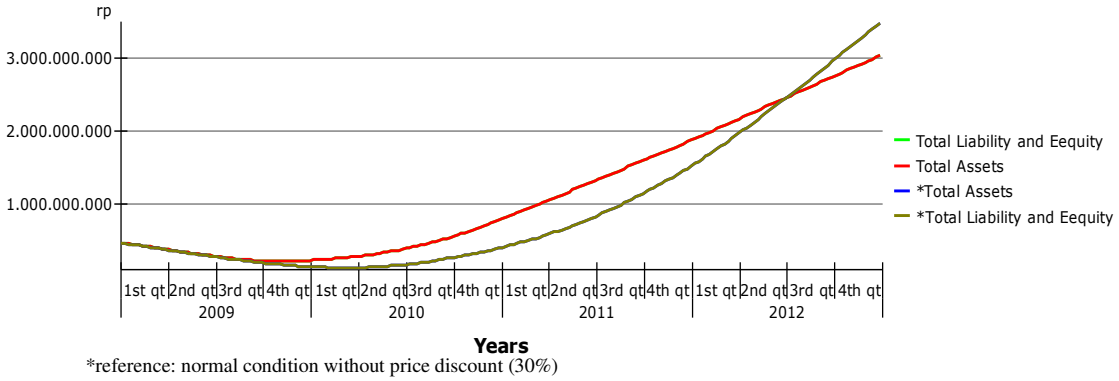
all of that fund was not all invested, a total value worth of Rp. 267,522,400,- hold in cash, so we can calculate the initial outlay (IO) is Rp 182,077,600,-.

**Figure 9: Decreasing payment method**




Debt from the bank has interest rate of 22%. Method used in this long-term debt payment is *decreasing* **(refer to Figure 9)**, where the total interest payable is determined from the beginning and will continue to decrease during the period of the debt agreement (3 years) with a fixed monthly basic pay. Of this debt must pay a monthly rate of interest added.
After that initial balance sheet at the end of the year to 0 (zero), at the beginning of the year one (1) SME already has some resources needed to run business activities. Balance at the end of the year will be the same as the balance early next year. Balance sheet end of year 0 (zero) or beginning of year 1 (one) in this simulation appear in **Appendix 1: Balance Sheet**. But we can see the movement of the total assets and total liability-equity time by time during the simulation as appears in **figure 10** below.

**Figure 10: Balance sheet**




*reference: normal condition without price discount (30%)

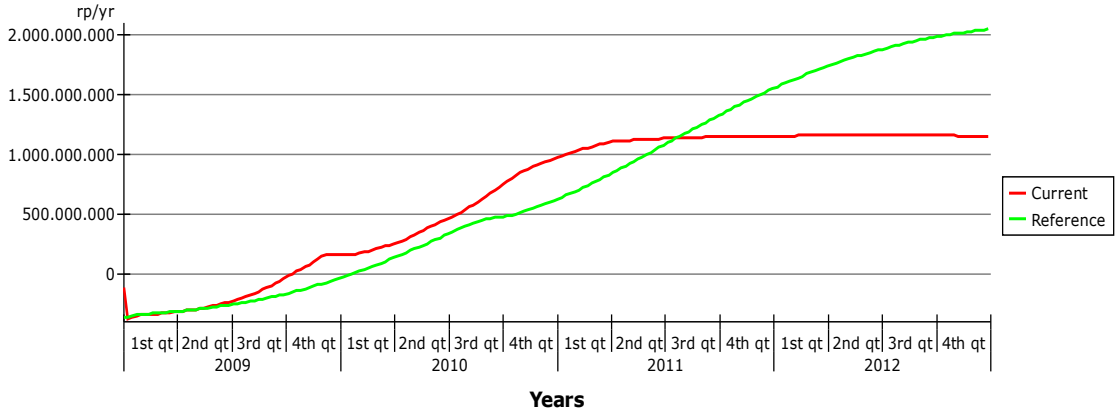
As **figure 10 shows**, the initial operation has increased the amount of the total assets and total liability-equity but then decreased until mid-year and then gradually increases in the last quarter. Price discount policy looks give an impact to fasten the growth of total assets.

In this simulation seems that the dynamics change of underlies activities on the strategic assets of the SMEs, such as customers, sales, inventory, human resources, and machines capacity can be captured in the balance sheet during the year.
In the simulation of this case study, SMEs have assumed policies that always pay the bill in full and on the due time e.g. account payable, wage liability, investment debt, and interest liability will be paid on monthly basis. For tax liability, we assumed, will be paid on yearly basis as well as dividend but during the simulation there is no dividend paid. Meanwhile, on the assets side, during the simulation, cash generates mainly from cash sales (20%) and collection of account receivables with collection time is four (4) months.
Policies associated with the production capacity, companies are always adjusting the machines capacity loss because of time usage in the production process. The impact of this policy is the production capacity will remain stable from the starting point. Replacement engine is financed by debt investments that are considered not generate interest liability (only for simplification). Payment investment debt made in full within a period provided.

## Income statement

Dynamic changes that occur in strategic assets are also reflected in the company income statement from time to time, as appears in the **figure 11: Income statement** below. Appear on the SME's income statement graphics are still deficit at the beginning of the early-run operating business, and then start moving up and down on a range of net profit Rp. 150,000,000, - in each quarter. In this case, it is assumed all the profits, not to be distributed in any form of a dividend. We can see the effect of price discount from the beginning of operation will make SMEs' net income higher than the reference simulation, but reach stable condition sooner.

**Figure 11: Income statement**



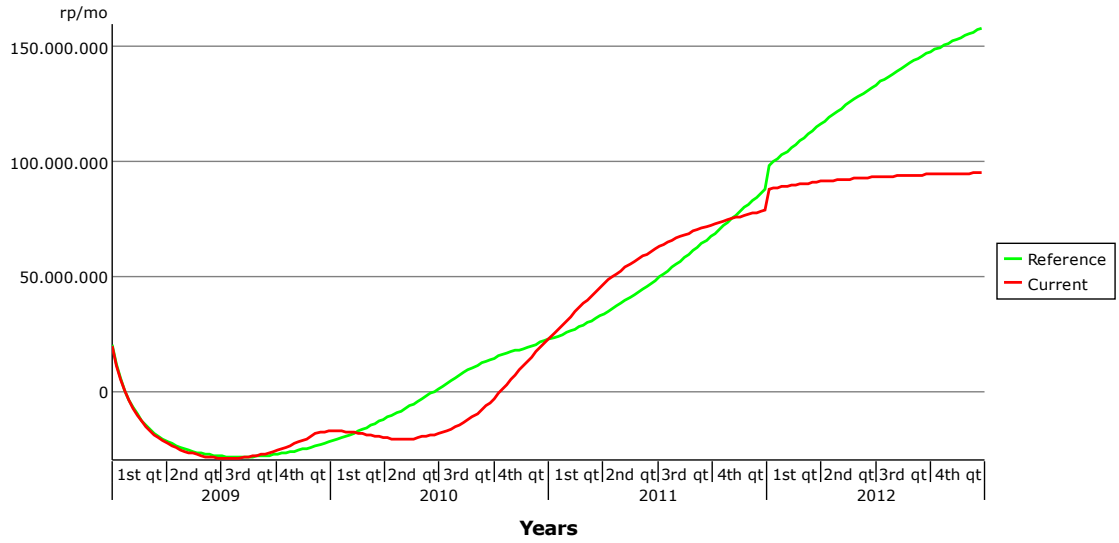

reference: normal condition without price discount (30%)

## Cash flow statement

Dynamics changes of in balance sheet and income statement in one year still appear to be followed by cash flow statement.. However, we can see the dynamics change up and down from the cash flow statement from the year to year during the simulation period, as displayed

on the **figure 12: Cash Flow Statement** and in detail refer to **Appendix 3a and 3b: Cash Flow Statement**.

**Figure 12: Cash flow statement**




reference: normal condition without price discount (30%)

**Figure 12: Cash Flow Statement** shows the dynamics on the changes up and down the incoming cash flow, which is can be positive or negative. Cash position at the end of a period plus the current year cash flow, it can be inflows (positive cash flow) or outflows (negative cash flows) equal the beginning cash position of the SMEs the following year. We can see the effect of the policy which is price discount 30% in the cash flow statement. In the first three quarter it looks similar then afterwards fluctuates more intense before reaches steady state in the last year.

### Investment Criterion and Financial Ratio

After we successfully create a weekly financial report, then we can easily create a variety of investment criterion such as NPV, IRR, and Payback Period. In calculating these criterions we used 30 days time step. Investment criteria from year to year in the simulation of this case study can be seen in Table 9 below:

**Table 9:**
**Investment Criterion**

| Time | 01 Jan 2009 | 01 Jan 2010 | 01 Jan 2011 | 01 Jan 2012 | 01 Jan 2013 | 01 Jan 2014 | 01 Jan 2015 |
|---|---|---|---|---|---|---|---|
| Payback Period (yr) | ? | -0,61 | -0,63 | -1,01 | 61,46 | 1,19 | 0,77 |
| Net Present Value (rp) | -182.077.600,00 | -446.354.272,78 | -655.153.144,57 | -635.882.141,66 | -380.428.895,06 | -99.821.638,40 | 98.667.965,86 |

It appears in the **Table 9**, payback period of one year period until the end of the simulation. Payback period is a matter of the feasibility of an investment regardless of the time value of money. Calculated with the formula:

Payback period = (TIME-STARTTIME)*IO/'Cashflow Total'

Similarly with another investment criterion, the NPV, it appears in **Table 9**, the value of NPV of the project investment is still negative, so that the various assumptions and policy lever taken in this case study, and it appears that investment is still losers. Then from the other criterion; IRR, this investment criterion is obtained from the interest rate at the time when the investment produces NPV equal to 0 (zero). In this simulation assumed that the credit interest rate is 22%, so that the NPV is negative, of course, according to the IRR criteria, this investment will be rejected, because the interest rate on the NPV equal to 0 (zero) is smaller than the existing interest rate which is equal to 17,03%.

However, if we simulate more than five years, e.g.; 7 years, that investment will be profitable. Approximately this is one of the weak points of the criteria which the investment is highly dependent on the time horizon. When running this business for 7 years will result 0,77 years in term of Payback period, with NPV worth of Rp. 98,667,965.86329, then the IRR is 25,79%, so this investment will be accepted. Then, if it is assumed that this business wills "going concern" although the investment criteria for five years do not appear will make any benefit, it will not be a problem. These investment criterions will improve along with a policy change such as policy in period to collect account receivable, the sooner the more improvement can make.

Last, we will see how changes in the ratio of financial-ratio that we extract from the above financial reports, such as appear in **Table 10** below;

**Table 10:**
**Financial Ratio**

| Time | 01 Jan 2009 | 01 Jan 2010 | 01 Jan 2011 | 01 Jan 2012 | 01 Jan 2013 | 01 Jan 2014 |
|---|---|---|---|---|---|---|
| Inventory Turnover (yr^-1) | ? | 2,51 | 7,87 | 7,89 | 10,04 | 7,60 |
| Asset Turn Over (yr^-1) | -0,07 | -0,59 | -1,91 | 2,38 | 0,68 | 0,33 |
| R O A (yr^-1) | -0,26 | -1,46 | -1,22 | 1,95 | 0,56 | 0,27 |
| R O E (yr^-1) | -0,97 | 0,60 | -0,42 | 3,72 | 0,69 | 0,30 |
| Gross Profit Margin (%) | ? | -18,56 | 40,72 | 52,71 | 44,42 | 51,48 |
| Net Profit Margin (%) | -? | -168,17 | 21,49 | 40,86 | 34,89 | 39,64 |
| Debt to Equity | 2,67 | -1,23 | -0,46 | -6,29e-16 | -8,66e-17 | -4,62e-17 |
| Debt Ratio | 0,73 | 3,00 | -1,35 | -3,30e-16 | -7,03e-17 | -4,11e-17 |

Appear in the table above, the inventory turnover ratio in the second year is 2, 51 times, and then begin to rise until year fourth, and then decline at the end of the simulation. Meanwhile, gross and net profit margins show that SME still unprofitable in first two years of operating than become profitable in the rest years of simulation. For ROA and ROE, in the second and third years are still different because the company still must pay for long-term debt repayments, after debt settled, the ROA and ROE looks close. While the ratio of debt, appear to SMEs is very liquid after the third year at which ratio value is 0 (zero), because it does not anymore have debts.

In fact, this ratio is used by financial managers as feedback in making decisions to run the company operating the following year. Such as e.g. in the table above, a manager wanted to keep its inventory turnover is not going down, then he can take some steps to adjust or change decisions he took in the previous period that will be applied in the period to come. In this situation, simulation such as in this paper is very important. Where the simulation will give the entrepreneur a chance to have an artificial experiences to run the SME or company without sacrificing the strategic assets, as is mostly done by young entrepreneur when they runs a new or has been built business.

## Conclusion

This paper shows a system dynamic model capturing financial reports, such as Balance sheet, Income and Cashflow statements, traditionally used by SMEs' entrepreneurs to understand their company long term sustainability. By applying a step-by-step system dynamics model building process, SMEs' entrepreneurs can better understand the net of cause-and-effect relationships underlying company financial and non-financial results. Such an approach is also likely to foster decision makers understanding about the figures portrayed in a balance sheet. The use a case-study allowed the authors to experiment the above approach to a small leather handcraft operating in Indonesia. The use of simulation in SMEs' business planning can be also used as a training tool for young or beginner entrepreneurs.

## The weakness of the paper and further studies

In this simulation has been applied several common factors which are strategic assets of a company, particularly SMEs in the leather industry. They also have some policy lever associated with the strategic asset management. However, it is still deemed incomplete and detail where many things that may be included in this model, from other micro-elements because these elements are important for the development of SMEs, as expressed by Nguyen (2006) and Berry (1997) in their works. Factors like the role of cooperatives in the community's, emotional and cultural relations that exist in small cluster of the industry in a particular region, or the model in the supplier's level, relationships with suppliers and others. Further studies will be very interesting and would provide a greater contribution to the parties who need such as employers and policy makers if it is involving the macroeconomic model such as inflation, interest rates, taxes, and government policies on SMEs in a country (Yamaguchi, 2006).

The assumption is taken in this paper is merely a subjective assumption, not based on actual conditions experienced by the true actors, even though the original case of this study is the result of direct interaction with the case of craftsmen. Further studies will be very interesting if the parties directly involved with the group modeling proposed by Vennix (1999).

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## Appendix 1: Balance sheet

**Balance Sheet**

| Time | 01 Jan 2009 | 08 Jan 2009 | 15 Jan 2009 | 22 Jan 2009 | 29 Jan 2009 | 06 Feb 2009 |
|---|---|---|---|---|---|---|
| Cash | 122.556.000,00 | 127.195.143,70 | 129.931.964,73 | 131.237.769,62 | 131.372.906,44 | 130.529.731,31 |
| Account Receivebles_AR | 144.966.400,00 | 136.510.026,67 | 129.199.604,24 | 122.368.086,73 | 115.962.076,27 | 109.897.783,91 |
| Prepaid Expenses | 25.000.000,00 | 24.902.777,78 | 24.805.555,56 | 24.708.333,33 | 24.611.111,11 | 24.513.888,89 |
| Total Value_Inventory Raw Material | 49.077.600,00 | 49.750.650,00 | 49.699.550,00 | 49.649.720,33 | 49.601.794,37 | 49.554.802,44 |
| Total Inventory Value_Finished Product | 0,00 | 5.556.483,33 | 5.485.433,33 | 5.487.589,72 | 5.692.458,46 | 5.861.615,93 |
| **Total Current Asset** | **341.600.000,00** | **343.915.081,48** | **339.122.107,86** | **333.451.499,73** | **327.240.346,65** | **320.357.822,48** |
| Total Value of Machines | 106.000.000,00 | 106.000.000,00 | 106.000.000,00 | 106.000.000,00 | 106.000.000,00 | 106.000.000,00 |
| Tools | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 |
| **Total Fixed Asset** | **108.000.000,00** | **108.000.000,00** | **108.000.000,00** | **108.000.000,00** | **108.000.000,00** | **108.000.000,00** |
| ***Total Assets*** | ***449.600.000,00*** | ***451.915.081,48*** | ***447.122.107,86*** | ***441.451.499,73*** | ***435.240.346,65*** | ***428.357.822,48*** |
| Account Payables | 0,00 | 886.200,00 | 770.420,00 | 685.082,05 | 626.451,14 | 588.862,08 |
| Tax liability | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Interest liability | 0,00 | 1.399.021,56 | 2.462.537,02 | 3.268.831,14 | 3.877.922,23 | 4.335.824,34 |
| Investment Debt | 0,00 | 252.777,78 | 446.574,07 | 595.151,23 | 709.060,39 | 796.390,74 |
| Longterm debt | 327.044.000,00 | 324.924.270,37 | 322.804.540,74 | 320.684.811,11 | 318.565.081,48 | 316.445.351,85 |
| **Total Liability** | **327.044.000,00** | **331.662.269,70** | **333.904.071,83** | **335.122.542,20** | **335.559.826,36** | **335.398.767,53** |
| Owner Equity | 122.556.000,00 | 122.556.000,00 | 122.511.215,78 | 122.330.515,07 | 122.019.373,67 | 121.585.007,08 |
| Retain earning | 0,00 | -2.303.188,22 | -9.293.179,75 | -16.001.557,53 | -22.338.853,38 | -28.625.952,13 |
| **Total Equity** | **122.556.000,00** | **120.252.811,78** | **113.218.036,03** | **106.328.957,54** | **99.680.520,29** | **92.959.054,95** |
| ***Total Liability and Eequity*** | ***449.600.000,00*** | ***451.915.081,48*** | ***447.122.107,86*** | ***441.451.499,73*** | ***435.240.346,65*** | ***428.357.822,48*** |

## Appendix 2: Income statement

**Statement of Income**

| Time | 01 Jan 2009 | 08 Jan 2009 | 15 Jan 2009 | 22 Jan 2009 | 29 Jan 2009 | 06 Feb 2009 |
|---|---|---|---|---|---|---|
| Revenue Total | 0,00 | 41.956.872,45 | 45.329.533,51 | 47.065.366,92 | 45.010.420,00 | 43.212.588,63 |
| COGS | 0,00 | 285.762.000,00 | 282.108.000,00 | 271.934.338,31 | 274.101.462,28 | 260.540.813,51 |
| **Gross Profit** | **0,00** | **-243.805.127,55** | **-236.778.466,49** | **-224.868.971,39** | **-229.091.042,28** | **-217.328.224,88** |
| Due Prepaid Expenses | 5.100.000,00 | 5.100.000,00 | 5.100.000,00 | 5.100.000,00 | 5.100.000,00 | 5.100.000,00 |
| Marketing Expense | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 |
| Administration | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 |
| **EBITDA** | **-31.500.000,00** | **-275.305.127,55** | **-268.278.466,49** | **-256.368.971,39** | **-260.591.042,28** | **-248.828.224,88** |
| Total Depreciation of Mechines | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 |
| Depreciation Tools | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 |
| **EBIT** | **-46.500.000,00** | **-290.305.127,55** | **-283.278.466,49** | **-271.368.971,39** | **-275.591.042,28** | **-263.828.224,88** |
| Interest Loan Payment per month | 19.047.600,00 | 18.924.143,33 | 18.800.686,67 | 18.677.230,00 | 18.553.773,33 | 18.430.316,67 |
| Interest Loan_wc Payment per month | 52.902.080,00 | 52.559.196,15 | 52.216.312,30 | 51.873.428,44 | 51.530.544,59 | 51.187.660,74 |
| **EBT** | **-118.449.680,00** | **-361.788.467,03** | **-354.295.465,45** | **-341.919.629,84** | **-345.675.360,21** | **-333.446.202,29** |
| Tax | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **Net Income** | **-118.449.680,00** | **-361.788.467,03** | **-354.295.465,45** | **-341.919.629,84** | **-345.675.360,21** | **-333.446.202,29** |

## Appendix 3a: Cashflow (direct)

**Statement of Cashflow (DIRECT)**

| Time | 01 Jan 2009 | 08 Jan 2009 | 15 Jan 2009 | 22 Jan 2009 | 29 Jan 2009 | 06 Feb 2009 |
|---|---|---|---|---|---|---|
| **Account Receivebles_AR Collection (rp/mo)** | **36.241.600,00** | **34.127.506,67** | **32.299.901,06** | **30.592.021,68** | **28.990.519,07** | **27.474.445,98** |
| Account Paybles Payment (rp/mo) | 0,00 | 886.200,00 | 770.420,00 | 685.082,05 | 626.451,14 | 588.862,08 |
| Direct Labor Cost (rp/yr) | 244.800.000,00 | 244.800.000,00 | 244.800.000,00 | 244.800.000,00 | 244.800.000,00 | 244.800.000,00 |
| Maintenance M_T (rp/yr) | 1.200.000,00 | 1.200.000,00 | 1.200.000,00 | 1.200.000,00 | 1.200.000,00 | 1.200.000,00 |
| Electricity Cost (rp/yr) | 28.800.000,00 | 28.800.000,00 | 28.800.000,00 | 28.800.000,00 | 28.800.000,00 | 28.800.000,00 |
| **Operation Costs (rp/mo)** | **-4.900.000,00** | **-9.986.200,00** | **-13.090.420,00** | **-15.473.748,72** | **-17.307.762,26** | **-18.721.200,60** |
| New Prepaid Expenses (rp/yr) | 100.000,00 | 100.000,00 | 100.000,00 | 100.000,00 | 100.000,00 | 100.000,00 |
| Administration (rp/yr) | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 | 2.400.000,00 |
| Marketing Expense (rp/yr) | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 | 24.000.000,00 |
| Interest payment (rp/mo) | 0,00 | 1.399.021,56 | 2.462.537,02 | 3.268.831,14 | 3.877.922,23 | 4.335.824,34 |
| Tax payment (rp/yr) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **Operation Expenses (rp/yr)** | **-26.500.000,00** | **-43.288.258,67** | **-56.050.444,19** | **-65.725.973,64** | **-73.035.066,76** | **-78.529.892,03** |
| ***Cash from operating (rp/yr)*** | ***349.599.200,00*** | ***254.798.795,82*** | ***183.529.235,23*** | ***125.106.375,37*** | ***76.160.098,99*** | ***35.151.570,22*** |
| Investment Debt Payment (rp/mo) | 0,00 | 252.777,78 | 446.574,07 | 595.151,23 | 709.060,39 | 796.390,74 |
| Addition Tools (rp/yr) | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 |
| ***Cash from Investing (rp/yr)*** | ***-2.000.000,00*** | ***-5.033.333,33*** | ***-7.358.888,89*** | ***-9.141.814,81*** | ***-10.508.724,69*** | ***-11.556.688,93*** |
| Addition to Long term debt_Inv (rp/yr) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Addition to Long term debt _wc (rp/yr) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Cash Dividend (rp/yr) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| Total principal loan payment (rp/yr) | 109.014.666,67 | 109.014.666,67 | 109.014.666,67 | 109.014.666,67 | 109.014.666,67 | 109.014.666,67 |
| ***Cash from financing (rp/yr)*** | ***-109.014.666,67*** | ***-109.014.666,67*** | ***-109.014.666,67*** | ***-109.014.666,67*** | ***-109.014.666,67*** | ***-109.014.666,67*** |
| **Cashflow_DIRECT (rp/wk)** | **4.639.143,70** | **2.736.821,03** | **1.305.804,88** | **135.136,83** | **-843.175,13** | **-1.660.940,27** |

## Appendix 3b: Cash flow (Indirect)

**Statement of Cashflow (INDIRECT)**

| Time | 01 Jan 2009 | 08 Jan 2009 | 15 Jan 2009 | 22 Jan 2009 | 29 Jan 2009 | 06 Feb 2009 |
|---|---|---|---|---|---|---|
| Net Income (rp/yr) | -118.449.680,00 | -361.788.467,03 | -354.295.465,45 | -341.919.629,84 | -345.675.360,21 | -333.446.202,29 |
| Total Depreciation of Mechines (rp/yr) | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 |
| Depreciation Tools (rp/yr) | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 |
| Change in Prepaid Expenses (rp/yr) | -5.000.000,00 | -5.000.000,00 | -5.000.000,00 | -5.000.000,00 | -5.000.000,00 | -5.000.000,00 |
| Change in Account Receivebles_AR (rp/yr) | -434.899.200,00 | -375.964.582,04 | -351.335.185,91 | -329.451.966,67 | -311.877.892,82 | -295.123.280,83 |
| Change in Total Value_Inventory Raw Material (rp/yr) | 34.614.000,00 | -2.628.000,00 | -2.562.668,94 | -2.464.763,69 | -2.416.727,50 | -2.298.592,96 |
| Change in Total Inventory Value_Finished Product (rp/yr | 285.762.000,00 | -3.654.000,00 | 110.900,01 | 10.536.106,33 | 8.699.527,17 | 22.856.211,66 |
| Change in AP (rp/yr) | 45.576.000,00 | -5.954.400,00 | -4.388.808,93 | -3.015.303,64 | -1.933.151,79 | -767.912,77 |
| Change in Tax liability (rp/yr) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **Cash from Operation_INDIRECT (rp/yr)** | **277.649.520,00** | **200.103.715,01** | **142.062.680,45** | **93.781.690,56** | **52.610.847,82** | **17.563.484,84** |
| Change in Total Value of Machines (rp/yr) | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 | 13.000.000,00 |
| Change in Tools (rp/yr) | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 | 2.000.000,00 |
| **Cash from Investing_INDIRECT (rp/yr)** | **-15.000.000,00** | **-15.000.000,00** | **-15.000.000,00** | **-15.000.000,00** | **-15.000.000,00** | **-15.000.000,00** |
| Change in Interest liability (rp/yr) | 71.949.680,00 | 54.695.080,81 | 41.466.554,77 | 31.324.684,81 | 23.549.251,17 | 17.588.085,38 |
| Change in Investment Debt (rp/yr) | 13.000.000,00 | 9.966.666,67 | 7.641.111,11 | 5.858.185,19 | 4.491.275,31 | 3.443.311,07 |
| Change in Longterm debt (rp/yr) | -109.014.666,67 | -109.014.666,67 | -109.014.666,67 | -109.014.666,67 | -109.014.666,67 | -109.014.666,67 |
| Cash Dividend (rp/yr) | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 |
| **Cash from Financing_INDIRECT (rp/yr)** | **-24.064.986,67** | **-44.352.919,19** | **-59.907.000,78** | **-71.831.796,67** | **-80.974.140,19** | **-87.983.270,22** |
| ***Cash Flow 1b_INDIRECT (rp/wk)*** | ***4.639.143,70*** | ***2.736.821,03*** | ***1.305.804,88*** | ***135.136,83*** | ***-843.175,13*** | ***-1.660.940,27*** |