AN ANALYSIS ON THE IMPACT OF MODERN TECHNOLOGY IN VASU TRADERS

By

KARTHIK G

Roll No.: 0803MBA1579

Reg. No.: 68108101592

A PROJECT REPORT

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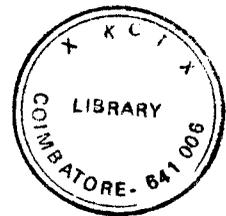
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of

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CHENNAI 600 025

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BONAFIDE CERTIFICATE

Certified that the Project report titled "AN ANALYSIS ON THE IMPACT OF MODERN TECHNOLOGY IN VASU TRADERS" is the bonafide work of Mr. KARTHIK G who carried out the work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

Signature of Student

Signature of Guide

Name: KARTHIK G

Roll No.: 0803MBA1579

Reg. No.: 68108101592

Coimbatore - 641 006, Tamilnadu.

Name: Dr. S. V. DEVANATHAN

Designation: Professor and Director, KCT Business School

Address: Kumaraguru College of Technology, Coimbatore-641 006, Tamilnadu
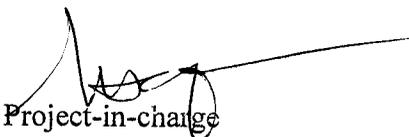
Signature of Project-in-charge

Name: Dr. S. V. DEVANATHAN

Designation: Director, KCT Business School

TNGST No. 5101008
Area Code No. 262

STD .04554
ஆபீஸ் -31255
வீடு -31320

N. V. வாசு

M/s. வாசு டி ரேடால்ஸ்

176, மெயின் பஜார், தே...... - 625 518.

தேனி மாவட்டம்.

தேதி :02/12/2009

BONAFIDE CERTIFICATE
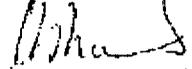
TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. G. KARTHIK, Roll No. **0803MBA1579**, MBA student of Distance Education, ANNA UNIVERSITY, Chennai, has successfully completed his project titled AN **ANALYSIS ON THE IMPACT OF MODERN TECHNOLOGY** in our organization.

During his tenure his conduct was good. We wish all the best in their future endeavors.

Yours sincerely,

N V VASU

Certificate of Viva-voce-Examination

This is to certify that ~~Thiru~~/Mr./~~Tmt~~. KARTHIK G (Roll No. 0803MBA1579; Register No. 68108101592) has been subjected to Viva-voce-Examination on ....07.-03.-10...... (Date) at ......4.:00P.M... (Time) at the Study centre KUMARAGURU COLLEGE OF TECHNOLOGY, COIMBATORE - 641006, TAMIL NADU

Internal Examiner

Name: Prof.Dr. S.V. DEVANATHAN

Designation: Director, KCT Business School

Address: Kumaraguru College of Technology,
        Coimbatore-641 006, Tamilnadu.
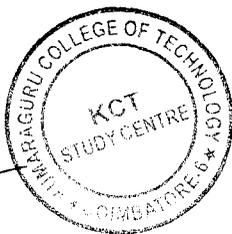
External Examiner

Name: PROF DR. K. RAMAMOORTHY

Designation: PROF & HEAD, DEPT OF MBA

Address: COIMBATORE INSTITUTE OF
        MANAGEMENT AND TECH.,
           COIMBATORE

Coordinator

Study centre

Name: Dr.S.SADASIVAM

Designation: Dean (Biotechnology)

Address: Kumaraguru College of Technology,
Coimbatore-641 006, Tamilnadu.

ABSTRACT

Process technology pertains to the techniques of producing and marketing goods and services. Process technology also includes work methods, equipments, distribution and logistics. It is embedded in a firm's value chain. Process technology changes are designed to produce and market goods and services faster, more efficiently, or in greater volume. Non –usage of technology might serve as a major source for redundant work effort, fatigue mind and body of the workers and other physical and psychological inabilities.

Process technology changes make it feasible for the firm to reduce its cost or cycle tie and improve the quality of is products. Process technology changes modify the way a firm conducts its business. Thus, changes in process technology may bring about changes in the organization, including its human resources practices, logistics, and marketing functions. In broader perspective we fail to analyze the growth of the company if we do not rely on the modern technology, our vision seems to be restricted.

This project titled as "**An Analysis on the Impact of Modern Technology in Vasu Traders**" was done to ensure identifying and analysis the present technological implementation of the company and to provider suitable suggestions in order to focus on the companies growth by implementing the advanced technological equipments. Impact on the technological up gradation at workplace is analyzed and appropriate improvement, management strategies are suggested as the end result of this study.

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(KARTHIK.G)

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CHAPTER 1- INTRODUCTION

Products produced by any company either are based on a set of technology and the set of competencies within the company or are dependent on technology and other companies. In today's rapidly changing technological environment, there is a great need for proper implementation and supervision of new technologies.

To bring these streamlined and customized the strategies, company requires strong foundation and experience in handling such situations. The modern technologies available in the global market need to be analyzed in means of various factors like economic, social, political, ecological, technical, educational, personal health, safety related, and many more.

Choice of technology helps in identifying the best technology. Effective choice is based on preselected criteria for a technology to meet specified needs. Comparative advantage is a mechanism to identify the strengths to select technologies. Technology scale up strategy has to be undertaken to identify whether it is suitable technology for the enterprise or it is better to import technology from outside.

Firms have often been credited with continual improvements in process technology. This has led to lower costs and higher product quality. Process technology changes modify the way a firm conducts its business. Thus, changes in the process technology may bring about changes in the organization, including its human resources practices, logistics, and marketing functions.

Process and product technologies are important for the ultimate success of a firm. Indeed, in addition to developing technological capabilities, the deployment of capabilities in products, and process is central to the value creation by firms.

Introduction or adaption of new technology, or technological change, can have both positive and negative effects on organizational productivity. Productivity is the relationship between output and inputs of business system. Higher the ratio between the two more is the productivity.

Introduction of new technology may increase organizational productivity if new technology facilitates lower consumption of inputs, lower processing time, lower wastages, lower defective, more ease and safety in manufacturing and more efficiency.

1.1 RESEARCH BACKGROUND - DESCRIPTION OF FOOD PRODUCT INDUSTRY

Process technology pertains to the techniques of producing and marketing goods and services. Process technology also includes work methods, equipments, distribution and logistics. Our study determines the impact of introducing new technology in vasu traders. The existing system undergoes process change which will create an impact on the productivity of the firm, quality of the product, processing time, reduce wastages, meet the market demand, and increase the revenue of the firm and more ease process. The impacts of introducing new technology are measured using financial, production and statistical tools and techniques.

1.1.1 COMPANY PROFILE

Vasu traders a food product manufacturer which produces around 26 products backed up with high quality. Product range includes variety of masala's, flours, ready to eat preparations and asafoetida. Currently products reach the consumers through 20 agents and 500 retailers. Products are currently marketed only in couple of districts. To strengthen the distribution across the state the firm has planned to go for some marketing strategies which will make the possibility of wide spread of business.

1.1.2 QUALITY POLICY

The quality of the products themselves stands testimony to their credentials and product has become a household name. The product range is so wide and all products are baked up with high quality.

The upper most reason for the success of the brand can be attributed to meeting the demand of consumers from every walk of life by pricing the product competitively and various size packs which can be afforded by common man.

1.1.3 MISSION, VISION AND VALUES

Our Vision

To manufacture and market food products on a sustainable basis catering to all segment of the society at affordable prices and increase intensity value of the stack holder with highest corporate governance standards

Our Mission

We are dedicated to provide our customers with finest high quality product, hygienically prepared and competitively priced, leaving up to expectations of customers and suppliers for achieving symbolic relationship. We will achieve this with best business ethics and practices

Our Strengths

- Employees
- Loyal Customers
- Continuous market analysis and study
- Strong resources & network
- Quality service
- Standardization & gradation of products as per international standards
- International business standard ethics

Our turn over has been increasing at 10% over the last 3 years and we are confident of continuing this growth rate. We have currently 26 product ranges available in different pack size to suit every household.

1.1.4 Our Strategy

The success stems from our customers-oriented approach. After surveying the consumers needs our R&D develops the products as per the customer's requirement. As per our quality guidance and specifications the products are produced by the qualified manufacturing company through special partner oriented programmed.

1.2 IDENTIFIED PROBLEM

Process technology change is the main focus for the Vasu Traders to compete in the current market. Recently the Vasu Traders has started concentrating on improving the process technology used so far. This is from strong understanding of the customer expectation and it is to gain confidence from the customers. Vasu traders take steps strategically to fulfill the expectations of our customers.

The analysis is made with the existing projects in our organization and need to derive with many organizational initiatives suiting each project requirement. From this analysis new process technology should be evolved which will increase the productivity, quality of product manufacturing, reduce manually interruption in packing, and highly satisfies the customers needs.

1.3 NEED FOR STUDY

The Study of Process Technology Change helps in suggesting the necessary strategies the organization could implement to increase the productivity and quality of the product they are manufacturing by introducing modern equipments. And also the revenue growth is evaluated using various forecasting methods as end result of implementing this modern technological equipment in the shop floor. Management strategies are suggested to the organization which will highly increase the level of customer satisfaction.

1.5 OBJECTIVES:

Primary Objective:

- To analyze the impact of process technology change at Vasu Industries Pvt. Ltd.

Secondary Objective:

- Identifying the existing technology system.
- Identifying & quantifying the impact of process technology change.
- Analyzing and identifying the exposure and required training to individuals.
- Suggesting suitable management strategies.

1.6 SCOPE OF THE PROJECT

This study involves the various aspects of productivity performance improvement of the company by analyzing the current productivity and demand in the market. The project helps the company to improve the productivity and quality in order to meet the market demand and high customer satisfaction in means of product quality

1.7 DELIVERABLES

The study would ensure identifying and analysis the present technological implementation of the company and to provide suitable suggestions in order to focus on the companies growth by implementing the advanced technological equipments. Suggestions will be mainly focused on productivity increase, on time delivery, quality improvement, revenue growth which will lead to widen the business.

CHAPTER – 2 LITERATURE SURVEY

2.1 REVIEW OF LITERATURE

2.1.1 CASE STUDY 1: BAG-IN BOX FOOD PACKAGING LINE

This simulation model was developed to improve the existing production facilities for one of the world's leading producers of ready-to-eat cereals. Plant management had formulated some process modifications and wanted to objectively evaluate the effects of each one. By using a simulation model, plant engineers were able to see the effects of the aforementioned changes in their model before they were introduced into the actual plant systems.

The main objective of the study was to understand the behavior of the existing packaging system and to assist in designing a new and more efficient one. First, a base model, operating under original specification and parameters, was developed for evaluation. Then, alternative scenario's and suggested system modifications, were modeled and evaluated to determine the optimal line configuration.

Several scenarios in the packaging system were evaluated to determine a configuration that would optimize system throughput. One system modification suggested that the same production efficiency could be achieved by removing a bagging machine from the packaging lines. However, when only one case packer was used in the same system, throughput decreased. Current system difficulties could be resolved by modifying the system configuration, or by increasing the speed of the conveyors.

2.1.2 CASE STUDY 2: SIMULATION MODEL OF A BOTTLING LINE

A major producer of baby-food products desired additional information about their existing bottling system and recommendations to improve production efficiency. To meet the client's goal, they simulated the existing design and then modeled several different scenarios to optimize system throughput.

First, a base model operating under original specifications and parameters was developed for evaluation. Then, alternative scenarios and suggested system improvements were modeled and evaluated to determine the line configuration that would optimize system throughput.

The process simulation allowed engineers to test the system and identify inefficiencies. This study led to the most effective system configuration by quantifying the effect of changes to the system.

2.1.3 CASE STUDY 3: AUTOMATION PLANNING FOR MANUFACTURING

A consumer products manufacturer was considering the purchase of new automation to reduce manpower requirements. Simulation was used to estimate the manpower requirements. Simulation was used to estimate the manpower requirements necessary to meet new customer requirements.

The client is a water faucet manufacturer. The company's strength is that they produce a huge variety of high quality faucets and are able to meet the needs of virtually and customer. Their production system is rather antiquated, resulting in high manufacturing cost due to heavy labor requirements and large inventories.

The objective of the simulation was to provide the client with estimated for the manpower savings that would be achieved if the new automation were purchased. This would allow the company to determine if the purchase of new automation was valuable investment.

2.1.4 CASE STUDY 4: TRANSLATION OF BUSINESS OBJECTIVES INTO PERFORMANCE IMPROVEMENTS INITIATIVES

A company with 80 locations was incurring huge costs (time and money) to support multiple products. In addition, customers complained frequently about the time required to receive the ordered products.

Company went for an analysis to find the cause for the delay in manufacturing the products. They developed and implemented a standardization strategy for all locations. Implemented an evaluation mechanism to measure customer satisfaction and insure that standards and process were strictly followed.

As a result customer complaints decreased by 94% due to on time deliver of the products and also technology maintenance expenses dropped by 40% within 12 months.

2.1.5 CASE STUDY 5: IMPLEMENTATION OF COMPANY WIDE INITIATIVE USING RAPID ROLL-OUT METHODOLOGY FOR PRODUCTIVITY IMPROVEMENT

A global client needed to identify best practices and implement a manufacturing system for 40,000 employees worldwide. They measures taken to improve productivity were they identified best practices for 20 departments in 12 manufacturing plants within the company, performed a gap analysis, then developed and/or redesigned business processes, developed a training program with over 50 modules and leveraged the client's employees for the implementation of sites throughout the world.

After the implementation of measurements they saved $250,000 due to utilizing the client's employees to conduct implementation training and coaching, decrease of 67% in the company's raw work in process inventory and culture change supported the best practice implementation.

2.2 RESEARCH GAP

A number of studies and research has been conducted on the process change the firm has to undergo to increase their productivity and quality of the product. Also a number of studies have been made relating to the troubles faced by the Management and employees when firm implement such process change. Different studies have concentrated and analyzed on various problems like determining the stress undergone by the employees, the company's trend compared in the market, the conflicts and the issues faced that can happen for the management in customer's satisfaction. The management focuses for delivery of the services with the temperament of the clients.

Such studies and researches imply that the management should seek for the higher customer satisfaction level. The managers should get the feedback from the client managers quarterly and improvise the process and product technology.

So far, the research has suggested that the firm should concentrate on the modern technology that is available in the market to compete with the other firms. But this study will project the valuable suggestion to the management of the firm in means of productivity improvement according to the demand they have in the market, increase the quality of the product, forecasting their revenue growth, utilization of the manpower they have without laying off them due the current implementation of automation system and process change in the current production system.

CHAPTER – 3 METHODOLOGY

3.1 TYPE OF PROJECT

The study has been conducted by forecasting techniques, so that the inputs are gathered from the past data's. "The Study Process Technology Change" identifies the impact on productivity, revenue growth, quality and labor utilizations. Study will produce some valuable management strategies which will help the company to grow towards the future targets. The research design used for the study is descriptive research design.

3.2 TARGET RESPONDENTS

The target respondents are none. Since the study deals with the performance improvement of the organization to meet the market demand the targeted respondents are none.

3.3 ASSUMPTIONS, CONSTRAINTS AND LIMITATIONS

- The organization has disclosed the required information honestly and correctly without any bias.
- The company was not able to divulge certain confidential information's like the exact figures of the costs involved in any project of each business unit.
- The staff might not disclose all the details as they may be afraid of their superiors.

3.4 SAMPLING METHOD

The sampling technique adopted is Random sampling. Here the sales of the product, balance sheet, manpower utilization of past years of the organization are analyzed.

3.5 DATA PROCESSING

Primary data are not gathered for this study since the analysis is done using existing data's.

Secondary Sources

Secondary data refers to information gathered from sources already existing.

Man Power Utilization Report

Sales Report

Production Report

Balance Sheet

3.6 TOOLS FOR ANALYSIS

Processed data will be analyzed and interpreted using appropriate financial tools like

1. Capital budgeting appraisal methods
   - Net present value
   - Pay back period
   - Internal rate of return
2. Probability assignment
3. Standard deviation and coefficient of variation
4. Sensitivity analysis
5. Profitability Index

3.6.1.1 NET PRESENT VALUE

Net present value (NPV) or net present worth (NPW)[1] is defined as the total present value (PV) of a time series of cash flows. It is a standard method for using the time value of money to appraise long-term projects. Used for capital budgeting, and widely throughout economics, it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met.

Formula:

Each cash inflow/outflow is discounted back to its present value (PV). Then they are summed. Therefore NPV is the sum of all terms $\dfrac{R_t}{(1+i)^t}$, where

t - The time of the cash flow

i - The discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.)

Rt - the net cash flow (the amount of cash, inflow minus outflow) at time t (for educational purposes, R0 is commonly placed to the left of the sum to emphasize its role as (minus the) investment.

3.6.1.2 PAY BACK PERIOD

Payback period as a tool of analysis is often used because it is easy to apply and easy to understand for most individuals, regardless of academic training or field of endeavor. When used carefully or to compare similar investments, it can be quite useful. As a stand-alone tool to compare an investment with "doing nothing," payback period has no explicit criteria for decision-making (except, perhaps, that the payback period should be less than infinity).

3.6.1.3 INTERNAL RATE OF RETURN

The internal rate of return (IRR) is a rate of return used in capital budgeting to measure and compare the profitability of investments. It is also called the discounted cash flow rate of return (DCFROR) or simply the rate of return (ROR).[1] In the context of savings and loans the IRR is also called the effective interest rate. The term internal refers to the fact that its calculation does not incorporate environmental factors (e.g. the interest rate or inflation).

Formula:

Given a collection of pairs (time, cash flow) involved in a project, the internal rate of return follows from the net present value as a function of the rate of return. A rate of return for which this function is zero is an internal rate of return.

Given the (period, cash flow) pairs (n, Cn) where n is a positive integer, the total number of periods N, and the net present value NPV, the internal rate of return is given by r in:

$$NPV = \sum_{n=0}^{N} \frac{C_n}{(1+r)^n} = 0$$

3.6.2 PROBABILITY ASSIGNMENT

Probability may be described as a measure of someone's opinion about the likelihood that an event will occur. Probability may be objective or subjective. An objective probability is based on large number of observations under independent and identical conditions repeated over a period of time. A subjective probability is based on personal judgment since there are no large numbers of independent and identical observations. In capital budgeting decision, the probabilities are of a subjective type since they are based on a single event.

3.6.3 STANDARD DEVIATION AND COEFFICIENT OF VARIATION:

· The coefficient of variation is useful because the standard deviation of data must always be understood in the context of the mean of the data. The coefficient of variation is a dimensionless number. So when comparing between data sets with different units or widely different means, one should use the coefficient of variation for comparison instead of the standard deviation.

3.6.4 SENSITIVITY ANALYSIS

The sensitivity analysis approach takes care of this aspect by providing more than one estimate of the future return of a project. It is thus superior to one figure forecast since it gives a more precise idea about the variability of the return.

Usually sensitivity analysis provides information about cash flows under three assumptions 1) Pessimistic 2) Most likely 3) Optimistic out comes associated with the project. It explains how sensitive the cash flows are under these different situations. The larger is the difference between the pessimistic and optimistic cash flows, the more risky is the project and vice versa.

3.6.5 PROFITABILITY INDEX

Profitability index (PI), also known as profit investment ratio (PIR) and value investment ratio (VIR), is the ratio of investment to payoff of a proposed project. It is a useful tool for ranking projects because it allows you to quantify the amount of value created per unit of investment.

The ratio is calculated as follows:

PV of future cash inflows

Profitability Index = ------------------------------------

PV of Initial Investment

Assuming that the cash flow calculated does not include the investment made in the project, a profitability index of 1 indicates breakeven. Any value lower than one would indicate that the project's PV is less than the initial investment. As the value of the profitability index increases, so does the financial attractiveness of the proposed project.

Rules for selection or rejection of a project:

If PI > 1 then accept the project

If PI < 1 then reject the project

3.6.6 PERCENTAGE ANALYSIS

Percentage refers to special kind of ratio; percentages are used for making comparison between two or more series of data. Percentages are used to describe relationships and are used to compare the relative terms which are distributed into two or more series of data.

CHAPTER - 4 DATA ANALYSIS AND INTERPRETATION

4.1 ANALYSIS AND INTERPRETATION

ASSUMPTIONS FOR PROJECT A AND PROJECT B

- The cost of capital is assumed to be at 12%.

- Bank loan contributes 24% of the total investment cost for Project B at 13% interest rate.

- Depreciation to be charged at 15% for all machinery.

- Under economic conditions the cash inflows are reduced by 12% for pessimistic and increased by 12% for optimistic from the expected cash inflows and kept constant for most likely.

- The probability is assigned as 0.25 each for pessimistic and optimistic and for most likely it is assumed to be 0.50.

- It is advisable to the company to adopt more techniques like Risk adjusted discount rate and simulation analysis to find out the suitable project for its business as the capital investment is irreversible they should be very cautious in taking a decision.

- In New model – Project B, the latest technology machines are used as following below:
    a. Form Fill and Scale Machine

    b. Automatic Screw Conveyor Feeder.

PROPOSED ANALYSIS AND INTERPRETATION METHODOLOGIES

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                    ┌─────────────────┐
                    │    CAPITAL      │
                    │  INVESTMENT     │
                    │   APPRAISAL     │
                    └─────────────────┘
                             │
          ┌──────────────────┴──────────────────┐
          ▼                                      ▼
┌─────────────────┐                    ┌─────────────────┐
│   OLD MODEL     │                    │   NEW MODEL     │
│  PROJECT - A    │                    │  PROJECT - B    │
└─────────────────┘                    └─────────────────┘
          │                                      │
          ▼                                      ▼
┌──────────────────────────┐        ┌──────────────────────────┐
│ USING DCF TECHNOLOGY      │        │ USING DCF TECHNOLOGY      │
│ PAY BACK                  │        │ PAY BACK                  │
│ NET PRESENT VALUE         │        │ NET PRESENT VALUE         │
│ INTERNAL RATE OF RETURN   │        │ INTERNAL RATE OF RETURN   │
└──────────────────────────┘        └──────────────────────────┘
          │                                      │
          ▼                                      ▼
┌──────────────────────────┐        ┌──────────────────────────┐
│ RISK ANALYSIS TECHNIQUES  │        │ RISK ANALYSIS TECHNIQUES  │
│ PROBABILITY ASSIGNMENT    │        │ PROBABILITY ASSIGNMENT    │
│ STANDARD DEVIATION        │        │ STANDARD DEVIATION        │
│ COEFFICIENT OF VARIATION  │        │ COEFFICIENT OF VARIATION  │
│ SENSITIVITY               │        │ SENSITIVITY               │
└──────────────────────────┘        └──────────────────────────┘
          │                                      │
          └──────────────────┬───────────────────┘
                             ▼
                    ┌─────────────────┐
                    │ MEASURING KEY   │
                    │   VARIABLES     │
                    └─────────────────┘
                             │
                             ▼
                    ┌─────────────────┐
                    │  SUGGEST A      │
                    │    MODEL        │
                    └─────────────────┘
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4.2 OLD MODEL PROJECT A

4.2.1 COST OF THE PROJECT AND MEANS OF FINANCE

TABLE NO: 4.2.1
Cost of the Project and means of finance for Project A

Particulars	Amount (Rs in thousands)
Crusher Machine(For Chilli)	315.00
Crusher Machine(For Flour)	315.00
Crusher Machine(For Masala)	315.00
Plour Machine (10HP)	71.40
Plour Machine (15HP)	94.50
Filter Machine	52.50
TOTAL	**1163.40**
Means of finance	
Own fund	1163.40
Bank loan at 13%	0.00
TOTAL	**1163.40**

Inference:

From the table it can be inferred that the total cost of the Project A comes to Rs.1163.40 in thousands. Own fund of Rs.1163.40 in thousands is invested for Project A.

4.2.2 DEPRECIATION UNDER DECLINING BALANCE METHOD

TABLE NO: 4.2.2
Depreciation under declining balance method for Project A

Particulars						(Rs in thousands)
Years	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Crusher Machine(For Chilli)	45.00	38.25	32.51	27.64	23.49	19.97
Crusher Machine(For Flour)	45.00	38.25	32.51	27.64	23.49	19.97
Crusher Machine(For Masala)	45.00	38.25	32.51	27.64	23.49	19.97
Plour Machine (10HP)	10.20	8.67	7.37	6.26	5.32	4.53
Plour Machine (15HP)	13.50	11.48	9.75	8.29	7.05	5.99
Filter Machine	7.50	6.38	5.42	4.61	3.92	3.33
Total	166.20	141.27	120.08	102.07	86.76	73.74

Inference:

From the table it can be inferred that all the machinery uses for producing food products charged depreciation at 15% under declining balance method for the whole Project period of 2009-10 to 2014-15.

4.2.3 ANALYSIS OF NET CASH INFLOWS FOR THE PERIOD 2009-10 TO 2014-15

TABLE NO: 4.2.3
Net Cash inflows for Project A

Particulars						(Rs in thousands)
Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Revenue	1190.00	1368.50	1573.78	1809.84	2081.32	2393.52
(less Variable cost)	740.00	754.80	769.60	784.40	799.20	814.00
(less Fixed cost)	240.00	240.00	240.00	240.00	240.00	240.00
(less Depreciation)	166.20	141.27	120.08	102.07	86.76	73.74
EBIT	43.80	232.43	444.10	683.37	955.36	1265.77
(less) Interest	0.00	0.00	0.00	0.00	0.00	0.00
PBT	43.80	232.43	444.10	683.37	955.36	1265.77
(less) Tax	11.90	13.69	15.74	18.10	20.81	23.94
PAT	31.90	218.75	428.36	665.28	934.55	1241.84
(add) Depreciation	166.20	141.27	120.08	102.07	86.76	73.74
NCF*	198.10	360.02	548.44	767.34	1021.30	1315.58

Inference:

From the above table it can be inferred that Net cash inflows moves positively for the entire Project period of five years (2009-10 to 2014-15) and shows high net cash inflows in the last year of the project.
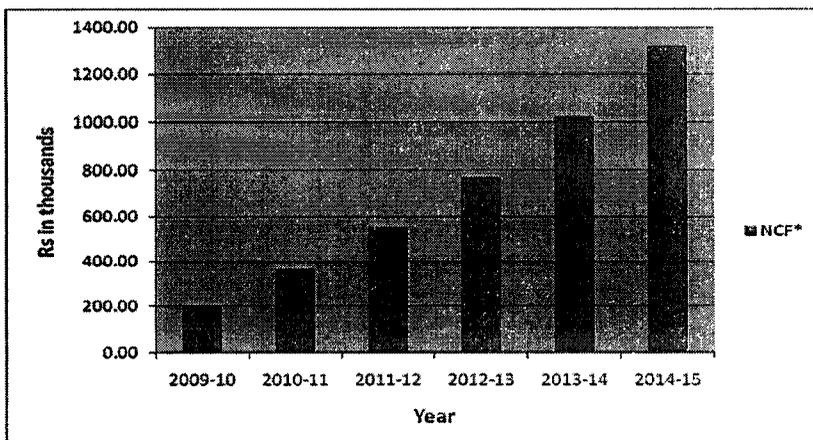
FIG NO: 4.2.3

Net cash inflows for Project A

4.2.4 PAYBACK PERIOD

TABLE NO: 4.2.4
Pay back period for Project A

Year	Cash inflows (Rs in thousands)	Cumulative cash inflows
2009-10	198.10	198.10
2010-11	360.02	558.12
2011-12	**548.44**	**1106.55**
2012-13	**767.34**	**1873.90**
2013-14	1021.30	2895.20
2014-15	1315.58	4210.78

Investment cost = Rs. 1163.40 (in thousand)

$$\text{Pay back period} = 3 + \left[\frac{1163.40 - 1106.55}{767.34} \right] \times 12$$

$$= 3.89 \text{ Years}$$

Inference:

From the above table it can be inferred that pay back period is 3.89 years hence it can break even its investment cost in the 10th month of 4th year of the Project period.

4.2.5 NET PRESENT VALUE

Formula:

$$\text{Net present value} = \left[\frac{C_1}{(1+k)^1} + \dots\dots + \frac{C_n}{(1+k)^n} \right] - C_o$$

Where, C_1- cash inflows in 1st year,

C_n- cash inflows for n^{th} year

C_o- investment cost

TABLE NO: 4.2.5
Net Present Value for Project A

Year	Cash Inflows (Rs in thousands)	Discount Factor at 25%	Present Value (Rs in thousands)
2009-10	198.10	0.80	158.48
2010-11	360.02	0.64	230.41
2011-12	548.44	0.51	280.80
2012-13	767.34	0.41	314.30
2013-14	1021.30	0.33	334.66
2014-15	1315.58	0.26	344.87
otal present value of future cash inflows			1663.53
ess) Investment cost			1163.40
ET PRESENT VALUE			500.13

Profitability Index = 1663.53/1163.40 = 1.43

Inference:

The above table shows that the Project A is profitable as the net present value stands is Rs.500.13 in thousands and hence it adds value to the company. PI is greater than 1 so project is acceptable.

4.2.6 INTERNAL RATE OF RETURN: (TRIAL AND ERROR METHOD)

Formula:

Difference in calculated

Present value and required

Net cash outlay

Internal rate of return = _____ **X** difference in rate

Difference in calculated

Present values

TABLE NO: 4.2.6
Internal rate of return for Project A

Year	Cash inflows (Rs in thousands)	Discount factor at 25%	Present value (Rs in thousands)	Discount factor at 33%	Present value (Rs in thousands)
2009-10	198.10	0.80	158.48	0.75	148.95
2010-11	360.02	0.64	230.41	0.57	203.52
2011-12	548.44	0.51	280.80	0.43	233.12
2012-13	767.34	0.41	314.30	0.32	245.24
2013-14	1021.30	0.33	334.66	0.24	245.41
Total present value of future cash inflows			1318.65		1076.24
(less) Investment cost			1163.40		1163.40
NET PRESENT VALUE			**155.25**		**-87.16**

155.25

Internal Rate of Return = 25 + _____ X 8 = **30.12%**

(1318.40-1076.24)

Inference:

It can be inferred from the above table that net present value is positive at 25% return in Rs.155.25 in thousands but actually it exceeds the investment cost and net present value shows negative value at 33% return in Rs.-87.16 in thousands which is below the investment cost. The exact IRR for Project A lies between 25% to 33%. Hence the company can yield a return of 30.12% by engaging in Project A.

4.2.7 PROBABILITY ASSIGNMENT

PRESENT VALUE OF EXPECTED NET CASH INFLOWS FOR THE YEAR 2009-10

Formula:

$$PV\ (ENCF)\ =\ \frac{ENCF}{(1+K)^n}$$

TABLE NO: 4.2.7
Present value of expected net cash inflows in Project A for 2009-10

Possible events	Cash inflows (Rs in thousands)	Probability	Expected value (Rs in thousands)
Pessimistic	174.328	0.25	43.582
Most likely	198.10	0.50	99.05
Optimistic	221.872	0.25	55.468
EXPECTED NET CASH INFLOWS			198.10
PRESENT VALUE(ENCF)			**176.88**

Inference:

This table shows that the present value of expected net cash inflows for the year 2009-10 is Rs.176.88 in thousands is less than the expected net cash inflows when the cash inflows are reduced by 12% from the expected cash inflows for pessimistic conditions and increase by 12% for optimistic conditions and no change in most likely conditions.

4.2.8 EXPECTED NET PRESENT VALUE (ENPV)

TABLE NO: 4.2.8
Expected net present value for Project A

Year	PV (ENCF)* (Rs in thousands)
2009-10	176.88
2010-11	321.44
2011-12	489.68
2012-13	685.13
2013-14	911.88
TOTAL	2585.00
(less) Investment cost	1163.40
ENPV**	1421.60

PV (ENCF)* - Present value of expected net cash inflows

**ENPV ** ** - Expected net present value

Inference:

The above table shows that the expected net present value is Rs.1421.40 in thousands due to the present value of expected net cash inflows shows an increasing trend throughout the Project period even when the cash inflows are reduced by 12% in pessimistic conditions.

4.2.9 STANDARD DEVIATION AND COEFFICIENT OF VARIATION

STANDARD DEVIATION FOR THE YEAR 2009-10

Formulas:

$$\text{Mean} = \frac{\sum x}{N}$$

Standard Deviation $(\sigma) = \sqrt{\sum Ncf}$

TABLE NO: 4.2.9
Standard deviation for Project A in the year 2009-10

Possible events	Cash inflows (X) (Rs in Thousands)	Deviation from mean (X−198.10) (Rs in Thousands)	Deviations squared (X −198.10)^2 (Rs in Thousands)	Probability	Net cash inflows(Ncf) (Rs in Thousands)
Pessimistic	174.33	-23.77	565.11	0.25	141.28
Most likely	198.10	0.00	0.00	0.50	0.00
Optimistic	221.87	23.77	565.11	0.25	141.28
	$\sum$= 594.30				282.55
Mean	198.10				
Standard deviation					16.81

Inference:

From the table it can be inferred that the deviation from the net cash inflows of the Project A for the year 2009-10 is expected to be Rs.16.81 in thousands and it indicates risk to the project.

4.2.10 TOTAL STANDARD DEVIATION AND COEFFICIENT OF VARIATIOIN FOR THE PERIOD 2009-10 to 2015-16

Formula:

$$\text{Coefficient of variation} = \frac{\text{Standard deviation}}{\text{Expected cash inflows}}$$

TABLE NO: 4.2.10
Total standard deviation and coefficient of variation for Project A

Year	PV(ENCF)* (Rs in thousands)
2009-10	16.81
2010-11	30.55
2011-12	46.54
2012-13	65.11
2013-14	86.66
Total Standard Deviation	**245.67**
Total expected value	2895.20
Coefficient of variation (%)	**8.49%**

Inference:

It is inferred from the table that the deviations in cash inflows for each year are increasing, that makes the Project A more risky to the extent of Rs.245.67 in thousands and the coefficient of variation at 8.49%.

4.2.11 SENSITIVITY ANALYSIS

REVENUE AND VARIABLE COST UNDER CHANGING SALES VOLUME FOR THE YEAR 2009-10

TABLE NO: 4.2.11
Revenue and variable cost under changing sales volume in the Project A

Particulars	Product				Tota
	Sambar Powder	Ragi flour	Wheat flour	Rice flour	
Sales Volume-Pessimistic(In kgs)	7875	3375	5850	4087.8	21187
Sales Volume-Most Likely(In kgs)	8750	3750	6500	4542	?354?
Sales Volume-Optimistic(In kgs)	9625	4125	7150	4996.2	25896
Variable Cost Per Kgs (In Rs)	57.55	16.01	18.00	13.08	104.6
Selling Price (In Rs)	85.00	28.00	33.99	26.49	173.4
	Pessimistic			(Rs in thousands)	
Revenue	669.38	94.50	198.84	108.29	1071.0
(Less) Variable Cost	453.21	54.03	105.30	53.46	666.0
Contribution	**216.17**	**40.47**	**93.54**	**54.82**	**405.0**
	Most Likely			(Rs in thousands)	
Revenue	743.75	105.00	220.94	120.32	1190.0
(Less) Variable Cost	503.56	60.04	117.00	59.40	740.0
Contribution	**240.19**	**44.96**	**103.94**	**60.91**	**450.0**
	Optimistic			(Rs in thousands)	
Revenue	818.13	115.50	243.03	132.35	1309.0
(Less) Variable Cost	553.92	66.04	128.70	65.35	814.0
Contribution	**264.21**	**49.46**	**114.33**	**67.00**	**495.0**

INPUTS FOR CALCULATION:

Sales volumes are reduced by 10% for pessimistic, increased by 10% for optimistic and kept constant for most likely.

Inference:

This table shows that the contribution for the year 2009-10 under pessimistic conditions is Rs.405.00 in thousands, in most likely conditions Rs.450.00 in thousands, and in optimistic conditions further increased to Rs.495.00 in thousands.

4.2.12 NET CASH INFLOWS UNDER CHANGING SALES VOLUME FOR THE YEAR 2009-10

TABLE NO: 4.2.12
Cash inflows under changing sales volume in Project A

Particulars	Pessimistic (Rs in thousands)	Most Likely (Rs in thousands)	Optimistic (Rs in thousands)
Revenue	1071.00	1190.00	1309.00
(less) Variable cost	666.00	740.00	814.01
(less) Fixed cost	240.00	240.00	240.00
(less) Depreciation	166.20	166.20	166.20
EBIT	-1.20	43.80	88.80
(less) Interest	0.00	0.00	0.00
PBT	-1.20	43.80	88.80
(less) Tax	11.90	11.90	11.90
PAT	-13.10	31.90	76.90
(add) Depreciation	166.20	166.20	166.20
NET CASH INFLOWS	**153.10**	**198.10**	**243.10**

Inference:

This table indicates for the year 2009-10 under pessimistic conditions shows net cash inflows as Rs.153.10 in thousands, for most likely as Rs.198.10 in thousands, and for optimistic as Rs.243.10 in thousands and indicating that the Project A will perform well even under three different conditions.

4.2.13 NET PRESENT VALUE UNDER CHANGING SALES VOLUME

TABLE NO: 4.2.13
Net present value under changing sales volume for Project A

Year	Discount rate at 12%	Pessimistic (Rs in thousands)		Most Likely (Rs in thousands)		Optimistic (Rs in thousands)	
		Cash inflows	Present value	Cash inflows	Present value	Cash inflows	Present value
2009-10	0.89	153.10	136.69	198.10	176.87	243.10	217.05
2010-11	0.80	298.65	238.08	360.02	287.00	421.39	335.93
2011-12	0.71	468.02	333.13	548.44	390.37	628.85	447.61
2012-13	0.64	664.80	422.49	767.34	487.66	869.89	552.83
2013-14	0.57	893.09	506.76	1021.30	579.52	1149.52	652.27
AL			**1637.16**		**1921.42**		**2205.68**
Investment			1163.40		1163.40		1163.40
PRESENT UE			**473.76**		**758.02**		**1042.28**

Inference:

The table shows that the net present value remains positive for all the three different conditions though a change of 10% decrease for pessimistic conditions and a 10% increase for optimistic conditions in the sales volume is effected. And also it creates the risk of losing the cash inflows to the extent of Rs.568.52 in thousands between optimistic and pessimistic conditions.

4.2.14 REVENUE UNDER CHANGING SELLING PRICE PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.2.14
Revenue under changing selling price per unit in the Project A

Particulars	Product				Total
	Sambar Powder	Ragi flour	Wheat flour	Rice flour	
Selling price per unit-Pessimistic(In Rs)	80.75	26.60	32.29	25.17	164.81
Selling price per unit-Most Likely(In Rs)	85.00	28.00	33.99	26.49	173.48
Selling price per unit-Optimistic(In Rs)	89.25	29.40	35.69	27.81	182.15
Sales volume(in units)	8750	3750	6500	4542	23542
	Pessimistic			(Rs in thousands)	
Revenue	706.56	99.75	209.89	114.30	1130.50
	Most Likely			(Rs in thousands)	
Revenue	743.75	105.00	220.94	120.32	1190.00
	Optimistic			(Rs in thousands)	
Revenue	780.94	110.25	231.98	126.33	1249.50

INPUTS FOR CALCULATION:

Selling price are assumed to be decrease by 5% in pessimistic, increase by 5% in optimistic and kept constant for most likely.

Inference:

From the above table it can be inferred that when the selling price of the product changes under three different conditions the revenue shows Rs.1130.50 in thousands for pessimistic conditions, Rs.1190.00 in thousands for most likely, and for optimistic Rs.1249.50 in thousands.

4.2.15 NET CASH INFLOWS UNDER CHANGING SELLING PRICE PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.2.15
Net cash inflows under changing selling price per unit in the Project A

Particulars	Pessimistic (Rs in thousands)	Most Likely (Rs in thousands)	Optimistic (Rs in thousands)
Revenue	1130.50	1190.00	1249.50
(less) Variable cost	740.00	740.00	740.00
(less) Fixed cost	240.00	240.00	240.00
(less) Depreciation	166.20	166.20	166.20
EBIT	-15.70	43.80	103.30
(less) Interest	0.00	0.00	0.00
PBT	-15.70	43.80	103.30
(less) Tax	11.90	11.90	11.90
PAT	-27.60	31.90	91.40
(add) Depreciation	166.20	166.20	166.20
NET CASH INFLOWS	**138.60**	**198.10**	**257.60**

Inference:

The table shows that the net cash inflows for the year 2009-10 under pessimistic conditions takes Rs 138.60 in thousands and arrives positively in most likely Rs.198.10 in thousands and optimistic conditions Rs. 257.60 in thousands. It indicates that this Project is not much risky.

4.2.16 NET PRESENT VALUE UNDER CHANGING SELLING PRICE PER UNIT

TABLE NO: 4.2.16
Net present value under changing selling price per unit

Year	Discount rate at 12%	Pessimistic (Rs in thousands)		Most Likely (Rs in thousands)		Optimistic (Rs in thousands)	
		Cash inflows	Present value	Cash inflows	Present value	Cash inflows	Present value
2009-10	0.89	138.60	123.75	198.10	176.88	257.60	230.00
2010-11	0.80	291.59	232.45	360.02	287.00	428.44	341.55
2011-12	0.71	469.75	334.36	548.44	390.37	627.13	446.38
2012-13	0.64	676.85	430.15	767.34	487.66	857.83	545.17
2013-14	0.57	917.24	520.47	1021.30	579.52	1125.37	638.57
TOTAL			1641.18		1921.42		2201.66
(less) Investment cost			1163.40		1163.40		1163.40
NET PRESENT VALUE			477.78		758.02		1038.26

Inference:

From the table it can be inferred that the net present value even under pessimistic assumptions shows positive value and it is apparent from the range of Net present value of optimistic and pessimistic conditions that the risk of Project A turns out to be Rs.560.48 in thousands **(1038.26-477.78)**

4.2.17 VARIABLE COST UNDER CHANGING VARIABLE COST PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.2.17
Variable cost under changing variable cost per unit in Project A

Particulars	Product				Total
	Sambar Powder	Ragi flour	Wheat flour	Rice flour	
Variable cost per unit-Pessimistic(In Rs)	60.43	16.81	18.90	13.73	109.87
Variable cost per unit-Most Likely(In Rs)	57.55	16.01	18.00	13.08	104.64
Variable cost per unit-Optimistic(In Rs)	54.67	15.21	17.10	12.43	99.41
Sales volume(in units)	8750	3750	6500	4542	23542.00
	Pessimistic			(Rs in thousands)	
Revenue	528.74	63.04	122.85	62.38	777.01
	Most Likely			(Rs in thousands)	
Revenue	503.56	60.04	117.00	59.40	740.00
	Optimistic			(Rs in thousands)	
Revenue	478.38	57.04	111.15	56.43	703.00

INPUTS FOR CALCULATION:

Variable costs are assumed to be increase by 5% in pessimistic, decrease by 5% in optimistic and kept constant for most likely.

Inference:

The table infers that the variable cost is increased to Rs.10529.71in thousands for pessimistic conditions, for most likely it reduces to Rs.10028.30in thousands and it further decreases to Rs.9526.88in thousands indicating that it gives more profit under optimistic conditions for the year 2009-10.

4.2.18 NET CASH INFLOWS UNDER CHANGING VARIABLE COST PER UNIT FOR THE YEAR 2009-10

<div align="center">

TABLE NO: 4.2.18
Net cash inflows under changing variable cost per unit in Project A

</div>

Particulars	Pessimistic (Rs in thousands)	Most Likely (Rs in thousands)	Optimistic (Rs in thousands)
Revenue	1190.00	1190.00	1190.00
(less) Variable cost	777.00	740.00	703.00
(less) Fixed cost	240.00	240.00	240.00
(less) Depreciation	166.20	166.20	166.20
EBIT	6.80	43.80	80.80
(less) Interest	0.00	0.00	0.00
PBT	6.80	43.80	80.80
(less) Tax	11.90	11.90	11.90
PAT	-5.10	31.90	68.90
(add) Depreciation	166.20	166.20	166.20
NET CASH INFLOWS	**161.10**	**198.10**	**235.10**

Inference:

The above table shows that the net cash inflows for optimistic Rs.621.66in thousands and most likely Rs.319.10in thousands conditions are positive but for pessimistic it is negative (Rs.-120.46) in thousands and it tends to be risky for the year 2009-10.

4.2.19 NET PRESENT VALUE UNDER CHANGING VARIABLE COST PER UNIT

TABLE NO: 4.2.19
Net present value under changing variable cost per unit

Year	Discount rate at 12%	Pessimistic (Rs in thousands)		Most Likely (Rs in thousands)		Optimistic (Rs in thousands)	
		Cash inflows	Present value	Cash inflows	Present value	Cash inflows	Present value
2009-10	0.89	161.10	143.84	198.10	176.88	235.10	209.91
2010-11	0.80	322.28	256.92	360.02	287.00	397.76	317.09
2011-12	0.71	509.96	362.98	548.44	390.37	586.92	417.76
2012-13	0.64	728.12	462.74	767.34	487.66	806.56	512.59
2013-14	0.57	981.34	556.84	1021.30	579.52	1061.26	602.19
TOTAL			1783.31		1921.42		2059.53
(less) Investment cost			1163.40		1163.40		1163.40
NET PRESENT VALUE			619.91		758.02		896.13

Inference:

This table clearly indicates the present value of cash inflows exceeds by Rs.619.91 in thousands to cover up the investment cost of Rs.1500.00 in thousands under pessimistic conditions and exceeds under most likely Rs.758.02 in thousands as well as in optimistic conditions Rs.896.13 in thousands. The difference between optimistic and pessimistic net present value Rs.276.22 in thousands adds risk to the Project A.

4.3 NEW MODEL PROJECT B

4.3.1 COST OF THE PROJECT AND MEANS OF FINANCE

TABLE NO: 4.3.1
Cost of the Project and means of finance for Project B

Particulars	Total Cost (Rs in thousands)
Crusher Machine(For Chilli)	315.00
Crusher Machine(For Flour)	315.00
Crusher Machine(For Masala)	315.00
Plour Machine (10HP)	71.40
Plour Machine (15HP)	94.50
Filter Machine	52.50
Form Fill and Scale Machine	840.00
Automatic Screw Conveyor Feeder	294.00
TOTAL	**2297.40**
Means of finance	
Own fund	1750.00
Bank loan at 13% Interest	547.40
TOTAL	**2297.40**

Bank loan %   = (Bank loan/Investment Cost) * 100

= 547.40/2297.40 = 24%

Own fund %   = (Own fund/Investment Cost) * 100

= 1750/2297.40 = 76%

Inference:

The above table shows that 24% of source of investments were borrowed from Bank. This can helps the company to contribute their funds for some other purposes.

4.3.2 DEPRECIATION UNDER DECLINING BALANCE METHOD

TABLE NO: 4.3.2
Depreciation under declining balance method for Project B

Particulars						(Rs in thousands)
Years	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Crusher Machine(For Chilli)	45.00	38.25	32.51	27.64	23.49	19.97
Crusher Machine(For Flour)	45.00	38.25	32.51	27.64	23.49	19.97
Crusher Machine(For Masala)	45.00	38.25	32.51	27.64	23.49	19.97
Plour Machine (10HP)	10.20	8.67	7.37	6.26	5.32	4.53
Plour Machine (15HP)	13.50	11.48	9.75	8.29	7.05	5.99
Filter Machine	7.50	6.38	5.42	4.61	3.92	3.33
Form Fill and Scale Machine	120.00	102.00	86.70	73.70	62.64	53.24
Automatic Screw Conveyor Feeder	42.00	35.70	30.35	25.79	21.92	18.64
Total	328.20	278.97	237.12	201.56	171.32	145.62

Inference:

From the table it can be inferred that all the machinery used for producing food products charged depreciation at 15% under Declining balance method for the whole Project period of 2009-10 to 2014-15.

4.3.3 ANALYSIS OF NET CASH INFLOWS FOR THE PERIOD

2009-10 TO 2014-15

TABLE NO: 4.3.3
Net cash inflows for Project B

Particulars						(Rs in thousands)
Year	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Revenue	1530.00	1912.50	2390.63	2988.28	3735.35	4669.19
(less Variable cost)	765.00	780.30	795.60	810.90	826.20	841.50
(less Fixed cost)	250.00	250.00	250.00	250.00	250.00	250.00
(less Depreciation)	328.20	278.97	237.12	201.56	171.32	145.62
EBIT	**186.80**	**603.23**	**1107.90**	**1725.83**	**2487.83**	**3432.07**
(less) Interest	162.00	162.00	162.00	162.00	162.00	162.00
PBT	**24.80**	**441.23**	**945.90**	**1563.83**	**2325.83**	**3270.07**
(less) Tax	15.30	19.13	23.91	29.88	37.35	46.69
PAT	**9.50**	**422.11**	**921.99**	**1533.94**	**2288.48**	**3223.37**
(add) Depreciation	328.20	278.97	237.12	201.56	171.32	145.62
NCT*	**337.70**	**701.08**	**1159.12**	**1735.50**	**2459.80**	**3369.00**

INPUTS FOR CALCULATION:

Interest for loan amount calculated at 13%. Therefore the company should spend Rs.162.00 (in thousands) as Interest amount for every year.

Inference:

From the above table it can be inferred that Net cash inflows shows an increasing trend for the entire Project period of five years (2009-10 to 2014-15).

FIG NO: 4.3.3

Net cash inflows for Project B
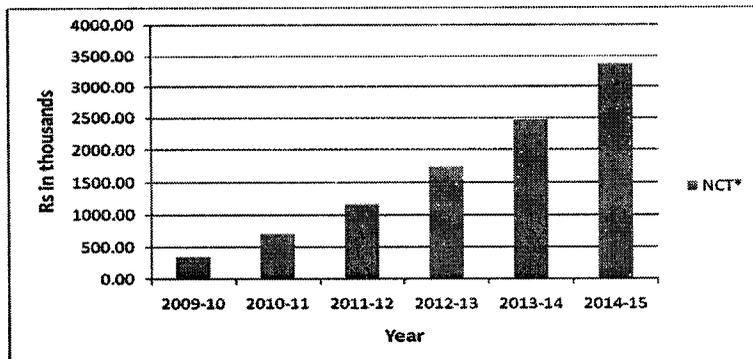
4.3.4 PAY BACK PERIOD

TABLE NO: 4.3.4
Pay back period for Project B

Year	Cash inflows (Rs in thousands)	Cumulative cash inflows
2009-10	337.70	337.70
2010-11	701.08	1038.78
2011-12	**1159.12**	**2197.89**
2012-13	.1735.50	3933.39
2013-14	2459.80	6393.19
2014-15	3369.00	9762.19

Investment cost = Rs.2297.40 (in thousands)

$$\text{Pay back period} = 3 + \left[\frac{2297.40 - 2197.89}{1735.50} \right] \times 12$$

$$= \textbf{3.69 Years}$$

Inference:

From the above table it can be inferred that pay back period is 3.69 years hence it can break even its investment cost in the 8th month of 4th year of the Project period.

4.3.5 NET PRESENT VALUE

Formula:

$$\text{Net present value} = \left[\frac{C_1}{(1+k)^1} + \ldots\ldots + \frac{C_n}{(1+k)^n} \right] - C_o$$

Where, C_1 - cash inflows in 1st year,

C_n - cash inflows for nth year

C_o - investment cost

TABLE NO: 4.3.5
Net Present Value for Project B

Year	Cash Inflows (Rs in thousands)	Discount Factor at 25%	Present Value (Rs in thousands)
2009-10	337.70	0.80	270.16
2010-11	701.08	0.64	448.69
2011-12	1159.12	0.51	593.47
2012-13	1735.50	0.41	710.86
2013-14	2459.80	0.33	806.03
2014-15	3369.00	0.26	883.16
Total present value of future cash inflows			3712.37
(less) Investment cost			2297.40
NET PRESENT VALUE			1414.97

Profitability Index = 3712.37/2297.40 =1.62

Inference:

From the above table it can be inferred that the net present value of Project B is Rs.1414.97 in thousands which is greater than zero and indicates that it is a profitable Project. PI is greater than 1 so project is acceptable.

4.3.6 INTERNAL RATE OF RETURN: (TRIAL AND ERROR METHOD)

Formula:

Difference in calculated

Present value and required

Net cash outlay

Internal rate of return = _____ X difference in rate

Difference in calculated

Present values

TABLE NO: 4.3.6
Internal rate of return for Project B

Year	Cash Inflows (Rs in thousands)	Discount Factor at 25%	Present Value (Rs in thousands)	Discount Factor at 33%	Present Value (Rs in thousands)
2009-10	337.70	0.80	270.16	0.75	253.91
2010-11	701.08	0.64	448.69	0.57	396.33
2011-12	1159.12	0.51	593.47	0.43	492.69
2012-13	1735.50	0.41	710.86	0.32	554.65
2013-14	2459.80	0.33	806.03	0.24	591.07
Total present value of future cash inflows			2829.20		2288.65
(less) Investment cost			2297.40		2297.40
NET PRESENT VALUE			531.80		-8.75

531.80

Internal Rate of Return = 25 + _____ X 8

(2829.20 – 2288.65)

= 32.87%

Inference:

It can be inferred from the above table that net present value is positive at 25% return Rs.531.80 in thousands but actually it exceeds the investment cost and net present value shows negative value at 33% return Rs.-8.75 in thousands which is below the investment cost. The exact IRR for Project B lies between 25% to 33%. Hence the company can yield a return of 32.87% by engaging in Project A.

4.3.7 PROBABILITY ASSIGNMENT

PRESENT VALUE OF EXPECTED NET CASH INFLOWS FOR THE YEAR 2009-10

Formula:

$$PV\ (ENCF)\ =\ \frac{ENCF}{(1+K)^n}$$

TABLE NO: 4.3.7
Present value of expected net cash inflows for Project B

Possible events	Cash inflows (Rs in thousands)	Probability	Expected value (Rs in thousands)
Pessimistic	297.176	0.25	74.294
Most likely	337.70	0.50	168.85
Optimistic	378.224	0.25	94.556
EXPECTED NET CASH INFLOWS			337.70
PRESENT VALUE(ENCF)			301.52

Inference:

This table shows that the present value of expected net cash inflows for the year 2009-10 is Rs337.70 in thousands which is less than the expected net cash inflows when the cash inflows are reduced by 12% from the expected cash inflows for pessimistic conditions and increase by 12% for optimistic conditions and no change in most likely conditions.

4.3.8 EXPECTED NET PRESENT VALUE (ENPV)

TABLE NO: 4.3.8
Expected net present value for Project B

Year	PV(ENCF)* (Rs in thousands)
2009-10	301.52
2010-11	625.96
2011-12	1034.93
2012-13	1549.55
2013-14	2196.25
TOTAL	5708.21
(less)Investment cost	2297.40
ENPV**	3410.81

PV (ENCF)* - Present value of expected net cash inflows

ENPV **   - Expected net present value

Inference:

The above table shows that the expected net present value is greater than zero i.e.,Rs.3410.81 in thousands due to the present value of expected net cash inflows shows an increasing trend throughout the Project period even when the cash inflows are reduced by 12% in pessimistic conditions.

4.3.9 STANDARD DEVIATION AND COEFFICIENT OF VARIATION

STANDARD DEVIATION FOR THE YEAR 2009-10

Formulas:

$$\text{Mean} = \frac{\sum x}{N}$$

$$\text{Standard Deviation} (\sigma) = \sqrt{\sum \text{Ncf}}$$

TABLE NO: 4.3.9
Standard deviation for Project B in the year 2009-10

Possible events	Cash inflows (Rs in thousands)	Deviation from mean (Rs in thousands)	Deviations squared (Rs in thousands)	Probability	Net cash inflows(NCF) (Rs in thousands)
Pessimistic	297.18	-40.52	1642.19	0.25	410.55
Most likely	337.70	0.00	0.00	0.50	0.00
Optimistic	378.22	40.52	1642.19	0.25	410.55
	1013.10				821.10
Mean	337.70				
Standard deviation					28.65

Inference:

This table clearly indicates that the deviation from the expected cash inflows of the Project B touched at Rs.28.65 in thousands for the year 2009-10 and indicates that this project is riskier.

4.3.10 TOTAL STANDARD DEVIATION AND COEFFICIENT OF VARIATION FOR THE PERIOD 2009-10 TO 2013-14

Formula:

$$\text{Coefficient of variation} = \frac{\text{Standard deviation}}{\text{Expected cash inflows}}$$

TABLE NO: 4.3.10
Total standard deviation and coefficient of variation for Project B

Year	PV(ENCF)* (Rs in thousands)
2009-10	28.65
2010-11	59.49
2011-12	98.35
2012-13	147.26
2013-14	208.72
Total Standard Deviation	542.48
Total expected value	6393.19
Coefficient of variation (%)	8.49

Inference:

From the table it can be inferred that the deviations in the cash inflows for each year are increasing, and making the Project B risky to the extent of Rs.542.48 in thousands. And the coefficient of variation at 8.49%

4.3.11 SENSITIVITY ANALYSIS

REVENUE AND VARIABLE COST UNDER CHANGING SALES VOLUME FOR THE YEAR 2009-10

TABLE NO: 4.3.11
Revenue and variable cost under changing sales volume in Project B

Particulars	Product				Total
	Sambar Powder	Ragi flour	Wheat flour	Rice flour	
Sales Volume-Pessimistic(In kgs)	9450	4950	7695	6554.7	28649.7
Sales Volume-Most Likely(In kgs)	10500	5500	8550	7283	31833
Sales Volume-Optimistic(In kgs)	11550	6050	9405	8011.3	35016.3
Variable Cost Per Kgs (In Rs)	44.50	13.50	15.92	12.00	85.92
Selling Price (In Rs)	85.00	28.00	34.00	26.47	173.47
	Pessimistic			(Rs in thousands)	
Revenue	803.25	138.60	261.63	173.52	1377.00
(Less) Variable Cost	420.53	66.83	122.50	78.65	688.50
Contribution	**382.73**	**71.78**	**139.13**	**94.87**	**688.49**
	Most Likely			(Rs in thousands)	
Revenue	892.50	154.00	290.70	192.80	1530.00
(Less) Variable Cost	467.25	74.25	136.12	87.39	765.00
Contribution	**425.25**	**79.75**	**154.58**	**105.41**	**764.99**
	Optimistic			(Rs in thousands)	
Revenue	981.75	169.40	319.77	212.08	1683.00
(Less) Variable Cost	513.98	81.68	149.73	96.13	841.51
Contribution	**467.78**	**87.73**	**170.04**	**115.95**	**841.49**

INPUTS FOR CALCULATION:

Sales volumes are reduced by 10% for pessimistic, increased by 10% for optimistic and kept constant for most likely.

Inference:

The above table shows that the contribution for the year 2009-10 under pessimistic conditions is Rs.688.49 in thousands, in most likely conditions Rs.764.99 in thousands, and in optimistic conditions further increased to Rs.841.49 in thousands to give more profits for the year 2009-10.

4.3.12 NET CASH INFLOWS UNDER CHANGING SALES VOLUME FOR THE YEAR 2009-10

TABLE NO: 4.3.12
Net cash inflows under changing sales volume in Project B

Particulars	Pessimistic (Rs in thousands)	Most Likely (Rs in thousands)	Optimistic (Rs in thousands)
Revenue	1377.00	1530.00	1683.00
(less) Variable cost	688.50	765.00	841.51
(less) Fixed cost	250.00	250.00	250.00
(less) Depreciation	328.20	328.20	328.20
EBIT	110.29	186.79	263.29
(less) Interest	145.80	162.00	162.00
PBT	-35.51	24.79	101.29
(less) Tax	15.30	15.30	15.30
PAT	-50.81	9.49	85.99
(add) Depreciation	328.20	328.20	328.20
NET CASH INFLOWS	**277.39**	**337.69**	**414.19**

Inference:

This table shows that the net cash inflows varies under three different conditions but still it is in positive and hence, it is clear that this Project under changing sales volume is profitable.

4.3.13 NET PRESENT VALUE UNDER CHANGING SALES VOLUME

TABLE NO: 4.3.13
Net present value for changing sales volume for Project B

Year	Discount rate at 12%	Pessimistic (Rs in thousands)		Most Likely (Rs in thousands)		Optimistic (Rs in thousands)	
		Cash inflows	Present value	Cash inflows	Present value	Cash inflows	Present value
2009-10	0.89	277.39	247.67	337.69	301.51	414.19	369.81
2010-11	0.80	749.86	597.78	863.08	688.04	976.30	778.30
2011-12	0.71	1161.62	826.82	1321.12	940.35	1480.62	1053.88
2012-13	0.64	1679.76	1067.52	1897.50	1205.89	2115.24	1344.27
2013-14	0.57	2330.88	1322.61	2621.80	1487.68	2912.71	1652.75
TOTAL			4062.39		4623.47		5199.01
(less) Investment cost			2297.40		2297.40		2297.40
NET PRESENT VALUE			1764.99		2326.07		2901.61

Inference:

The table shows that the net present value remains positive for all the three different conditions though a change of 10% decrease for pessimistic conditions and a 10% increase for optimistic conditions in the sales volume is effected. And also it creates the risk of losing the cash inflows to the extent of Rs.1136.62 in thousands between optimistic and pessimistic conditions.

4.3.14 REVENUE UNDER CHANGING SELLING PRICE PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.3.14
Revenue under changing selling price per unit in Project B

Particulars	Product				Total
	Sambar Powder	Ragi flour	Wheat flour	Rice flour	
Selling price per unit-Pessimistic(In Rs)	80.75	26.60	32.30	25.15	164.80
Selling price per unit-Most Likely(In Rs)	85.00	28.00	34.00	26.47	173.47
Selling price per unit-Optimistic(In Rs)	89.25	29.40	35.70	27.79	182.14
Sales volume(in units)	10500	5500	8550	7283	31833
	Pessimistic			(Rs in thousands)	
Revenue	847.88	146.30	276.17	183.14	1453.48
	Most Likely			(Rs in thousands)	
Revenue	892.50	154.00	290.70	192.78	1529.98
	Optimistic			(Rs in thousands)	
Revenue	937.13	161.70	305.24	202.42	1606.48

INPUTS FOR CALCULATION:

Selling price are assumed to reduce by 5% in pessimistic, increase by 5% in optimistic and kept constant for most likely.

Inference:

From the table it can be inferred that the revenues for the year 2009-10 under pessimistic conditions stands at Rs.1453.48 in thousands, for optimistic conditions at Rs.1606.48 in thousands and remain constant under most likely conditions.

4.3.15 NET CASH INFLOWS FOR CHANGING SELLING PRICE PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.3.15
Net cash inflows for changing selling price per unit in the Project B

Particulars	Pessimistic (Rs in thousands)	Most Likely (Rs in thousands)	Optimistic (Rs in thousands)
Revenue	1453.50	1530.00	1606.50
(less) Variable cost	765.00	765.00	765.00
(less) Fixed cost	250.00	250.00	250.00
(less) Depreciation	328.20	328.20	328.20
EBIT	110.30	186.80	263.30
(less) Interest	0.00	0.00	0.00
PBT	110.30	186.80	263.30
(less) Tax	15.30	15.30	15.30
PAT	95.00	171.50	248.00
(add) Depreciation	328.20	328.20	328.20
NET CASH INFLOWS	**423.20**	**499.70**	**576.20**

Inference:

The table shows that the net cash inflows for the year 2009-10 under optimistic assumptions takes the value of Rs.576.20 in thousands, cash inflows decreased to Rs.499.70 in thousands in most likely conditions, and it still further decreased to Rs. 423.20 in thousands this causes risk in the cash inflows of the Project B.

4.3.16 NET PRESENT VALUE UNDER CHANGING SELLING PRICE PER UNIT

TABLE NO: 4.3.16
Net present value under changing selling price per unit sales for Project B

Year	Discount rate at 12%	Pessimistic (Rs in thousands)		Most Likely (Rs in thousands)		Optimistic (Rs in thousands)	
		Cash inflows	Present value	Cash inflows	Present value	Cash inflows	Present value
2009-10	0.89	423.20	377.86	499.70	446.16	576.20	514.46
2010-11	0.80	767.45	611.81	863.08	688.04	958.70	764.27
2011-12	0.71	1201.59	855.27	1321.12	940.35	1440.65	1025.43
2012-13	0.64	1748.08	1110.94	1897.50	1205.89	2046.91	1300.85
2013-14	0.57	2435.03	1381.70	2621.80	1487.68	2808.57	1593.66
TOTAL			4337.57		4768.12		5198.67
(less) Investment cost			2297.40		2297.40		2297.40
NET PRESENT VALUE			2040.17		2470.72		2901.27

Inference:

The above table shows that under most likely Rs.2308.32 in thousands and optimistic conditions Rs. 2738.87 in thousands the net present value is in positive but under pessimistic the net present value is in Rs. 1877.77 in thousands and the difference between optimistic and pessimistic net present value indicates the risk of the Project to the extent of Rs.861.10 in thousands.

4.3.17 VARIABLE COST FOR CHANGING VARIABLE COST PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.3.17
Variable cost for changing variable cost per unit in Project B

Particulars	Product				Total
	Sambar Powder	Ragi flour	Wheat flour	Rice flour	
Variable cost per unit-Pessimistic(In Rs)	46.73	14.18	16.72	12.60	90.21
Variable cost per unit-Most Likely(In Rs)	44.50	13.50	15.92	12.00	85.92
Variable cost per unit-Optimistic(In Rs)	42.28	12.83	15.12	11.40	81.62
Sales volume(in units)	10500	5500	8550	7283	31833.00
	Pessimistic			(Rs in thousands)	
Revenue	490.61	77.96	142.92	91.76	803.25
	Most Likely			(Rs in thousands)	
Revenue	467.25	74.25	136.12	87.39	765.00
	Optimistic			(Rs in thousands)	
Revenue	443.89	70.54	129.31	83.02	726.75

INPUTS FOR CALCULATION:

Variable costs are assumed to be increase by 5% in pessimistic, decrease by 5% in optimistic and kept constant for most likely.

Inference:

The table infers that the variable cost is increased to Rs.803.25 in thousands for pessimistic conditions, for most likely it reduces to Rs.765.00 in thousands and it further decreases to Rs.726.75 in thousands indicating that it gives more profit under optimistic conditions for the year 2009-10.

4.3.18 NET CASH INFLOWS FOR CHANGING VARIABLE COST PER UNIT FOR THE YEAR 2009-10

TABLE NO: 4.3.18

Net cash inflows for changing variable cost per unit in Project B

Particulars	Pessimistic (Rs in thousands)	Most Likely (Rs in thousands)	Optimistic (Rs in thousands)
Revenue	1530.00	1530.00	1530.00
(less) Variable cost	803.25	765.00	726.75
(less) Fixed cost	250.00	250.00	250.00
(less) Depreciation	328.20	328.20	328.20
EBIT	148.55	186.80	225.05
(less) Interest	0.00	0.00	0.00
PBT	148.55	186.80	225.05
(less) Tax	15.30	15.30	15.30
PAT	133.25	171.50	209.75
(add) Depreciation	328.20	328.20	328.20
NET CASH INFLOWS	461.45	499.70	537.95

Inference:

The above table shows that the net cash inflows for optimistic and most likely conditions are positive but for pessimistic it is Rs. 461.45 in thousands and it tends to be risky for the year 2009-10.

4.3.19 NET PRESENT VALUE UNDER FOR CHANGING VARIABLE COST PER UNIT

TABLE NO: 4.3.19
Net present value for changing variable cost per unit for Project B

Year	Discount rate at 12%	Pessimistic (Rs in thousands)		Most Likely (Rs in thousands)		Optimistic (Rs in thousands)	
		Cash inflows	Present value	Cash inflows	Present value	Cash inflows	Present value
2009-10	0.89	461.45	412.01	499.70	446.16	537.95	480.31
2010-11	0.80	824.06	656.94	863.08	688.04	902.09	719.14
2011-12	0.71	1281.34	912.03	1321.12	940.35	1360.90	968.66
2012-13	0.64	1856.95	1180.13	1897.50	1205.89	1938.04	1231.66
2013-14	0.57	2580.49	1464.24	2621.80	1487.68	2663.11	1511.12
TOTAL			4625.34		4768.12		4910.89
(less) Investment cost			2297.40		2297.40		2297.40
NET PRESENT VALUE			2327.94		2470.72		2613.49

Inference:

This table clearly indicates the present value of cash inflows is Rs.2327.94 in thousands to cover up the investment cost of Rs.2297.40 in thousands under pessimistic conditions and exceeds under most likely Rs.2470.72 in thousands as well as in optimistic conditions Rs.2613.49 in thousands. The difference between optimistic and pessimistic net present value is Rs.285.55 in thousands adds risk to the Project B.

CHAPTER 5 – CONCLUSIONS

5.1 SUMMARY OF FINDINGS

- From the research study it is found that the company sources 24% of investment cost from bank for its capital Project B by which they can enjoy the benefit of paying less tax on their inflows.

- From the research it is found that depreciation for the machinery used in the Projects is being charged at 15% under declining balanced method. This will help the company to have more earnings in the subsequent years of the Projects, as their depreciation cost remains to be floating even when the business at peak.

- It is observed that the **Net cash inflows** of both Project A and Project B are increasing every year and the total Net cash inflows of Project B is Rs 9762.19 in thousands, which is greater than Project A and hence Project B is more profitable than Project A.

- From the research it is found out that Project A equals cash inflows with its investment cost exactly at 3.89 years where as Project B can break even its investment cost in 3.69 years itself.

- It is observed that the **Net present value** of Project B Rs.1414.97 in thousands is higher than the Project A and indicates that Project B is more profitable.

- It is observed that the company can yield a return of 30.12% by committing in Project A, where as it can yield a higher return in Project B 32.87%.

- From the analysis it is found out that the Project B's expected Net present value is Rs. 3410.81 in thousands which is better than the Project A Rs.1421.60 in thousands when the **probabilities** are assigned to its cash inflows.

- This study founds that Project A involves a **quantifying risk** to the extent of Rs.245.67 in thousands and Project B to the extent of Rs.542.48 in thousands in generating cash inflows under three different economic conditions.

- It is found that under **sensitivity analysis for the sales volume**, Project B is more sensitive than the Project A as the Net present value of optimistic and pessimistic economic conditions shows a difference of Rs.1136.62 in thousands which is higher than the Project A Rs.568.52 in thousands.

- From the research study it is found that the **selling price per unit** of a product is sensitive for both the Projects. However, the Net present value of Project B shows a difference of Rs.861.10 in thousands between optimistic and pessimistic economic conditions which is greater than the Project A Rs.560.49 in thousands and indicating Project A is more vulnerable to selling price per unit.

- From the study that Net present value between optimistic and pessimistic economic conditions in Project A is Rs.276.22 in thousands which is less than the Project B when the **variable cost per unit** of a product changes fewer than three different conditions.

- It is observed that Selling price per unit is highly sensitive for both Project A and B than the sales volume and variable cost per unit.

5.2 SUGGESTIONS & RECOMMENDATIONS

- From the research study the company sources 24% of its investment amount from bank at the cost of 13% for Project B. This reduces the optimum cash inflows of the company. Hence it is advisable that the company can borrow from any other sources like individuals or any other financial institutions which cost their borrowings less than 13%.

- From the research study, the risk in generating cash inflows is Rs.9762.19 in thousands and also the investment cost is Rs.2297.40 in thousands in Project B, which is higher than the Project A but Project B results as more beneficial than Project A in all aspects of capital budgeting techniques. Hence, it is suggestible that the company can implement Project B for its business.

- From the research study, it was found that the Projects are evaluated under capital budgeting techniques on the basis of certain assumptions to arrive a decision. As the capital investment is irreversible they should be very cautious in taking a decision. Hence, it is advisable to the company to adopt more techniques like Risk adjusted discount rate and simulation analysis to find out the suitable project for its business.

5.3 CONCLUSIONS

- The Present study has made an in-depth analysis by capital budgeting techniques of the business. By using, discounted cash flow techniques the Projects are evaluated, deviations from the expected cash inflows are calculated to find out quantifying risk of the projects and also this study tells which project is more sensitive to the company.

- This analysis proved a great deal to the management to take a decision suitable to their business. The findings of the project help the company to become as one of the market leader in the business. The study paves way for enabling the future researchers to undertake similar studies.

5.4 DIRECTIONS FOR FUTURE RESEARCH

Future researches in these areas can be focused on the following aspects which were not deeply analyzed or covered in this study:

- The Organization should adopt more techniques like Risk adjusted discount rate and simulation analysis to find out the suitable project for its business
- The Organization should implement few more Process Change which helps to increase the efficiency of the production.
- The Organization should expand their business network across the districts by recruiting sales representatives for marketing purposes

APPENDIX

	Product			
	Sambar Powder	Rice flour	Wheat flour	Toor Dour
Sales Volume- Project A (In kgs)	8750	3750	6500	4542
Sales Volume- Project B (In kgs)	10500	5500	8550	7283
Difference in Sales Volume (In kgs)	1750	1750	2050	2741
% of Sales Increase	20.00%	46.67%	31.54%	60.35%
Variable Cost Per Kgs (In Rs) Project A	57.55	16.01	18.00	13.08
Variable Cost Per Kgs (In Rs) Project B	44.50	13.50	15.92	12.00
Variable Cost Difference Per Kgs (In Rs)	13.05	2.51	2.08	1.08

Comparison of Project A and Project B

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