CHAPTER III
METHODOLOGY

In the process of achieving the objectives of the research study, it is very imperative to follow a systematic and scientific approach to present and interpret the result of the study or investigation conducted. This chapter on methodology gives a detailed description of the research approach, sampling procedure, nature and sources of data, the analytical tools and techniques employed and other relevant information. The methodology chapter is discussed under the following heads.

3.1 Research Approach

The study concerned with seed companies and was confined to only one company called Akshay Seed Tech Company Limited, hence a case study approach was adopted in the study.

3.1.1 Location of study

The study was confined to Junagadh District of Gujarat state. It is located at 20˚ 47’ North and 21˚ 45’ North latitude and 70˚ 17’ East and 70˚ 55’ East longitudes. The district is surrounded by Rajkot District to its north, Porbandar District to its Northwest, Amreli District to its East, Gir Somnath District to its South and East and the Arabian Sea to its South West. The study is carried out during the year 2018. The total area of Junagadh District is 5093.36 km². The average rainfall of Junagadh District is 1260 mm. According to the 2011 census, Junagadh District has a population of 1,25,605 roughly equal to the nation of the Jamaica or the US state of Utah. This gives it a ranking of 142nd in India (out of a total of 640). The District has a population density of 300 inhabitants per square kilometer (800/sq m). its population growth rate over the decade 2001-2011 was 12.01 per cent. Junagadh has a sex ratio of 945 females for every 1000 males. It has a literacy rate of 59.63 per cent in 1991 which increased to 76.80 per cent in 2011.

3.2 Nature and Source of Data

The secondary data was used for the study. The data was collected for the seven years i.e. from 2010-11 to 2016-17. The data was collected from the annual reports of the company. The secondary data related to gross profit, operating profit, net profit, sales, expenses, assets, liabilities, etc. will be collected from the annual report of the company.
3.3 Analytical Tools

3.3.1 Working capital performance

To study the working capital performance, ratio analysis was used. It refers to the transient capital that the firm requires for its day by day operations. Working capital is used to finance short term financial obligations of a firm. Following ratios were used for the study of working capital performance:

3.3.1.1 Debtors turnover ratio

Debtors turnover is calculated by dividing credit sales by average debtors. When a company makes its sale on credit, debtors or accounts receivables are formed. Debtors turnover indicates the number of times debtors turnover each year. It measures the speed at which debtors are converted into cash. Generally, it is observed that a higher debtor’s turnover ratio will add to increased liquidity and reduces investment in debtors indicating efficient management of debtors.

\[
\text{Debtors Turnover Ratio} = \frac{\text{Credit Sales}}{\text{Average Debtors}}
\]
3.3.1.2 Inventory turnover ratio

Inventory turnover is calculated by dividing the cost of goods sold by the average inventory. This ratio indicates the efficiency of the firm in producing and selling its product, by indicating the number of times the inventory has been converted into sales during the period.

**Inventory Turnover Ratio = Cost of Goods Sold / Average Inventory**

3.3.1.3 Working capital turnover ratio

Working capital turnover ratio measures the efficiency of employment of working capital. It indicates the utilization of net working capital by Akshay Seed. To test the efficiency of working capital, working capital turnover ratio is calculated. The faster the working capital turnover, the lower is the investment in the components of working capital and greater are the profits. However, a very high turnover of working capital might indicate that the firm is operating with greater volume of sales. A low working capital turnover ratio should be taken to mean that the working capital is not adequately utilized. Both excessive and inadequate working capital for the firm is harmful.

**Working Capital Turnover Ratio = Net Sales / Net Working Capital**

3.3.1.4 Cash turnover ratio

This ratio is found out to get an idea if the company is enjoying any benefit out of holding any cash. Cash turnover is used to determine the proportion of cash required to generate sales. Cash turnover based on a company’s revenues over the average cash balance during that period. High cash turnovers can mean that a company is going through its cash cycle quickly. While this could mean that your company is being efficient with its cash, it could also potentially mean a company is low on cash and may need sort-term financing in the future.

**Cash Turnover Ratio = Annual Revenue / Average Cash Balance**

3.3.1.5 Current ratio

This ratio establishes a relationship between current assets and current liabilities. It is an indicator of the firm’s ability to promptly meet its short-term liabilities. Normally a higher current ratio is considered as a sign of financial strength, but an abnormally high ratio means that the current assets of the firm are being financed by long term sources of funds. The current ratio of 2:1 or more is considered satisfactory. Normally, a higher current
ratio is considered as a sign of financial strength, but an abnormally high ratio means that the current assets of the firm are being financed by long term sources of funds.

**Current Ratio = Current Assets /Current Liabilities (Standard norm = 2:1)**

### 3.3.1.6 Liquid ratio

This ratio is a better indicator of a firm’s liquidity position as it takes into consideration only the liquid assets like cash and debtors leaving aside the inventories. The liquid ratio of 1:1 is considered to represent a satisfactory current financial condition.

**Liquid Ratio = Current Assets – Inventories/Current Liabilities**  
*(Standard norm = 1:1)*

### 3.3.1.7 Cash ratio

Since, cash is most liquid asset, a financial analyst may examine cash ratio and its equivalent to current liabilities. Trade investment or marketable securities are equivalent of cash. Cash ratio is the ratio of a company's total cash and cash equivalents to its current liabilities. The metric calculates a company's ability to repay its short-term debt; this information is useful to creditors when deciding how much debt, if any, they would be willing to extend to the asking party. The cash ratio is generally a more conservative look at a company's ability to cover its liabilities. (Bhatia and Barwal, 2015).

**Cash Ratio = Cash + Marketable Securities/Current Liabilities**

### 3.3.2 Capital structure analysis

To analyze the capital structure, ratio analysis was used. It is used to judge the long-term financial soundness of any business. Long-term Solvency means the ability of the enterprise to meet its long-term obligation on the due date. Long term lenders are basically interested in two things: payment of interest periodically and repayment of principal amount at the end of the loan period. The following ratios were calculated to judge the long term financial solvency of the concern:

#### 3.3.2.1 Debt-equity ratio

The relationship between borrowed funds and owner’s capital is a popular measure of the long–term financial solvency of a firm. This relationship is shown by the debt- equity ratio. It is determined to ascertain soundness of the long–term financial policies of the company. Total debt ratio indicates what proportion of debt a company has relative to its
assets. The measure gives an idea to the leverage of the company along with the potential risks the company faces in terms of its debt-load. A debt ratio of greater than 1 indicates that a company has more debt than assets, meanwhile, a debt ratio of less than 1 indicates that a company has more assets than debt. Used in conjunction with other measures of financial health, the debt ratio can help investors determine a company's level of risk.

**Debt- Equity Ratio = Total Debt /Shareholders Fund**

3.3.2.2 **Total debt ratio**

A ratio that indicates what proportion of debt a company has relative to its assets. This measure gives an idea to the leverage of the company along with the potential risks the company faces in terms of its debt-load.

**Debt Ratio = Total Debt/Total Assets**

3.3.2.3 **Proprietary ratio**

Proprietary ratio relates the shareholder’s funds to total assets. It is a variant of the equity ratio. This ratio shows the long term or future solvency of the business. It is calculated dividing shareholders’ funds by the total assets. This ratio shows the financial strength of the company.

**Proprietary Ratio = Shareholders’ Fund / Total Assets**

3.3.2.4 **Interest coverage ratio**

This ratio measures the debt servicing capacity of a firm in so far as fixed interest on long term loan is concerned. That is, the relationship between Earnings Before Interest and Tax (EBIT) and fixed interest charges. It is expressed in percentage or number of times. It also highlights the ability of the firm to raise additional funds in future (Moorthi et al., 2012).

**Interest Coverage Ratio = EBIT / Interest**

3.3.3 **Profitability position**

To examine the profitability position, ratio analysis was used. It is a measure of efficiency and control. It indicates the efficiency or effectiveness with which the operations of the business are carried on. Profitability is the profit earning capacity which is a crucial factor contributing for the survival of the firms. Every firm aims to dig up maximum profits
out of the invested capital pool. The success of the company usually depends on its returns earned. The following ratios were calculated for profitability analysis:

### 3.3.3.1 Gross profit ratio

Gross profit margin indicates the relationship between gross profit and net sales. It measures the efficiency of the company’s operations. Higher the ratio, the better it is. A low ratio indicates unfavorable trend in the form of reduction in selling prices not accompanied by proportionate decrease in cost of goods sold or increase in cost of production.

\[
\text{Gross Profit Ratio} = \left( \frac{\text{Gross Profit}}{\text{Net Sales}} \right) \times 100
\]

### 3.3.3.2 Operating profit ratio

Operating profit margin is a measurement of what proportion of a company's revenue is left over after paying for variable costs of production such as wages, raw materials, etc. It indicates what portion of profit is left to cover non-operating expenses such as interests, reserves and dividends etc. The higher this ratio, the better is the operational efficiency of the company and vice versa.

\[
\text{Operating Profit Ratio} = \left( \frac{\text{Operating Profit}}{\text{Net Sales}} \right) \times 100
\]

### 3.3.3.3 Net profit ratio

Net profit margin is the percentage of revenue remaining after all operating expenses, interest, taxes and preferred stock dividends (but not common stock dividends). A higher ratio indicates better position of the company.

\[
\text{Net Profit Ratio} = \left( \frac{\text{Earnings After Tax}}{\text{Net Sales}} \right) \times 100
\]

### 3.3.3.4 Return on capital employed

Return on capital employed is a financial ratio that measures a company's profitability and the efficiency with which its capital is employed. Capital employed is the sum of shareholders' equity and debt liabilities; it can be simplified as (Total Assets – Current Liabilities). A higher ROCE indicates more efficient use of capital. ROCE should be higher than the company’s capital cost; otherwise it indicates that the company is not employing its capital effectively and is not generating shareholder value.

\[
\text{Return on Capital Employed} = \left( \frac{\text{EBIT}}{\text{Capital Employed}} \right) \times 100
\]
3.3.3.5 Return on net worth (Return on equity)

Return on net worth refers to the amount of net income earned as a percentage of shareholders equity. Return on equity measures a company's profitability by revealing how much profit a company generates with the money that shareholders have invested (Reddy, 2015).

\[
\text{Return on Net Worth} = \left( \frac{\text{Net Income}}{\text{Net Worth}} \right) \times 100
\]

3.3.4 Statistical tool

In addition to ratio analysis, following tools were also used for the study.

3.3.4.1 Average

It is defined as the sum of the given observations divided by the number of observations.

\[
\sum_{i=1}^{n} \frac{x_i}{n}
\]

Where;

\( x_i \) = Value of observation
\( n \) = Number of observation

3.3.4.2 Standard deviation

It is defined as the positive square root of the arithmetic mean of the squares of the deviations of the given values from arithmetic mean. The square of the standard deviation is absolute measure of dispersion.

\[
SD = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}
\]

Where;

\( SD \) = Standard Deviation
\( x \) = Value of variable
\( \bar{x} \) = Average
\( n \) = Number of observation
3.3.4.3 Coefficient of variation

Coefficient of variation is the percentage ratio of standard deviation and the arithmetic mean. It is usually expressed in percentage. Coefficient of variation is relative measure of dispersion.

\[ CV = \frac{S}{\bar{x}} \times 100 \]

Where;

\( CV = \) Coefficient of variation
\( S = \) Standard deviation
\( \bar{x} = \) Average

3.3.4.4 Compound annual growth rate (CAGR)

Compound growth rate is used to assess the ratios during the period 2010 to 2016. The growth rate of ratios is calculated by using following formula;

\[ Y_t = ab^t \]

\[ \log Y_t = \log a + t \log b \]

Where;

\( Y_t = \) Ratios
\( t = \) Time in years
\( a = \) Constant
\( b = \) Regression coefficient

The above equation can be fitted by using the least squares method of estimation. That equation also enables to obtain the CAGR in (%) as follows;

\[ CAGR = (\text{Antilog of } B - 1) \times 100 \]

3.3.5 Risk analysis

To measure the risk factor, risk analysis was used. The risk is generally measured with the help of financial ratios. It is to be noted that there are no prescribed accounting ratios for risk evaluation. Some specific index value methods are also followed to determine the risk. Risk factor helps to know about the financing of the current assets through long
term funds after fixed assets are financed in full. The formula used by Ghosh, (2016) for the risk analysis was used:

$$R_k = \frac{(E_j + L_j) - A_j}{C_j}$$

Where;

$R_k$ = Risk Factor  
$E_j$ = Equity + Retained Earnings  
$L_j$ = Long term Loans  
$A_j$ = Fixed Assets  
$C_j$ = Current Assets

**Implications of risk**

(i) $R_k = 0$: indicates the firm is using the aggressive policy and normally the profitability would be high.

(ii) $R_k = 1$: indicates the firm is using the conservative policy and normally the profitability would be low.

**3.3.5.1 Rank correlation between risk and profitability**

To measure the relationship between risk and profitability, rank correlation was used. The correlation coefficient between two series of ranks is called ‘Rank Correlation Coefficient’ ($r$). Spearman’s Rank Correlation uses rank rather than actual observation and makes no assumption about population from which actual observations are drawn.

$$r = 1 - \frac{6(\sum d_i^2)}{n(n^2 - 1)}$$

Where;

$r$ = Rank correlation coefficient  
$d$ = Difference between the two ranking.  
$n$ = Number of observations.

**3.3.6 Sustainable growth model**

Sustainable growth is the maximum rate at which a company can increase sales while maintaining the target or optimal leverage ratio without any additional external equity financing. The sustainable growth model assumes that total owners’ equity for a company can only increase when retained earnings increase. The impact of this limitation on sales
growth can be derived from the fundamental equation of accounting which states that assets must be equal to liabilities plus owners’ equity. The formula used by I. M. Pandey for sustainable growth was used:

\[ g_s = b \left[ r + (r-i) \frac{D}{E} \right] (1-T) \]

Where;

\( g_s \) = Sustainable growth rate

\( b \) = Retention ratio, Retained Earning/Profit After Tax

\( r \) = Return on Net Assets = Profit Before Interest and Tax/Net Assets

\( i \) = Interest rate

\( \frac{D}{E} \) = Debt-equity ratio

\( T \) = Corporate tax rate

Comparing the actual growth rate of sales with the sustainable growth rate forecast could reveal how the company is managing growth. In business practice, companies seldom focus their efforts on maintaining a financial equilibrium. However, this analysis applied for planning purposes could improve the cooperation between strategic, planning and financial managers to establish growth objectives compatible with financial policies. It is also a useful tool that could help in strategy formulation, although it only supports the decision process which depends on risk-taking predispositions and individual features of the top management.