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Working Capital and its Relationship with Sales (A Case Study of Tamil Nadu Newsprint and Papers Limited)

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Abstract

The purpose of this paper is to analyse the status of gross and net working capital and their association with sales of Tamil Nadu Newsprint and Papers Ltd., with reference to the Indian paper industry the period under study from 2006 to 2013. The research is mainly based on secondary financial data obtained from the Annual Reports of TNPL, BSE and NSE. It focused on the size, character, and annual growth rates of gross and net working capital of the company. In addition, it analysed the growth trends of gross and net working capital of the company in relation to sales. With the help of the Karl Pearson's correlation model, the inter-relationship between sales and working capital has been identified. Then the strength and significance of such a relationship has been tested with the use of other statistical tools such as coefficient of determination and Student's t-test. The major findings of the research showed that while there was an increase in sales positively, strongly, and significantly associated with an increase in gross working capital for both the company and the industry, its association with net working capital was negative, poorly related, weak, and insignificant for the company under study. There is a dearth of studies in the available literature that discusses the relationship existing between sales and working capital in India's paper industry, in general and Tamil Nadu Newsprint and Papers Ltd. in particular, and therefore this research is expected to add significant value to exploring the said linkage.

Keywords: *Working Capital, Gross Working Capital, Net Working Capital, Sales and Tamil Nadu Newsprint and Papers Ltd.*

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1. INTRODUCTION :

In a practical sense, the entire fund of an organization is invested in its assets which are of two kinds: one is fixed assets and the second is current assets (Satapathy, 1994; Sharma and Gupta, 1996; Chakraborty, 2005; Mahapatra and Panda, 2008). Investment in current assets is of utmost importance as it rapidly changes its shape from one form to another and *vice-versa* many times in a financial year (Mathur, 2002). Therefore, researchers and financial analysts usually put much emphasis on the study of current assets due to its natural significance in day to day business to maintain liquidity status and to pay off the current obligations as and when due (Bhattacharya, 2007). For the purpose of analysis, the currents assets have divided into two heads. One is "gross working capital" that represents the absolute quantity of current assets and includes inventories, sundry debtors, cash and bank balances, and misc. Current assets (Mead, 1933; Baker and Malott, 1936; Smith, 1938, 1974; Field, 1938; Bogen, 1948; Husband and Duckery, 1966; Gole, 1966; van Horne, 1973; Mehta, 1974; Aggarwal, 1981; Satapathy, 1994; Baral, 2003). The second is "net working capital" that is qualitative in nature and represents the remaining amount of current assets over and above the current liabilities of the organization like Sundry Creditors, bank loans, and other current liabilities (Saliers, 1927; Lincoln, 1929; Guthmann and Dougall, 1955; Gerstenberg, 1959; Gole, 1959, 1966; Park and Gladson, 1963; Kennedy and McMullen, 1968; Howard, 1971; Grass, 1972; Kuchhal, 1976; Guthmann, 1976; Kulkarni, 1982; Rao, 1990). Gitman (1976) defined it to be that part which is generally financed with long-term funds. This net working capital can be zero, positive, or negative. Sometime it is possible that the current liabilities are equal to the current assets resulting in zero net working capital. If the current liabilities exceed the current assets, then there is no net working capital, but a net current liabilities representing working capital deficit (Saliers, 1927; Lincoln, 1929; Aggarwal, 1981; Sharma and Gupta, 1996; Sathyamoorthi, 2002; Mahapatra and Panda, 2008). Thus, mere existence of current assets does not mean the presence of working capital. They must exceed the current liabilities.

2. REVIEW OF LITERATURE:

Many researchers have conducted empirical investigations on the aspect of "working capital" from different perspectives and in diverse environments. Kotia (1978), Shankaraiah and Sudarshan (1986), Sathyamoorthi (2002), Chakraborty (2005) and Raheman and Nasr (2007) for example extended a theoretical understanding regarding working capital and focused on the importance of its efficient management to keep a balance between the liquidity-risk and profitability aspects of a business firm as a part of their research work. Rao and Prasad (1985) analyzed the size of working capital in private corporate sectors in India over a period of ten years from 1961-1962 to 1981-1982. Similarly, Rao (1997) also extended a conceptual analysis of working capital and ascertained the magnitude of both gross and net working capital in fifteen cement companies in Indian industries over a period of nine years starting from 1985-1986 to 1993-1994. Presently, researcher ascertained the size of both sales and working capital and then tested the correlation that existed between them. Subsequently, Satapathy (1994) studied the size of both gross and net working capital in the chemical industry in India over a period of 12 years, from 1980 to 1991, and tested the correlation that existed between the sales volume and net working capital using Karl Pearson's coefficient of correlation (r) and tested the significance with

student's t-test at a predetermined level of 5 percent level of significance. Likewise, Mahapatra and Panda (2008) also discussed the literature pertaining to the meaning of working capital and its effective management for the well-being of the Indian paper industry. The research work focused on seven sample companies that are scattered throughout the country representing the paper industry. The decade under study was from 1991 to 2000 and the researchers calculated the size of sales, gross working capital, and net working capital of individual sample companies and then tested the correlation that existed between the variables like sales and gross working capital and sales and net working capital with the help of Karl Pearson's coefficient of correlation, then with probable errors [P.E.(r)]. While computing the inter-relationship that existed between sales and working capital in their studies, the said researchers gave theoretical justification that growth in size of business depends up on sales or turnover, both in term of value and volume, besides other factors. Growth in business can be measured by ascertaining growth in sales. Growth in sales would result in growth in production, raw material consumption, inventories, man-hours, receivables, etc. which would need more working capital. Hence, in an ordinary sense, growth in sales may result in growth in working capital and *vice-versa*. However, it is also to be remembered that excessive working capital is undesirable as it indicates improper/mismanagement of funds and, therefore, may have an adverse impact on sales volume over a period of time.

The above studies have provided the researcher with a solid base and enriched his ideas regarding how to enumerate and describe the characters of the absolute volume of variables like gross and net working capital and estimated their inter-relationship, if any, with the variable "sales" of a company through the use of a correlation model that estimates the correlation coefficient (r). In addition, the above studies have also highlighted whether such relationships between the variables are significant at a predetermined level of significance. On the basis of the above research work, researcher has developed his own methodology for analysis of such variables of a company like Tamil Nadu Newsprint and Papers Limited.

3. BRIEF PROFILE OF THE COMPANY:

Tamil Nadu Newsprint and Papers Limited (TNPL) was established by the Government of Tamil Nadu during early eighties to produce Newsprint and Printing & Writing Paper using bagasse, a sugarcane residue, as primary raw material. The Company commenced production in the year 1984 with a initial capacity of 90,000 tonnes per annum (tpa). Over the years, the production capacity has been increased to 2,45,000 tpa and the Company has emerged as the largest bagasse based Paper Mill in the world consuming about one million tonnes of bagasse every year. The Company completed a Mill Expansion Plan during December 2010 to increase the mill capacity to 4,00,000 tpa. TNPL exports about 1/5th of its production to more than 50 countries. Manufacturing of quality paper for the past two and half decades from bagasse is an index of the company's technological competence. A strong record in adopting minimum impact best process technology, responsible waste management, reduced pollution load and commitment to the corporate social responsibility make the company one of the most environmentally compliant paper mills in the world. TNPL offers high-quality surface sized and non-surface sized paper to suit the needs of modern high speed printing machines. TNPL's cutting edge technology backed by experienced professionals ensures quality products to customers. TNPL's manufacturing

processes are equipped with state-of-the-art control systems to maintain critical quality parameters on line. The paper produced by TNPL is eco- friendly as the pulp is manufactured out of renewable raw material and is subjected to Elemental Chlorine Free (ECF) bleaching. As the paper is acid free, it has a longer colour stability and enhanced permanency in terms of strength characteristics.

TNPL caters to the requirements of multifunctional printing processes like sheet-fed, web offset, and digital printers. The paper reels have uniform profile with strength properties to cope even with high speed machines. TNPL manufactures Printing and Writing Papers in substances ranging from 50 GSM to 110 GSM. Following are the main products of TNPL:

- **ULTRA WHITE MAPLITHO/PRINT VISTA:** A premium product with superior brightness and opacity for high resolution, multi-colour printing. It is an ideal product for high-end printing segments like diaries, calendars, annual reports, brochures and catalogues.
- **ELEGANT MAPLITHO:** A high bright paper with excellent visual appeal and good surface properties. It is best suited for printing of diaries, calendars, posters, annual reports and quality text books etc.
- **HI-TECH MAPLITHO:** With a pleasant shade and improved optical properties, Hi-tech maplitho is an economical product for quality multi-colour printing on high speed web offset printing machines. The product has been an ideal choice amongst the computer stationery, notebook and calendar manufacturers.
- **PIGMENT PAPER:** Super Surface Sized product with lightweight coated properties. An ideal grade suitable for multi-colour high speed sheet and web offset printing machines.
- **OFFSET PRINTING PAPER:** Bright and endowed with superior internal bonding strength, it renders good functional properties. This product is best suited for student notebooks and continuous stationery.
- **CREAMWOVE:** This is a product for "low end-high quality" printing. It is ideal for examination papers, text books, students exercise notebooks and a wide range of stationery.
- **COPYCROWN:** A super bright multi-purpose office paper known for high opacity. It is offered in ready to use cut size packets converted and packed on state of the art on line sheets. Copy crown comes in attractive, compact and convenient packages. This product is available in A4 size 80/75 GSM packs of 500 sheets. This multi-functional paper is designed to meet all the printing needs of a modern office. It is ideally suited for laser, inkjet, plain paper fax and digital copiers.
- **COPIER:** A widely known copier paper conforming to international standards. This copier paper is offered in 80 and 75 GSM. It is available in A4, A3 and legal sizes. Operationally well accepted for high-speed copying by virtue of its excellent dimensional stability. The product is offered in moisture proof attractive convenient packs.
- **RADIANT PRINTING:** A non-surface sized paper with good strength and visual appearance. This product is the customer's choice for printing of textbooks, student notebooks, brochures and commercial grade printing.
- **ACE MARVEL:** An innovative product for different end-applications such as "Thermal and carbonless coating", Notebooks and Computer Stationery. Ace Marvel + is specially treated for lint free high quality and high speed 4 colour offset printing.

- **HARDBOUND NOTEBOOK:** TNPL Hardbound notebooks are made from top class surface sized ultra-white paper with a very pleasing shade with extra smoothness for trouble free writing. The notebooks are made with strong and rigid covers with laminated multi-colour designs. The binding, made with latest technology, is the unique feature which is very easy to handle, durable and at the same time has long life.
- **STUDENT'S FAVOURITE:** Ready-to-use cut sized writing paper offered in convenient and shrinks wrapped packing. It is converted to perfect dimensions in an online sheeting machine of international repute. This bright writing paper with a smooth finish is an ideal choice for writing. The product is offered in two sizes viz. 33.5 X 42.0 cm and 34.5 X 43.0 cm in reams of 500 sheets.
- **SUPER PRINT MAPLITHO:** A Product for high speed printing. The smooth surface with an excellent finish gives unique print evenness. This printer friendly product exhibits high degree of run ability and low degree of ink consumption. This new product from TNPL is becoming an ideal choice among printers and publishers.
- **PERFECT COPIER:** A new economic copier developed with functional properties for trouble free "High-volume", "High-speed" commercial mass copying. The product is offered in moisture proof attractive convenient packs.

4. METHODOLOGY OF THE STUDY

The present study is exploratory in nature and has been conducted keeping in mind two major objectives:

i. Determining the size, and character of gross and net working capital of Tamil Nadu Newsprint and Papers Ltd.; and
ii. Analysing the association of gross and net working capital with sales volume of the company and the Indian paper industry as a whole over the most crucial period of economy that begins from the year 2006 and ends in 2013.

The data required for the purpose of this study are mainly secondary in nature and are related to the financial statements of the company under observation that have been obtained from annual reports of the concern companies as well as from BSE and NSE data base, as available at their official websites.

The target company has been selected for case study taking into account of two basic needs. Those are:

i. Availability of year-wise financial data over a period of ten years starting from the year 2006 to 2013, which is the pre-requisite for the financial analysis of the company, especially for the trend analysis, with reference to Indian paper industry; and
ii. Homogeneity between the annual financial data so collected for the company under study and the available consolidated annual financial statements prepared for the industry by BSE and NSE data base.

5. RESEARCH HYPOTHESIS:

Keeping in view of the objectives of the study, researcher has undertaken two testable hypotheses (the null H_0 versus the alternative H_1).

Hypothesis 1

H_{01}. There is no significant relationship between the two variables "sales" and "gross working capital" in Tamil Nadu Newsprint and Papers Ltd. and the Indian paper industry, as a whole.

H_{11}. There is a significant relationship between the two variables "sales" and "gross working capital" in Tamil Nadu Newsprint and Papers Ltd. and the paper industry, as a whole.

Hypothesis 2

H_{02}. There is no significant relationship between the two variables "sales" and "net working capital" in Tamil Nadu Newsprint and Papers Ltd. and the Indian paper industry, as a whole.

H_{12}. There is a significant relationship between the two variables "sales" and "net-working capital" in Tamil Nadu Newsprint and Papers Ltd. and the Indian paper industry, as a whole.

6. TECHNIQUE OF ANALYSIS:

Keeping in mind the major objectives and research hypothesis of the study, three different techniques of data analysis have been provided. The first one is "descriptive analysis", where the size, positioning (maximum, minimum, and average status), and annual growth rate of working capital, both gross and net, for Tamil Nadu Newsprint and Papers Ltd. during the years under study have been determined and analysed. The second technique applied is "trend analysis" which is significant in representing the year-wise data of the gross and net working capital of the company in the form of growth trends where the status of the business is going upward or downward as per the trend characters has been analysed. The third technique is "quantitative analysis", where four different methods have been used:

1. Karl Pearson's correlation model: to study the nature and degree of relationship between sales and gross working capital and sales and net working capital of the company and the paper industry, as a whole.
2. Coefficient of determination (d): to estimate the strength of the said relationships[1].
3. Student's t-test to estimate the significance of such relationships at a level hypothesized by us (say at 1 percent or 5 percent level of significance, i.e. at 99 percent or 95 percent degree of confidence, respectively)[2].
4. The computer generated p-value (probability level, i.e. significant at p = (0.01)[3] to draw the final inferences.

For this purpose the Microsoft Excel 2010 Software has been used to analyse the financial data.

7. SPECIFICATION OF STATISTICAL TOOLS AND MODELS:

As discussed earlier, our study involves the use of few statistical tools and econometric models during the process of analysis. While computing the statistical values, sales, gross working capital and net working capital in the form of three different variables has been used. The detail specifications of all given below:

1. If $X_1 + X_2 + X_3 + \cdots X_n$ is a set of "n" number of observations of variable "X", and X_1 and X_n represent the base year and most recent year data, respectively, then:

- Annual growth rate (A.G.R) of the variable:

For the second year $= \left(\frac{X_2 - X_1}{X_1}\right) * 100$;

For the third year $= \left(\frac{X_3 - X_2}{X_2}\right) * 100$; and likewise;

For the "n"th year $= \left(\frac{X_n - X_{n-1}}{X_{n-1}}\right) * 100$;

- Arithmetic mean or average of the variable X:

$$\bar{X} = \left(\frac{X_1 + X_2 + X_3 + X_n}{n}\right) = \left(\frac{\sum X}{n}\right)$$

- Standard deviation of the variable X:

$$\sigma_X = \sqrt{\frac{\sum x^2}{n}} \text{ where } x = (X - \bar{X}), \text{ and } \sum X^2 = \sum (X - \bar{X})^2$$

- Coefficient of variation (CV) of the variable X:
  CV= $\frac{\sigma}{x}$ x 100

2. If $X_1 + X_2 + X_3 + \cdots X_n$ is a set of "n" number of observations of variable "X", and $Y_1 + Y_2 + Y_3 + \cdots Y_n$ is an another set of same "n" number of observations of variable Y, then:

Correlation model for estimating the value of Karl Pearson's coefficient of correlation (r) between two set of variables "X" and "Y": $r = = \frac{\sum XY}{n.\sigma_x \sigma_y}$

Where: $x = (x - \bar{x})$ and $y = (y - \bar{y})$ and

$\sum XY = [(x_1 - x)(y_1 - y) + (x_2 - x)(y_2 - y) + \ldots\ldots\ldots\ldots + (x_n - x)(y_n - y)$

σ_x = standard deviation of X–series
σ_y = standard deviation of Y–series

n = no. of pairs of observation.
X = first variable.
Y = second variable.
r = coefficient of correlation.

And:

$$P:E(r) = 0.6745*\frac{1-r^2}{\sqrt{n}}$$

Where:
P.E.(r) = probable error of correlation coefficient (r).

- Coefficient of determination (d) between two set of variables namely "X" and "Y":d = (r*r) = r^2.

- Test of significance ("t" value of "r") between two set of variables "X" and "Y":t = $r*\sqrt{[\frac{n-2}{1-r^2}]}$

where:
(n - 2) = degree of freedom[4].
n = no. of pairs of observations.
r = coefficient of correlation between the two variables.

8. ANALYSIS AND DISCUSSION ON GROSS WORKING CAPITAL:

This section enumerates the results of different techniques of analysis as discussed above, keeping in view of the status of gross working capital and its relationship with sales of the company under observation. The details are discussed below.

A.I Descriptive Analysis:

If we look into the absolute figures as presented in Table I, it can be clearly seen that the absolute volume of gross working capital of the Tamil Nadu Newsprint and Paper Ltd. almost steadily increased over the period under study. It was observed to be Rs. 363.59 crore in the year 2006, which reached at Rs 827.41 crore in the year 2013, registering a growth from 100 to 228 percent, respectively. However, during the year 2013, the company maintained a relatively lower volume of gross working capital in comparison to its previous year, which is clear in the table.

It is also revealed from the table that the annual growth rates of gross working capital of the company maintained their growth during the entire period under study, though not steadily, thereby presenting a zigzag movement. The rate of growth was highest in the year 2009 with 35.08 percent and lowest being 1.19 percent, as recorded in 2007. Though the growth rate was negative in 2013 with 11.87 percent, this marginal negativity was estimated to be impact less to influence the overall growth rate of the company.

The average annual growth rate of gross working capital was estimated to be 13.52 percent for the company against the industry average of 4.29 percent for the entire period under study. It is therefore, clear that the company was more prompt in making a regular investment in current assets as compared to the industry as a whole that is expected to enhance its short-term liquidity status.

A.II Trend Analysis:

Next, the growth trends of gross working capital needs a fair amount of consideration. However, analysis of the growth trend of gross working capital in relation to sales is highly desirable on account of the inter-relationship that exist between them, i.e., any increase or decrease in sales volume is correlated with an increase or decrease in gross working capital and *vice-versa*.

Figure 1 shows the growth trends of both "sales" and "gross working capital" of Tamil Nadu Newsprint and Paper Ltd. over the decade under analysis. It can be seen that the indices of both these items showed steadily increasing trends over the entire period of study, except in the year 2013 when growth trends of both these items exhibited a minor declination. The average growth index figures maintained by these two items over the period under study were estimated to be "143" and "163", respectively, against the industry averages of "169" and "135", which seems to be satisfactory for the company.

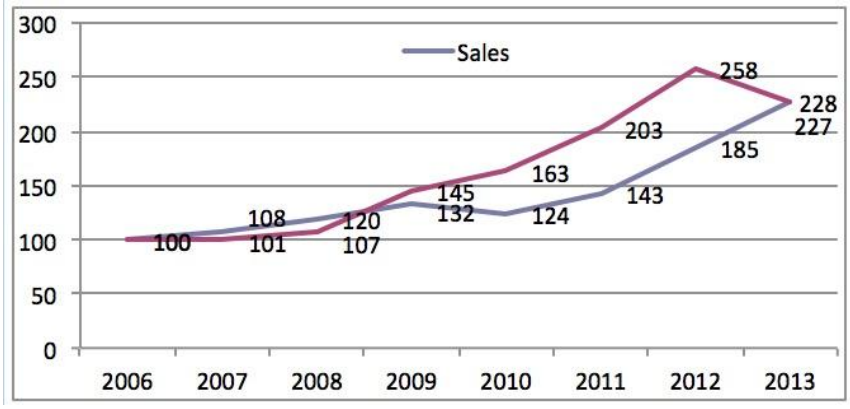

Fig.-1: *Growth trends of 'Sales' and 'Gross Working Capital' of Tamil Nadu Newsprint and Papers Ltd.*

Table-1:*Sales, Current Assets, Current Liabilities, and Net Working Capital Position of Tamil Nadu Newsprint and Paper Ltd. for the Period from 2006 To 2013*

Year	Sales (A)		Current Assets (B)			Current Liabilities (C)			Net working capital (B-C)		
	Amounts	Indices	Amount	A.G.R (in %)	Indices	Amount	A.G.R (in %)	Indices	Amount	A.G.R (in %)	Indices
2006	849.23	100	363.59	-----	100	196.97	-----	100	166.62	-----	100
2007	920.48	108	367.91	1.19	101	258.32	31.15	131	109.59	-34.23	66
2008	1020.47	120	390.52	6.14	107	308.58	19.46	157	81.94	-25.24	49
2009	1119.57	132	527.49	35.08	145	321.97	4.34	163	205.52	150.84	123
2010	1056.10	124	593.98	12.61	163	334.06	3.75	170	259.92	26.47	156
2011	1216.76	143	736.60	24.01	203	421.85	26.28	214	314.75	21.09	189
2012	1574.85	185	938.88	27.46	258	805.87	91.03	409	133.01	-57.74	80
2013	1937.05	228	827.41	-11.87	227	917.97	13.91	466	-90.56	-168.09	-54
Avg.	1211.81	143	593.30	13.52	163	445.70	27.13	226	147.60	-12.41	89
Ind. Avg.e	11167.32	169	5107.36	4.29	135	4968.72	1.19	115	138.64	7.26	25

***Notes**: A.G.R is the abbreviation of "annual growth rate"; figures in parenthesis indicate negative values; trend index Figures (indices) in decimals have been reduced to their nearest integers; trend index for the base year 2006 = 100, amount in crore rupees*
***Source:** Compiled from the Annual reports of TNPL and data base of NSE and BSE.*

A.III Quantitative Analysis

Table II depicts the various statistical measures computed to determine the nature, degree, strength, and significance level of relationship that is associated between "sales" and "gross working capital" of Tamil Nadu Newsprint and Paper Ltd. and the Indian paper industry as a whole, over the period under study.

The coefficient of correlation (r) between the two stated variables was estimated to be 0.86 with the probable error [P.E.(r)] of 0.062, for the company under study. Therefore, it is clear that the two variables were linearly related and positively associated with each other to a greater extent which is statistically significant at a predetermined level of 1 percent level of significance[5]. That means the relationship is significant at p = 0.01 with the confidence level being 86 percent. The strength of the relationship was measured with the help of coefficient of determination (d), and was estimated to be 0.739 which indicated that the relationship is strong up to 74 percent. In other words, 74 percent of the variance of gross working capital can be "explained" by sales.

On the other hand, the correlation coefficient (r) between "sales" and "gross working capital" for the industry was estimated to be 0.951 with a probable error [P.E.(r)] of 0.02. Both the variables were also found to be linearly related and positively associated with each other to a greater extent which is statistically significant at 1 percent level of significance (significant at p = 0.01) with a confidence level of 99 percent. The coefficient of determination (d) for the relationship was 0.904 which means that the relationship was strong up to 90 percent to explain the variance of gross working capital by sales.

From the above rigorous analysis, it can be concluded that both the variables, i.e. "sales" and "gross working capital" were positively, significantly, and strongly correlated with each other, both in case of the company and the industry as a whole. However, comparatively the strength of the said correlation, in addition to the degree of association between the two variables was better in case of the company than the industry as a whole at a predetermined 1 percent level of significance.

Table-2: *Estimating the Strength and Significance of correlations between Sales and Gross Working Capital of Tamil Nadu Newsprint and Paper Ltd. and Indian Paper Industry for the period from 2006 to 2013.*

Particulars	Sales to Gross Working Capital of Andhra Pradesh Paper Mills Ltd	Sales to Gross Working Capital of Indian Paper Industry
Coefficient of correlation (r)	0.860	0.951
Probable error of "r" [P.E.(r)]	0.062	0.019
Coefficient of determination (d)	0.739	0.904
Test of significance ("t" value of "r") table value at five per cent (p)	4.125	8.667
	2.447	1.960

Notes: *Level of significance was predetermined at 1 percent, and t (6) at 0.01 = 2.447; values are computed with the use of statistical package of Microsoft Excel 2010; smaller the p-value, greater is the level of significance; and another oldest popular method to identify whether the relationship is significant or not is to compare the value of "r" with six times the value of its probable error, i.e. if "r" > 6*P.E.(r), then the relationship is significant. However, student's "t-test" is the more rigorous and widely accepted method to analyse the level of significance*
Source: *Compiled from the Annual Reports of TNPL and data base of BSE and NSE.*

9. ANALYSIS AND DISCUSSION ON NET WORKING CAPITAL:

The current part discusses the results of various techniques of analysis as adopted in the research, keeping in mind the status of net working capital and its relationship with sales of the company under study. It is mainly concerned with attempting to establish a relationship between the current assets, current liabilities, and the inter-relationship that exist between them (Smith, 1974; Satapathy, 1994; Rao, 1997). This is because any increase in the volume of net working capital may be either due to an increase in the volume of current assets or decrease in the volume of current liabilities or both, and *vice-versa* (Mahapatra and Panda, 2008). Therefore, these three aspects of the study are needed to be analysed simultaneously to make the interpretation worthwhile for decision making.

A.I Descriptive Analysis

The size of net working capital and the annual rate of growth for different years of study are presented in Table I. It can be noticed from the said table that the absolute volume of net working capital of Tamil Nadu Newsprint and Papers Ltd. highly fluctuated and declined during the entire period under study. The absolute size of net working capital, on an average, increased from Rs 166.62 crore (100 percent) in the year 2006 to Rs 314.75 crore (189 percent) in the year 2011, in spite of an overall increase in the volume of current liabilities. It was due to the fact that the amount of current assets of the company decreased from Rs 166.62 crore (100 percent) in the year 2006 to Rs 90.56 crore (54 percent) registering a comparatively lower growth than the current liabilities. Except the years 2009, 2010 and 2011, the annual growth rates of current assets were also lower than the current liabilities during this period. Since 2006 to 2008, the volume of net working capital went on decreasing and was as low as Rs 81.94 crore (49 percent) in 2008, which further decreased during 2012 and 2013, the lowest figure of Rs 90.56 crore (54 percent) in 2013. It was obvious as, during these years, the growth in current liabilities were much higher than the growth in current assets, both in volume and annual growth rates, and that, in turn, was sufficient to have a significant impact on the overall fiscal-health of the company. As evident from the table, during the last year of study, the company had a check on the annual growth rate of its current liabilities. However, that was not sufficient to improve its fiscal-deficit status as the absolute volume of current liabilities was still much higher than the current assets of that year, which ultimately resulted in a lower net working capital worth Rs 90.56 crore in 2013.

The average annual growth rate of current assets was poor in case of the company under study (-12.41 percent) and it was almost two times the industry average value (4.29 percent). However, the average annual growth rate of current liability of the company (27.13 percent) was nearly twenty three times of the industry average (1.19 percent). This was certainly not a good sign for the overall liquidity status of the company as it significantly declined its short-term solvency position. Over the entire period under study, the average annual growth rate of net working

capital was significantly negative for the company that was estimated to be -12.41 percent, whereas, in case of the industry, it was positive that stood at 7.26 percent. Therefore, it is clear that the fiscal-status of the company was worse in comparison to the industry during the period under study and all its investment in current assets were highly insufficient to pay off its short-term obligations on time, which was more acute, especially during the later-half of the study.

A.II Trend Analysis:

Figure 2 shows the growth trend of net working capital of Tamil Nadu Newsprint and Paper Ltd.in relation to its sales trend, and a joint analysis of such trends has been undertaken here on account of the relationship that exists between them as an increase or decrease in the volume of sales also associates with an increase or decrease in the volume of net working capital and *vice-versa*.

It is vivid from the aforesaid figure that the growth trend of "sales" of the company, on an average, maintained a smooth progression over the years under consideration. However, the trend line of "net working capital" witnessed a zigzag but declining movement during this decade. During the year 2006 to 2008, it showed a downward movement so as sales. However, till 2010 it could maintain an overall upward movement so as sales. Again, since then, it registered a remarkable downfall in movement for the rest of the period; and especially during the last three years, the status of the trend was worse enough to represent a significant deficit of working capital status of the company under study. As explained earlier, the movement of the sales trend was, however, remained upward during all these years.

The average growth index figures maintained by "sales" and "net working capital" were recorded to be "143" and "89", respectively, for the company under study, whereas the paper industry, as a whole, could maintain the average indexes of "169" and "25", respectively, for the mentioned variables. It is, therefore, clear that the industry was in a practice of maintaining lower liquidity status during the period under study as its average index for net working capital declined much, almost one-fourth of the base year's yard-stick of 100. It seems as if this sort of industry practice had much impact upon the company under study that highly influenced its short-term financial policies. The result was the worst for the company as its average growth index for the net working capital went far below to a negative figure that is almost one and half of its base year standard of 100. The performance standard of the company was, therefore, highly unsatisfactory in comparison to the industry as a whole.

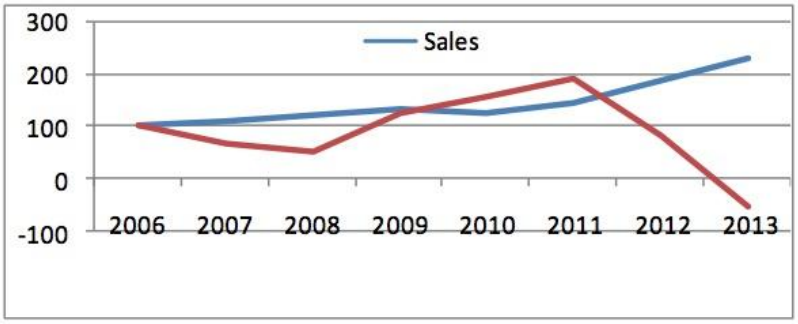

Fig.-2:*Growth trends of Sales and Net Working Capital of Tamil Nadu Newsprint and Papers Ltd.*

A.III Quantitative Analysis:

In an attempt to estimate the nature, degree, strength, and significance of the relationship that is inherent between the "sales" and "net working capital" of the company and the industry, as a whole, various statistical measures have been calculated and presented in Table III.

It is revealed during the period of analysis that the coefficient of correlation (r) between sales and gross working capital was negative at a value of 0.577 with a probable error [P.E.(r)] of 0.159 in case of the company under study, whereas, in case of the industry as a whole, it was calculated to be positive at a value of 0.832 with a probable error [P.E.(r)] of 0.066. Moreover, for the company under study, the association among the two aforesaid variables was found to be insignificant at a predetermined level of 5 percent[6], (insignificant at p = 0.074) whereas, it was significant at the same level for the industry (significant at p = 0.0028). It was also noticed that the coefficient of determination (d) among the two variables was just 0.333 for the company under study, i.e., the relationship is strong up to 33 percent, whereas, in case of the industry, it was found to be 0.692, i.e., the relationship is strong up to 69 percent. In other words, in case of the industry, the variance of the relationship can be explained up to 69 percent, whereas it can be explained only up to 33 percent for the company under study.

Therefore, it can be concluded that the correlation between "sales" and "net working capital" of the company was worse during the period under study in comparison to the industry, as a whole. It was calculated to be negative with lower degree of association, weak and insignificant at a predetermined level of significance of 5 percent. On the contrary, the said correlation was positive with higher degree of association, strong and significant at a level of 5 percent for the industry as a whole.

Table-3: *Estimating the Strength and Significance of correlation between Sales and Net Working Capital of Tamil Nadu Newsprint and Paper Ltd. for the period from 2006 to 2013*

Particulars	Sales to Net Working Capital of Andhra Pradesh Paper Mills Ltd	Sales to Net Working Capital of Indian Paper Industry
Coefficient of correlation (r)	- 0.577	0.832
Probable error of "r" [P.E.(r)]	0.159	0.066
Coefficient of determination (d)	0.333	0.692
Test of significance ("t" value of "r")	5.189	4.239
table value at five per cent (p)	2.447	1.960

Notes: Level of significance was predetermined at 5 percent and t (6) at 0.05 = 2.447; values are computed with the use of Microsoft Excel 2010; smaller the p-value, greater is the level of significance
Source: Compiled from the Annual Reports of TNPL and data base of BSE and NSE.

10. TESTING OF HYPOTHESIS:

Hypothesis 1

$H_0$1. There is no significant relationship between the two variables "sales" and "gross working capital" in Tamil Nadu Newsprint and Paper Ltd. and the Indian paper industry, as a whole.

$H_1$1. There is a significant relationship between the two variables "sales" and "gross working capital" in Tamil Nadu Newsprint and Paper Ltd. and the Indian paper industry, as a whole.

The present hypothesis was examined with the help of statistical tools like Karl Pearson's coefficient of correlation (r), coefficient of determination (d) and student's t-test. The coefficient of correlation (r) between sales and gross working capital of the company was found to be 0.86 which was statistically significant at 1 percent level of significance with the strength of the relationship being around 97 percent against to its industry benchmark, where the coefficient of correlation (r) was estimated to be 0.951 that was also statistically significant at 1 percent level of significance with the strength of the relationship being 90 percent. As the above analysis fits well to the alternative $H_1$1 that is set for the study, therefore, we accept it and reject the null $H_0$1.

Hypothesis 2

$H_0$2. There is no significant relationship between the two variables "sales" and "net working capital" in Tamil Nadu Newsprint and Paper Ltd. and the Indian paper industry, as a whole.

$H_1$2. There is a significant relationship between the two variables "sales" and "net working capital" in Tamil Nadu Newsprint and Paper Ltd. and the Indian paper industry, as a whole.

This hypothesis was also tested with the same statistical techniques that were used while analysing the first hypothesis. During the test, the coefficient of correlation (r) between the two variables, i.e. sales and net working capital of the company was found to be -0.577 which was statistically insignificant at a predetermined level of 5 percent level of significance. On the contrary, the "r" value of the two said variables was calculated to be 0.832 for the paper industry which was significant at the predetermined level of 5 percent. Moreover, the value of the coefficient of determination indicating the strength of the relationship between the said variables was 0.692 for the industry, whereas, it was merely 0.333 for the company. However, on the basis of above findings we accept the alternative $H_1$2 and reject the null $H_0$2.

11. CONCLUSION:

The absolute volume of gross and net working capital is expected to influence the day to day operations, and, therefore, the liquidity and short-term solvency status of most manufacturing concerns and the present case under analysis being no exception. Over the years, the gross working capital volume of the company almost steadily increased, and thus the company proved itself to be prompt enough in investing funds in current assets than the industry, and thus ultimately improved its liquidity status. The association of sales volume with gross working capital for the company was also linear, highly positive, significant, and stronger than its industry counterpart.

The case of net working capital was, however, opposite to the character of gross working capital of the company. During the analysis, it has come to our notice that its absolute volume, on an average, declined over the years with higher fluctuations and registered significantly negative volume during the last three years of the study. This was in fact due to the result of an aggressive

policy in financing the current assets that had been strictly followed by the company as it raised much higher current liabilities during these years to finance a remarkable portion of non-current assets in addition to financing the total current assets. It can therefore be concluded that the overall fiscal-status of the company was highly unsatisfactory in comparison to the industry benchmark. The company was helpless to pay current obligations in time that remarkably declined its short-term solvency position, which was acute especially during the later years of the study. In addition, the correlation between sales and net working capital was observed to be negative, weak, and statistically insignificant, resulting in the worse condition against the positive association of such variables of the industry, where the relationship was even strong, better, and significant.

Notes

1. The coefficient of determination (d) is a more useful measure to interpret the value of correlation coefficient (r). It is observed there that the closeness of the relationships between two variables is not proportional to the correlation coefficient (r) (Gupta, 1997).
2. A relationship can be strong, yet not significant. Conversely, a relationship can be weak but significant. Coefficient of determination (d) estimates the variance or change in condition or variation of the relationship. Student's t-test is a more rigorous test to estimate the significance of correlation coefficient for a sample size #30.
3. Lower the p-value, greater is the level of significance (http://janda.org; http://janda.org/c10/Lectures/topic06/L24-significanceR.htm).
4. It deals with a two-tailed test with six degree of freedom, where "n" = 6.
5. The actual computerized output of data gets us a far more significant level of 0.001 for which the p-value is 0.000, for an accuracy of 99.99 percent. However, commonly used levels of significance in practice are 1 percent (0.01) and 5 percent (0.05).
6. The correlation between sales and net working capital for the company under study was, however, estimated to be significant at a level of 10 percent (0.1). It is to be remembered that while testing the level of significance, the value of two variables should be taken into account for the purpose of analysis.

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