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Working Capital Management Efficiency of DPSUs (MDL & Midhani) in India

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The amount of working capital components vary from organization to organization depending upon the operating cycle. The Working Capital Management efficiency is measured in terms of Working Capital Period (WCP) in days. The WCP is based on the amount in each of equally weighted receivable, inventory and accounts payable. The WCP represents the lead period between purchase of material from supplier till realization of money and payment against purchases to the vendor.

The company's financial performance measure (Profitability) is measured using the EBDIT (Earnings before depreciation, interest and tax) related to Total Assets (TA). This measure indicates the earning power of the company assets (EBDIT/TA) i.e. Net operating profit to Total Assets (NOPA).

Another measure is used for financial performance (Profitability) analysis that is EBDIT (Earnings .before depreciation, interest and tax) related to Sales i.e EBDIT/Sales i.e Net operating profit to Sales(NOPS). This represents the profit margin secured on sales.

To measure the financial performance-Liquidity of the firm, Cash flow from operations)/Sales (CCE) and Current Ratio (CR) are applied. The CCE represents the cash flow comes from operating activities related to the sales.

The formulae for calculating the values are given in the following table.

Table – 1.1: Capital Ratio Definitions

Working Capital Ratios	Abbreviatio	Formula
Average collection period	ACP	Receivables/(Sales/365)
Inventory holding period	ITIO	Inventories/(Sales/365)
Average Payment period	APP	Payables/(Sales/365)
Working Capital period	WCP	ACP + ITIO - APP
Current Ratio	CR	Current Assets /Current Liabilities
Cash conversion efficiency	CCE	(Cash flow from operations)/Sales
Net operating profit to Total Assets	NOPA	(EBDIT)/Total Assets
Net operating profit to Sales	NOPS	((EBDIT)/Sales

Source: Management Accounting defined Ratios

Deriving statistical evidence to conform to the association between the Working Capital Management efficiency (WCP) and Financial Performance (Liquidity & Profitability), Correlation analysis among WCP, ACP, ITIO, CCE, NOPA, NOPS and CR are undertaken to obtain the statistical evidence through Pearson Correlation coefficients. Statistical evidence is derived to find out the approaches of Working Capital Management (WCM) that Indian DPSUs use to increase profitability and liquidity.

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Classical Analysis of Variance – ANOVA-F test is done to prove the same. The data for the measure of WCM, profitability and liquidity, are collected from the Annual Reports containing financial statements of the select DPSUs over the period from 2002-03 to 2011-12.The publicly available financial information is collected from the Public Enterprise Survey of the Government of India, as well as the annual reports of DPSUs. For each DPSU, descriptive statistics for the components of working capital management efficiency for the DPSUs have been presented. The working capital variables are (i) ACP is the average collection period (ii) ITIO is the Inventories turnover per year in terms of days of holding of inventories, (iii) APP is the days of payable Period, WCP is the working capital period, CCE is the cash flow from operation to sales, NOPA is the EBDTA to Total Assets ratio, NOPS is the EBDTA to Sales ratio, and CR is the current ratio.

Working Capital Management: An Analysis of individual DPSUs

After understanding the basics of the Working Capital Management, it is required to analyze the Working Capital Management of the DPSUs one after another and also the DPSUs put together which will give the practical aspect of such companies as given below:

MDL

Based on the definitions cited, a ten years data of the MDL comprising the years from 2002-03 to 2011-12 has been taken into consideration and the relevant ratios have been calculated and presented in the following table.

Table – 1.2: Working Capital Management and Financial performance measures of MDL

Particulars\years	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Receivables/(Sales/365) (ACP)	76	188	177	80	643	854	709	41	177	47
Inventories/(Sales/365) (ITIO)	457	2300	6530	5749	97377	414197	662504	1121	6976	2216
Payables/(Sales/365) (APP)	1807	7024	16984	15263	193996	820931	1058371	1849	12016	3545
ACP+ITIO-APP (WCP)	-1275	-4536	-10276	-9434	-95975	-405879	-395159	-687	-4863	-1282
Current Assets/Current Liabilities (CR)	1.07	1.06	1.06	1.04	1.04	1.04	1.04	1.05	1.03	1.06
(Cash flow from operations)/Sales (CCE)	3.25	11.68	24.23	16.39	132.59	658.95	570.30	0.81	7.24	2.29
EBDIT/Total Assets (NOPA)	0.00	0.01	0.03	0.01	-0.01	0.03	0.02	0.02	0.02	0.03
(EBDIT)/Sales (NOPS)	-0.01	0.26	1.49	0.61	-6.76	63.11	73.85	0.13	0.60	0.32

Source: Statistics based on data of Annual Reports of MDL

To summarize the data, the descriptive statistics has been used. The commonly used measures of Central Tendency (Mean& Median) and the measures of Variability (Standard deviation) have been ascertained as given in the following table.

Table –1.3: Descriptive Statistics: Working Capital Management and financial performance measures of MDL

	ACP	ITIO	APP	WCP	CCE	NOPA	NOPS	CR
Mean	299	119943	213179	-92937	142.77	0.02	13.36	1.05
Median	177	6140	13639	-7149	14.03	0.02	0.46	1.04
SD	309.98	230030.45	391293.35	164644.44	252.60	0.01	29.25	0.01

Source: Statistics based on data of Annual Reports of MDL

The higher standard deviation for APP of 391293.35 days indicates a very wide variation in APP (Average Payable period) in MDL which shows that the company is not managing well its day's payable outstanding. Further the standard deviation for WCP is also 164644.44 days which indicates a very wide variation in days of working capital (WCP) indicating inefficiency in management of working capital. The company has not done well in respect of ITIO and APP which have contributed to increase in deviation of WCP.

Association of WCM efficiency and financial performance

The descriptive statistics show the working capital measure. The correlation analysis is done to analyze the association between the working capital management efficiency with financial performance (profitability and liquidity). To examine the relationship among these variables, the Pearson correlation coefficient is calculated as given below:

Table – 1.4: Correlation Analysis of MDL- WCM and Financial Performance measures

	ACP	ITIO	APP	WCP	CCE	NOPA	NOPS	CR
ITIO	0.82							
APP	0.87	0.99						
WCP	-0.90	-0.96	-0.99					
CCE	0.91	0.94	0.97	-1.00				
NOPA	-0.08	0.23	0.23	-0.22	0.24			
NOPS	0.77	0.96	0.97	-0.96	0.96	0.39		
CR	-0.51	-0.38	-0.40	0.42	-0.41	0.06	-0.33	

Source: Statistics based on data of Annual Accounts of MDL

In general, efficient working capital management should improve a company's profitability and liquidity. To improve profitability and liquidity, the WCP (Cash conversion cycle) should be negatively correlated to NOPA, NOPS and CCE. The correlation coefficients from the above table indicate that there is statistical evidence that the profitability and liquidity are negatively related to the working capital efficiency. This means the cash flow from operation (CCE), EBDIT to Assets (NOPA) and EBDIT to Sales (NOPS) are very much correlated to the improvement of profitability. From the above, it is noted that the ITIO and APP are positively related to CCE, NOPA and NOPS which indicate a close association of ITIO and APP with CCE, NOPA and NOPS.

Table – 1.5: Regression Analysis of MDL - WCM Efficiency (WCP) and Liquidity

SUMMARY OUTPUT						
Multiple R	1.00					
R Square	1.00					
Adjusted R Square	0.99					
Standard Error	11727.7					
Observations	12.00					
ANOVA						
	df	*SS*	*MS*	*F*	*Significan*	
Regression	2	2569476840	1284738420	934.	0.00	
Residual	9	1237869605	137541067.			
Total	11	2581855536				
	Coeffici	*Standard*	*t Stat*	*P-*	*Lower*	*Upper*
Intercept	-	96455.88	-0.12	0.90	-	206288.
Current Assets/Current Liabilities (CR)	11147.69	90145.09	0.12	0.90	-192774.6	215070.04
(Cash flow from operations)/Sales (CCE)	-649.79	15.75	-41.25	0.00	-685.42	-614.16

Source: Regression based on Microsoft Excel 07

The table – 1.5 shows the multiple regression analysis to investigate the association between the working capital efficiency (WCP) and Financial Performance -Liquidity measures (CR &CCE). The WCP is the dependent variables and the liquidity measures (CR&CCE) are independent variables. The regression analysis result indicates that the liquidity measure (CCE) is negatively associated whereas the CR is positively associated with WCP. The P value in case of CR is more than 0.5 and in case of CCE is less than 0.05 at 5 percent level of confidence indicating that the whole significance could not be concluded.

Test of Hypothesis

Hypothesis: There is no relationship between Working Capital Management efficiency and liquidity in DPSUs.

Level of Significance: 5 percent

Degree of freedom: 11

(i) From co-efficient exhibited in the Table – 1.5, it is noted that the calculated value of p for Liquidity - CR and CCE are 0.90 and 0.00 respectively. Since the calculated values of p (both cases) are not lower than 0.05 (5 percent significance level), the relationship could not be concluded.

(ii) From the ANOVA exhibited in the above table, the significance of F shows the goodness of fit of the model. The lower the number, the better is the fit. Since the value of the significance F is 0.00 i.e. less than 0.05, it is concluded that the model is fit to the data and there is significant relationship.

Hence the hypothesis is rejected. This indicates that there is a relationship between of the Working Capital Management efficiency and Liquidity of MDL.

Table – 1.6: Regression Analysis of MDL - WCM Efficiency (WCP) and Profitability

SUMMARY OUTPUT						
Multiple R	0.97					
R Square	0.95					
Adjusted R Square	0.94					
Standard Error	38223.22					
Observations	12					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	2	245036423135.78	122518211567.89	83.86	0.00	
Residual	9	13149130556.66	1461014506.30			
Total	11	258185553692.44				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-37452.87	16484.05	-2.27	0.05	-74742.37	-163.36
EBDIT/Total Assets (NOPA)	1733243.59	935500.43	1.85	0.10	-383005.41	3849492.60
(EBDIT)/Sales (NOPS)	-5850.31	472.26	-12.39	0.00	-6918.64	-4781.97

Source: Regression based on Microsoft Excel 07

The table – 1.6 shows the regression analysis to investigate the association between the working capital efficiency (WCP) and Financial Performance - Profitability measures (NOPA&NOPS). The WCP is the dependent variables and the profitability measures (NOPA&NOPS) are independent variables. The regression analysis result indicates that the profitability measure (NOPS) is negatively associated whereas the NOPA is positively associated with WCP. The P value in case of NOPA is more than 0.05 and in case NOPS is less than 0.05 (at 5 percent significance level) indicating that the whole regression could not be concluded.

Test of Hypothesis

Hypothesis: There is no relationship between Working Capital Management efficiency and profitability in DPSUs.

Level of Significance: 5 percent

Degree of freedom: 11

(i) From the Table –1.6, it is noted that the calculated value of p for Profitability - NOPA and NOPS are 0.10 and 0.00 respectively .In one case it is lower and in another case it is higher than 0.05 (5 percent significance level).Hence the relationship could not be concluded.

(ii) From the ANOVA exhibited in the above table, the significance of F shows the goodness of fit of the model. The lower the number, the better is the fit. Since the value of the significance F is 0.00 i.e. less than 0.05, it is concluded that the model is fit to the data and there is significant relationship **Hence the null hypothesis is rejected. This states that there is a relationship between the Working Capital Management efficiency and profitability of MDL.**

5.4.2.2 MIDHANI

Based on the definitions cited, a ten years data of the MIDHANI comprising the years from 2002-03 to 2011-12 has been taken into consideration and the relevant ratios have been calculated and presented in the following table.

Table – 1.7: Working Capital and Financial performance measures of MIDHANI

Particulars\years	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Receivables/(Sales/365)	237	125	87	88	113	110	100	108	93	99
Inventories/(Sales/365)	319	181	236	291	293	278	361	322	351	326
Payables/(Sales/365)	290	304	398	348	454	441	375	374	333	237
ACP+ITIO-APP (WCP)	266	2	-76	31	-48	-53	87	56	111	188
Current Assets/Current Liabilities (CR)	2.40	2.06	1.81	1.81	1.56	1.47	1.48	1.63	1.59	1.77
(Cash flow from operations)/Sales (CCE)	0.50	0.79	1.08	0.78	0.90	0.85	0.40	0.66	0.46	0.30
EBDIT/Total Assets	0.00	0.04	0.05	0.07	0.09	0.11	0.12	0.09	0.11	0.12
(EBDIT)/Sales (NOPS)	0.00	0.08	0.11	0.14	0.21	0.23	0.22	0.20	0.21	0.23

Source: Statistics based on data of Annual Reports of MIDHANI

To summarize the data, the descriptive statistics has been used. The commonly used measures of Central Tendency (Mean& Median) and the measures of Variability (Standard deviation) have been ascertained as given in the following table.

Table – 1.8: Descriptive Statistics: WCM and financial performance measures of MIDHANI

	ACP	ITIO	APP	WCP	CCE	NOPA	NOPS	CR
Mean	116	296	355	56	0.67	0.08	0.16	1.76
Median	104	306	361	44	0.72	0.09	0.20	1.70
SD	44.04	54.36	67.58	110.10	0.25	0.04	0.08	0.29

Source: Statistics based on data of Annual Reports of MIDHANI

The higher standard deviation for APP of 67.58 days indicates a wide variation in APP (Average Payable period) in MIDHANI. Further the standard deviation for WCP is also 110.10 days which indicates a wide variation in days of working capital (WCP). However the ACP median is 104 days which is near to the mean. i.e., 116 days which indicates that the company is managing the sales outstanding days well? When we compare the means ITIO and APP with their respective medians, it is noted that the company is doing well in those areas also.

Association of WCM efficiency and financial performance of MIDHANI

The descriptive statics show the working capital measure. The correlation analysis is done to analyze the association between the working capital management efficiency with financial

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performance (profitability and liquidity). To examine the relationship among these variables, the Pearson correlation coefficients are calculated as given below:

Table – 1.9 : Correlation Analysis of MIDHANI: WCP and Financial Performance measures

	ACP	ITIO	APP	WCP	CCE	NOPA	NOPS	CR
ITIO	0.039							
APP	-0.305	-0.090						
WCP	0.606	0.564	-0.780					
CCE	-0.209	-0.715	0.673	-0.850				
NOPA	-0.723	0.461	0.219	-0.196	-0.294			
NOPS	-0.722	0.438	0.350	-0.287	-0.185	0.987		
CR	0.771	-0.342	-0.599	0.507	-0.050	-0.899	-0.941	

Source: Statistics based on data of Annual Reports of MIDHANI

In general efficient working capital management should improve a company's profitability and liquidity. To improve profitability and liquidity, the WCP (Cash conversion cycle) should be negatively correlated to NOPA, NOPS and CCE. The correlation coefficients from the above table indicate that there is statistical evidence that the profitability and liquidity are negatively related to the working capital efficiency. This means the cash flow from operation (NTC), EBDIT to Assets (NOPA) and EBDIT to Sales (NOPS) are very much correlated to the improvement of profitability.

Table –1.10: Regression Analysis of MIDHANI- WCM Efficiency (WCP) and Liquidity

Multiple R	**0.97**					
R Square	0.93					
Adjusted R Square	0.92					
Standard Error	40.98					
Observations	12.00					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance*	
Regression	2	208890.15	104445.08	62.20	0.00	
Residual	9	15113.23	1679.25			
Total	11	224003.38				
	Coefficients	*Standard*	*t Stat*	*P-*	*Lower 95%*	*Upper*
Intercept	45.57	83.49	0.55	0.60	-143.30	234.44
Current	122.18	32.86	3.72	0.00	47.85	196.51
(Cash flow from	-309.98	48.43	-6.40	0.00	-419.54	-200.42

Source: Regression based on SPSS Statistics

The Table – 1.10 shows the multiple regression analysis to investigate the association between the working capital efficiency (WCP) and Liquidity measures (CR &CCE). The WCP is the dependent variables and liquidity measures (CR&CCE) are independent variables. The regression analysis result indicates that the liquidity measure (CCE) is negatively associated whereas the CR

is positively associated with WCP. However, the P values are minimal in both the cases indicating that the whole regression is significant.

Test of Hypothesis

Hypothesis: There is no impact of Working Capital Management efficiency on liquidity in DPSUs.

Level of Significance: 5 percent

Degree of freedom: 11

(i) From the Table – 1.10, it is noted that the calculated value of p for Liquidity - CR and CCE are 0.00 and 0.00 respectively. Since the calculated values of p are lower than 0.05 (5 percent significance level), it is concluded that the model is significant.

(ii) From the ANOVA exhibited in the above table, the significance of F shows the goodness of fit of the model. The lower the number, the better is the fit. Since the value of the significance F is 0.00 i.e. less than 0.05, it is concluded that the model is fit to the data

Hence the hypothesis is rejected. This indicates that there is impact of the Working Capital Management efficiency on Liquidity of MIDHANI.

Table – 1.11

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.74					
R Square	0.54					
Adjusted R Square	0.44					
Standard Error	106.69					
Observations	12.00					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance*	
Regression	2	121563.24	60781.6	5.34	0.03	
Residual	9	102440.14	11382.2			
Total	11	224003.38				
	Coefficien	*Standard*	*t Stat*	*P-*	*Lower 95%*	*Upper*
Intercept	208.37	62.90	3.31	0.01	66.09	350.65
EBDIT/Total Assets (NOPA)	11584.45	5549.03	2.09	0.07	-968.32	24137.23
(EBDIT)/Sales (NOPS)	-6577.73	2724.00	-2.41	0.04	-12739.84	-415.62

Regression Analysis of MIDHANI- WCM Efficiency (WCP) and Profitability

Source: Regression based on **SPSS Statistics**

The table 1.11 shows the regression analysis to investigate the association between the working capital efficiency (WCP) and Financial Performance - Profitability measures (NOPA&NOPS). The WCP is the dependent variables and profitability measures (NOPA&NOPS) are independent variables. The regression analysis result indicates that the profitability measure (NOPS) is negatively associated whereas the NOPA is positively associated with WCP. The P value in case of NOPA is more than 0.05 and NOPS is less than 0.05 (at 5 percent significance level) indicating that the significance of the model could not be decided.

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Test of Hypothesis

Hypothesis: There is no impact of Working Capital Management efficiency on profitability in DPSUs.

Level of Significance: 5 percent

Degree of freedom: 11

(i) From the Table -1.11, it is noted that the calculated value of p for Profitability - NOPA and NOPS are 0.07 and 0.04 respectively. In one case it is lower and in another case it is higher than 0.05 (5 percent significance level).Hence the model could not be concluded

(ii) From the ANOVA exhibited in the above table, the significance of F shows the goodness of fit of the model. The lower the number, the better is the fit. Since the value of the significance F is 0.03 i.e. less than 0.05, it is concluded that the model is fit to the data

Hence the hypothesis is rejected. This indicates that there is impact of the Working Capital Management efficiency on profitability in case of MIDHANI.