Inventory Ratios Optimization in SAP Implemented Companies

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Abstract—Efficient management of inventory will allow the organizations to compete in the competitive environment and generate profits not only in the global but also in the local markets. International organizations depend more on the Information Technology for gaining strategic advantage. SAP systems are being used for realization of goals, since these systems are centralized and integrate all the business processes. Binding different pharmaceutical business units geographically dispersed through IT increases the organization efficiency with smooth flow of accurate information to the decision makers. The current paper demonstrates the technology impact, analyzed the optimization ratios of SAP implemented select companies located in Hyderabad using inventory turnover ratios.

Index Terms— SAP, Turnover Ratio, Optimization, Inventory, Pharmaceutical

1 Introduction

The inventory turnover ratio (ITR) is a measure in number of times the inventory is sold by an organization during a calculated year. ITR, is a benchmark of organizational operation efficiency in management of the available assets. Maximizing inventory turnover reduces overhead costs, thus improves the profitability of an organization.

Raw Material Turnover Ratio (RMTR) indicates the number of times raw materials rotates during a calculated. It shows the speed with which raw material is consumed in relation to stock of raw material. Work-in-Progress Turnover Ratio (WIPTR) shows the speed with which the raw materials are converted into finished goods. Finished Goods Turnover Ratio (FGTR) implies the speed with which the finished goods are converted into sales.

2 Literature Survey

Inventory is generally maintained in an organization to fulfill the business activities in meeting the customer demands [1]. [2], inventory requirement of any organization and availability in the storage locations depends on many factors. Decrease in inventory, lowers the likelihood of lost sales and slowdown of production activities. Inventory levels are also affected by short-term interest rates [1]. [3] Analyzed the effect of inventory reduction on productivity growth and the result showed increased profitability.

[4], inferred that companies with decreasing amount of finished goods result in positive change in profitability and no significant relationship was detected between raw materials and work-in-process inventories in terms of financial performance, it was found that statistically significant positive correlation between inventory and financial performance. [5], found that raw materials inventories were more effective on firm performance than work-in-process and finished goods inventory

[6], the ideal inventory at storage locations and inventory turnover will differ between markets. [7], large inventory holding is not justified as inventory turnover does not warrant investments. Generally high values of ITR indicates the inventory was procured, produced, disposed and restores quickly within a given time interval [8].

In dynamic and competitive markets, inventory brisk movement is important for better RMTR through efficient operations for profitability Kros J.F, et al., 2006[9]. [10]Raw materials are converted into work-in-progress and finished goods, the quicker the process is repeated, higher the RMTR. Inventory has an economic value which is basically an idle resource, from financial perspectives the brisk work-in-progress turnover ratio helps realization of investments through sales [11]. [10], Work-in-progress inventory is presently in the production process and is yet to get converted to a finished product, for better WIPTR ratio requires quick conversion into finished goods.

[12], Quick finished goods turnover ratio fetches huge and quick profits to the firm since finished goods turned into sales and further new procurement of raw materials and the cycle continuous .[10], Finished goods inventory constitute the amount and worth of manufactured materials in inventory, which are ready and available to be sold to customers. Quick movement of finished goods is beneficial for firm benefitting with rapid gains.

3 Methodology

3.1 Objective

Optimization technique used on select pharmaceutical companies by using Raw Material Turnover Ratio, Work-in-Progress Turnover Ratio, Finished Goods Turnover Ratio and Inventory Turnover Ratio.

3.2 Hypothesis

SAP is real enabler for efficient Inventory Management.

3.3 Data

Source of data is from the balance sheets of respective companies.

3.4 Variables of the Study

Inventory Turnover Ratio (ITR) Inventory turnover is expressed as the number of times inventory is sold in a given period and is defined as cost of goods sold divided by average inventory.

Inventory Turnover Ratio = Cost of Goods Sold/Average

Total Inventories at Cost

Raw Material Turnover Ratio states number of times Raw Materials rotates during a given period.

Raw Material Turnover Ratio = Annual consumption of Raw Material / Average Raw Material Inventory

Work-in-Progress Turnover Ratio defines the speed withwhich the Work-in-Progress materials are converted into finished goods.

Work-in-Progress Turnover Ratio = Cost of Manufacture/Average Work-in-Progress Inventory at Cost

Finished Goods Turnover Ratio defines the speed at which the Finished Goods are converted into sales and then into cash.

Finished Goods Turnover Ratio = Cost of Goods Sold/Average Finished Stock

Raw Material Turnover Ratio to Inventory Turnover Ratio (RMT): RMT is RMTR / ITR * 100 and is calculated to find the percentage level of Raw Material Turnover in the total Inventory Turnover.

Work-in-Progress Turnover Ratio to Inventory Turnover Ratio (WIPT): WIPT is WIPTR / ITR * 100 and is calculated to find the percentage level of Work-in-Progress Turnover in the total Inventory Turnover.

Finished Goods Turnover Ratio to Inventory Turnover Ratio (FGT): FGT is FGT / ITR * 100 and is calculated to find the percentage level of Finished Goods Turnover in the total Inventory Turnover.

3.5 Scope of Study

Scope of study is confined to 3 SAP Implemented Pharmaceutical companies.

Natco Data obtained from the annual reports of the NATCO Company and the data is considered for the analysis taking into consideration of 6 years before and 6 years after implementation of SAP. NATCO implemented SAP in 2011 hence the financial year 2011 is excluded from analysis.

Neuland Labs Data obtained from the annual reports of the Neuland Company and the data is considered for the analysis taking into consideration of 7 years before and 7 years after implementation of SAP. Neuland implemented SAP in 2010 hence the financial year 2010 is excluded from the analysis.

Dr Reddy Labs Data obtained from the annual reports of the Neuland Company and the data is considered for the analysis taking into consideration of 10 years before and 10 years after implementation of SAP. Reddy Labs implemented SAP in 2007 hence the financial year 2007 is excluded from the analysis.

4 Optimization Analyses

4.1 NATCO Optimization Ratio

The RMT, WIPT and FGT ratios of NATCO were calculated taking into consideration before and after implementation of SAP. The values are presented in the table 1.

Table 1 NATCO Optimization Percentages
*SAP Implemented in the Year 2011

Year	RMT	WIPT	FGT
2005	184.25	250.99	534.27
2006	187.97	**455.52**	722.52
2007	201.99	222.83	473.77
2008	206.73	243.02	270.23
2009	231.12	257.08	268.21
2010	298.93	296.64	343.10
2011*	239.88	258.06	377.36
2012	323.22	288.89	**1222.13**
2013	315.82	235.74	827.29
2014	**384.78**	246.27	797.75
2015	342.33	267.51	812.11
2016	205.32	292.78	546.77
2017	303.53	345.83	576.00

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NATCO RMT percentages gradually increased before SAP implementation and increased substantially after SAP implementation, which indicates increase in raw material consumption, quality production process and quick conversion to fini shed products, increased sales and profits after SAP implementation. SAP implementation has improved procurement process, efficient production process, efficient storage space utilization, enhanced corporate sales and increase in liquidity and working capital position.

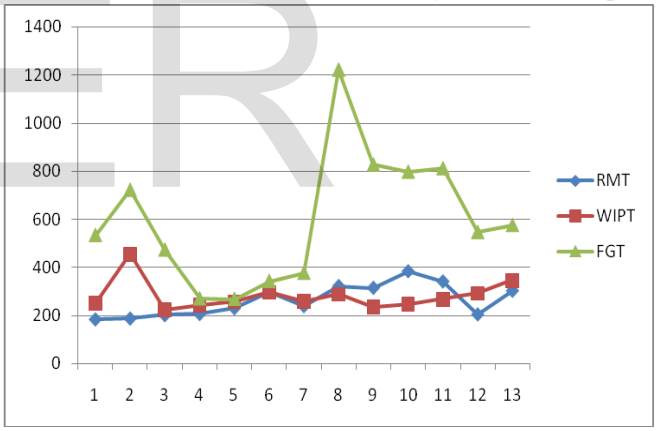


Figure 1 NATCO Optimization Graph Comparison							
1	2	3	4	5	6	7	8
2005	2006	2007	2008	2009	2010	2011	2012
9	10	11	12	13			
2013	2014	2015	2016	2017			

NATCO WIPT percentages show mixed trends in increase and decrease before and after SAP implementation which indicates increased profits and decreased usage of work-in-progress in production process after SAP implementation. But

actual percentage figures indicate increase in sales and profits after SAP implementation. SAP implementation has improved production process, better operations management, efficient material handling systems and increase in liquidity position and better working capital position.

NATCO FGT percentages show mixed trend in increase and decrease before and after SAP implementation which indicates increase and decrease in finished goods production and increase in sales and profits after SAP implementation. SAP implementation improved production process, better quality management, increased sales and distribution channels, corporate market outlets and customer base growth, better liquidity and working capital position.

NATCO RMT optimized ratio 384.78 realized in the year 2014 after SAP implementation. This indicates SAP implementation has improved NATCO profitability.

NATCO WIPT optimized ratio 455.52 realized in the year 2006 before SAP implementation. SAP implementation at

NATCO has overcome the inefficient production operations during the WIP stage in finished goods process and optimized sales and profits realized after SAP implementation.

NATCO FGT optimized ratio 1222.13 realized in the year 2012 after SAP implementation. This indicates SAP implementation has improved NATCO profitability.

4.2 Neuland Optimization Ratio

Table 2 Neuland Optimization Percentages
*SAP Implemented in the Year 2011

Year	RMT	WIPT	FGT
2003	241.26	311.05	290.31
2004	180.66	371.61	324.04
2005	226.07	473.89	292.68
2006	153.33	535.06	276.87
2007	162.15	590.70	227.89
2008	178.73	722.27	227.08
2009	206.33	794.94	173.96
2010*	261.04	988.91	176.66
2011	247.46	925.64	179.01
2012	253.62	957.72	177.72
2013	285.89	**1152.67**	179.74
2014	241.61	1131.60	181.93
2015	291.88	205.97	330.37
2016	270.36	228.75	**342.17**
2017	**301.80**	230.38	341.94

The RMT, WIPT and FGT ratios of Neuland were calculated taking into consideration before and after implementation of SAP. The values are presented in the table 2

Neuland RMT percentages gradually decreased and then increased before SAP implementation and mixed trends in decrease and increase after SAP implementation which indicates increase in raw material consumption, quality production process and quick conversion to work-in-progress, increased sales and profits after SAP implementation. SAP implementation has improved vendor management, continuous production process, good corporate sales, better storage space utilization and increase in liquidity and working capital position. Neuland WIPT percentages increased before SAP implementation and mixed trends in increase and decrease after SAP implementation which indicates increase and decrease in usage of work-in-progress in production process, WIPT percentage figures indicate increase in production operations, better operations management, better material handling systems, enhanced corporate sales and increase in liquidity and working capital position after SAP implementation.

Neuland FGT percentages show mixed trend in increase and decrease before SAP implementation and increased trends after SAP implementation which indicates increase in sales and profits after SAP implementation. SAP implementation helped continuous production process, better quality management, improved sales and distribution channels, increased corporate market outlets and customer base, better liquidity and working capital position.

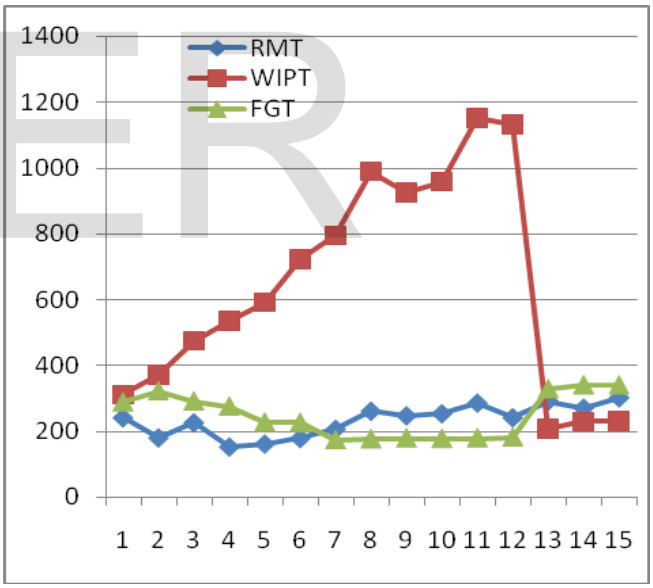


Figure 2 Neuland Optimization Graph Comparison

1	2	3	4	5	6	7	8
2003	2004	2005	2006	2007	2008	2009	2010
9	10	11	12	13	14	15	
2011	2012	2013	2014	2015	2016	2017	

Neuland RMT optimized ratio 301.80 realized in the year 2017 after SAP implementation. This indicates SAP implementation has improved Neuland profitability.

Neuland WIPT optimized ratio 1152.67 realized in the year 2013 after SAP implementation. This indicates SAP implementation has improved Neuland profitability.

Neuland FGT optimized ratio 342.17 realized in the year 2016 after SAP implementation. This indicates SAP implemen-

tation has improved Neuland profitability.

4.3 Dr Reddy Labs Optimization Ratio

The RMT, WIPT and FGT ratios of Reddy Labs were calculated taking into consideration before and after implementation of SAP. The values are presented in the table 3.

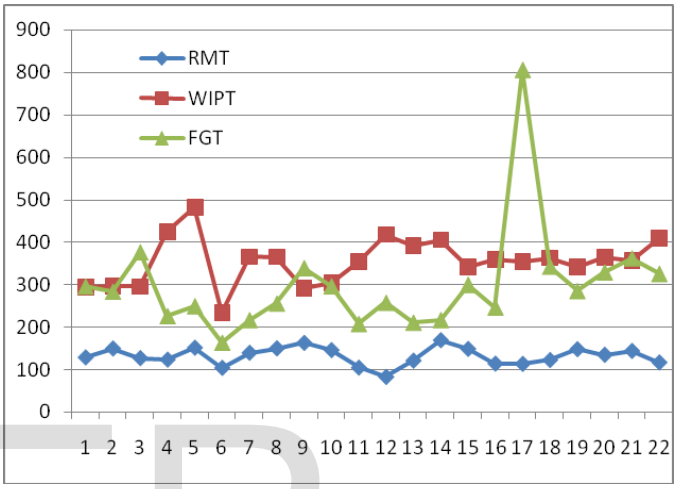
The Calculated Reddy Labs RMT percentages has initially increased and then decreased before and even after SAP implementation which indicates increase in raw material consumption in production process for finished goods, enhanced corporate sales, increased profits after SAP Implementation. SAP implementation has improved better supplier coordination, uninterrupted production process, increased corporate sales, better storage space utilization and increased liquidity and working capital position.

The Calculated Reddy Labs WIPT percentages has mixed trend before SAP implementation and consistent increase in WIPT percentages after SAP implementation which indicates efficient usage of work-in-progress in production process. Actual percentage figures indicates increase in sales which inturn generated good profits for the company. SAP implementation has improved production process, better operations management and material handling systems, increased corporate sales and increase in liquidity and working capital position.

Table 3 Reddy Labs Optimization Percentages
*SAP Implemented in the Year 2007

Year	RMT	WIPT	FGT
1996	128.68	295.23	295.23
1997	149.71	297.41	282.97
1998	127.04	295.92	375.61
1999	123.50	424.21	225.36
2000	151.58	**482.59**	248.81
2001	103.96	234.43	162.66
2002	139.64	366.12	215.91
2003	149.98	365.62	254.92
2004	162.99	293.05	338.53
2005	145.84	304.12	295.84
2006	104.56	354.72	206.76
2007*	82.75	418.01	256.77
2008	121.08	392.95	210.13
2009	**169.20**	405.99	216.19
2010	148.78	341.53	299.13
2011	113.91	359.18	245.58
2012	113.49	354.50	**804.87**
2013	122.49	363.23	341.77
2014	148.09	342.27	284.33
2015	134.86	364.21	328.54
2016	144.04	357.64	361.16
2017	116.89	410.00	324.77

The Calculated Reddy Labs FGT percentages has mixed trend of decrease and increase before and after SAP implementation which indicates increase in sales. Percentage figures indicate huge increase in revenue generation with lucrative profits for the company. SAP implementation has helped in continuous production process, improved quality management, improved sales and distribution channels, increased



corporate market outlets and customer base, better liquidity and working capital position.

Reddy Labs RMT optimized ratio 169.20 realized in the year 2009 after SAP implementation. This indicates SAP implementation has improved Reddy Labs profitability.

Reddy Labs WIPT optimized ratio 482.59 realized in the year 2000 before SAP implementation. SAP implementation has overcome the inefficient production operations during the

WIP stage in finished goods process and optimized sales and profits realized after SAP implementation.

Reddy Labs FGT optimized ratio 804.87 and FGH optimized ratio 12.42 realized in the year 2012 after SAP implementation. This indicates SAP implementation has improved Reddy Labs profitability.

Figure 3 Reddy Labs Optimization Graph Comparison

1	2	3	4	5	6	7	8
1996	1997	1998	1999	2000	2001	2002	2003
9	10	11	12	13	14	15	16
2004	2005	2006	2007	2008	2009	2010	2011
17	18	19	20	21	22		
2012	2013	2014	2015	2016	2017		

5. Optimization Summary Ratios

Raw Material Turnover Ratio to Inventory Turnover Ratio (RMT), Work-in-Progress Turnover Ratio to Inventory Turnover Ratio (WIPT), Finished Goods Turnover Ratio to Inventory Turnover Ratio (FGT).

Table 4 Optimized Ratios Overview Table

Var	NATCO	Neuland	Reddy Labs

RMT	**384.78**	**2014**	301.80	2017	169.20	2009
WIPT	455.52	2006	**1152.67**	**2013**	482.59	2000
FGT	**1222.13**	**2012**	342.17	2016	804.87	2012

From the optimized overview table 4, it is observed that NATCO RMT 384.78 is the most optimized ratio and realized in the year 2014 after SAP implementation, Neuland WIPT of 1152.67 is the most optimized ratios and realized in the year 2013 after SAP implementation and NATCO FGT of 1222.13 is the most optimized ratios and realized in the year 2012 after SAP implementation

6. CONCLUSION

Well managed inventory management is essential for organizations to survive and grow in competitive global markets. Data selected for analyses consist of both before and after SAP implementation relating to three pharmaceutical companies located in Hyderabad and the optimized outcome of the analyses is after implementation of SAP.

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