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A Study on Inventory Holding Time Period Analysis of SAP Implemented Companies

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Abstract: *Low Inventory Holding is one of the important business strategy which help firms to sustain and grow in the highly dynamic and competitive global environment. The impact of implementation of SAP technology on the pharmaceutical sector and its inventory holding ratio outcome on few select pharmaceutical companies located in Hyderabad are emphasized. Inventory holding costs depend on many variables which may vary from company to company. Basic components of IHP include cost of capital, storage and handling costs and costs of risk involved.*
Keywords: *SAP, Inventory Holding Period, Pharmaceutical and Inventory.*

I. Introduction

The Inventory Holding Period (IHP) confirms number of days on average that a business establishment holds inventory. Holding inventory for longer periods than necessary may indicate that the business has money tied up unnecessarily in inventory and is basically a liquidity indicator.High inventory holding is because of overstocking of raw material inventory, inefficient conversion of raw materials to work-in-progress and finished products, which would decline the profits. High inventory holding indicates increased inventory levels, where the workingcapital is invested inappropriately and liquidity position is not encouraging, thus a blockade to business expansion. Decreased inventory holding reduces holding costs and increases profits.

II. Literature Survey

[1] Observed average returns per annum increase with the duration of the holding period. [2] Found that the standard deviation of annual stock returns reduces as the duration of the holding period increases. [3] The compound returns earned over a rolling holding period are much more volatile than one might assume given historic rules of thumb for average return expectations, given the distinction of the buy and hold strategy, the duration of the holding period required for any positive return should not belong.

According to [9] when the holding cost rate is high, cost can be reduced by ordering more frequently instead of increasing the preservation cost, but in contrast he inventory holding cost rate is low, less ordering frequency is much beneficial. [4] Observed empirical confirmation that firms operating with longer lead times, higher gross margins, more uncertain demand and lower inventory holding costs have higher inventory levels. [4] Confirms paying attention not to the level of the inventory, but holding less inventory levels, which indicates the quality of managementcontrol.

The study conducted by [5] revealed a positive relationship between profitability and inventory holding period. [6] Has found that while the cash conversion period and inventory holding period decrease, then profitability increases. According to [7] there is a negative relationship between inventory holding period and firm's profitability.

[10] The number of days inventory holding period is the time lag between purchasing materials, manufacturing and selling the finished goods and is calculated by diving average inventories by the cost of goods sold per day [11]. [8] Analyzed the effect of low inventory holding on productivity growth, the result showed inventory reduction increased profitability.

III. Methodology

Objectives
Analyze the performance of select SAP implemented pharmaceutical companies using inventory holding period.

Hypothesis
Pharmaceutical companies which have implemented SAP and are located in Hyderabad were considered for the research study.
Null Hypothesis (H_0): There is no significant difference before and after implementation of SAP.
Alternate Hypothesis (H_1): There is a significant difference before and after implementation of SAP.

Data
Data from the respective companies balance sheets.

Software
The data analysis is carried out using SPSS 16.0 software.

Statistical Tools andTechniques:
Paired t-test is a statistical method that confirms whether the mean difference between two sets of observations are zero, it is applied to evaluate the impact of implementation of SAP using inventory holding period data, before and after implementation ofSAP.

Variables of theStudy
Inventory Holding Period shows the number of days Inventory was held in the firm.
Inventory Holding Period = (Inventory / Cost of sales) * 365

Scope ofStudy
Scope of study is confined to 3 SAP Implemented Pharmaceutical companies located in Hyderabad
Natco data obtained from the annual reports, 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, 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, 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.

IV. Analysis of Inventory Holding Period

Inventory Holding Period (IHP) indicates the number of days the inventory was held by company.

Table 1 NATCO Inventory Holding Period

Before SAP Implementation			**After SAP Implementation**		
Year	**D**	**IHP**	**Year**	**D**	**IHP**
2010	(-1)	260.901	2012	(+1)	329.720
2009	(-2)	128.930	2013	(+2)	263.538
2008	(-3)	152.592	2014	(+3)	372.829
2007	(-4)	134.836	2015	(+4)	437.650
2006	(-5)	128.431	2016	(+5)	346.958
2005	(-6)	119.017	2017	(+6)	247.458
Source: Compiled from the Company Balance Sheet D is Distance from before and after Implementation					

From the table 1, it is concluded that before and after implementation of SAP at NATCO there is a mixed trend in increase and decrease in the inventory holding period.

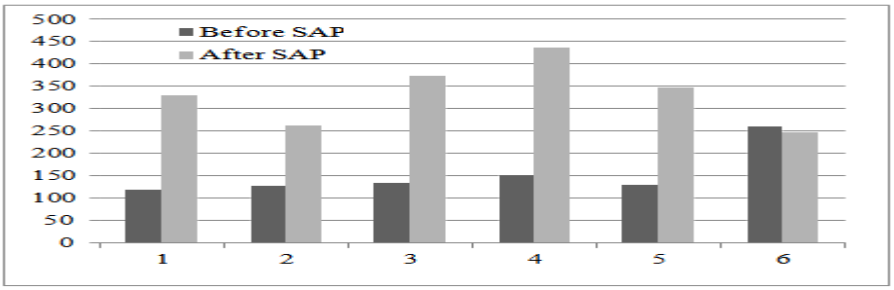

Figure 1 NATCO IHP Graph

	1	2	3	4	5	6
Before	2005	2006	2007	2008	2009	2010
After	2012	2013	2014	2015	2016	2017

Table 2 Neuland Inventory Holding Period

Before SAP Implementation			**After SAP Implementation**		
Year	**D**	**IHP**	**Year**	**D**	**IHP**
2009	(-1)	94.291	2011	(+1)	89.571
2008	(-2)	109.973	2012	(+2)	95.801
2007	(-3)	101.276	2013	(+3)	104.885
2006	(-4)	115.799	2014	(+4)	114.888
2005	(-5)	126.560	2015	(+5)	117.175
2004	(-6)	144.098	2016	(+6)	136.092
2003	(-7)	198.694	2017	(+7)	143.081
Source: Compiled from the Company Balance Sheet D is Distance from before and after Implementation					

From the table 2, it is concluded that after implementation of SAP at Neuland there is a mixed trend in decrease and increase in the inventory holding period.

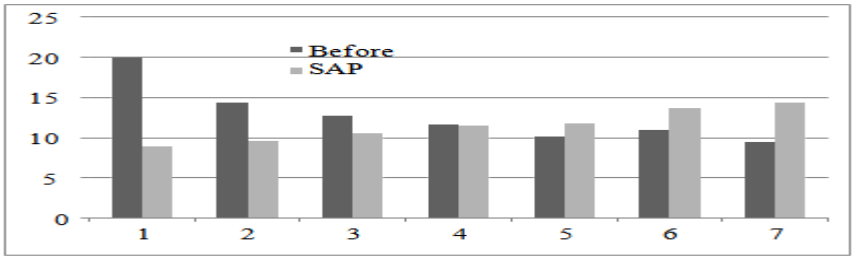

Figure 2 Neuland IHP Graph

	1	2	3	4	5	6	7
Before	2003	2004	2005	2006	2007	2008	2009
After	2011	2012	2013	2014	2015	2016	2017

Table 3 Dr Reddy Labs Inventory Holding Period

Before SAP Implementation			**After SAP Implementation**		
Year	**D**	**IHP**	**Year**	**D**	**IHP**
2006	(-1)	160.158	2008	(+1)	142.189
2005	(-2)	83.333	2009	(+2)	141.036
2004	(-3)	123.144	2010	(+3)	151.139
2003	(-4)	128.839	2011	(+4)	167.048
2002	(-5)	100.137	2012	(+5)	157.260
2001	(-6)	72.349	2013	(+6)	139.366
2000	(-7)	63.534	2014	(+7)	151.704
1999	(-8)	66.545	2015	(+8)	147.773
1998	(-9)	78.715	2016	(+9)	152.784
1997	(-10)	101.756	2017	(+10)	164.414
1996	(-11)	109.511			
Source: Compiled from the Company Balance sheet D is Distance from before and after Implementation					

From the table 3, it is concluded that before and after implementation of SAP at Reddy Labs there is a mixed trend in decrease and increase in the inventory holding period.

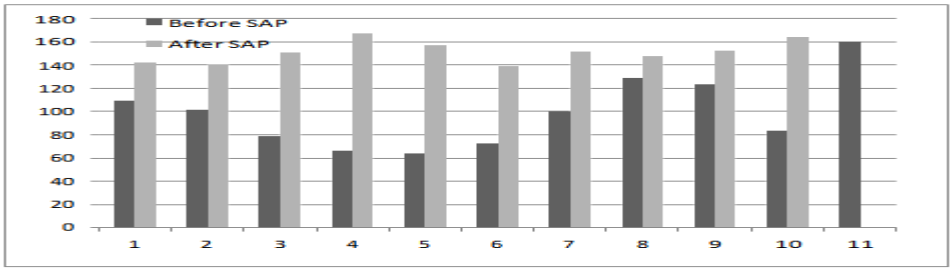

Figure 3 Dr Reddy Labs IHP Graph

	1	2	3	4	5	6	7	8	9	10	11
Before	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
After	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	

V. Paired T-TEST Analysis

Table 4 NATCO IHP t and p Value

Variable		Mean	Standard Deviation	t-value	p-value
IHP	Before	1.54118E2	53.484710	-5.219	0.003
	After	3.33026E2	70.549210		

NATCOIHP

The results after applying paired t-test is presented in the table 4, where IHP mean before SAP implementation is 1.54118E2 and after implementation is 3.33026E2, which shows an increase in the mean value of IHP after implementation of SAP thereby indicating increased production to meet demand. The IHP standard deviation before implementation of SAP is 53.484710 and after implementation is 70.549210, which shows an increase in the standard deviation of IHP after implementation of SAP showing increased production because of sales growth. The t-value is -5.219 and the p-value is 0.003. As the p-value is less than 0.05, the null hypothesis is rejected. Hence it can be concluded that there is a significant difference in the inventory holding period before and after implementation ofSAP.

NATCO IHP is low as inventory was held for a short period of time which indicated efficiency in managing assets with decreased sales and profits, the liquidity position was good and inventory holding costs decreased.

Table 5 Neuland IHP t and p Value

Variable		Mean	Standard Deviation	t-value	p-value
IHP	Before	1.27242E2	35.541385	1.705	0.139
	After	1.14499E2	19.807196		

Neul and IHP

The results after applying paired t-test is presented in the table 5, where inventory holding period mean before SAP implementation is 1.27242E2 and after implementation is 1.14499E2, which shows a decrease in the mean value of IHP after implementation of SAP thereby indicating efficient production for increased sales. The IHP standard deviation before implementation of SAP is 35.541385 and after implementation is 19.807196, which shows a decrease in the standard deviation of IHP after implementation of SAP showing timely production. The t-value is 1.705 and the p-value is 0.139. As the p-value is more than 0.05, the null hypothesis is accepted. Hence it can be concluded that there is no significant difference in the inventory holding period before and after implementation ofSAP.

Neuland IHP is high as inventory was held for a long period of time which indicated inefficiency in managing assets and thus inventory holding costs increased.

Table 6 Dr Reddy Labs IHP t and p Value

Variable		Mean	Standard Deviation	t-value	p-value
IHP	Before	9.78510E1	31.424799	-5.459	0.000
	After	1.51471E2	9.432898		

Dr Reddy LabsIHP

The results after applying paired t-test is presented in the table 6, where inventory holding period mean before SAP implementation is 9.78510E1 and after implementation is 1.51471E2, which shows a decrease in the mean value of IHP after implementation of SAP thereby indicating efficient production for increased sales. The IHP standard deviation before implementation of SAP is 31.424799 and after implementation is 9.432898, which shows a decrease in the standard deviation of IHP after implementation of SAP showing timely production. The t-value is -5.459 and the p-value is 0.000. As the p-value is less than 0.05, the null hypothesis is rejected. Hence it can be concluded that there is a significant difference in the inventory holding period before and after implementation ofSAP.

Reddy labs IHP is low as inventory was held for a short period of time which indicates efficiency in managing assets with decreased sales and profits, hence efficient usage of working capital and decrease in inventory holding costs.

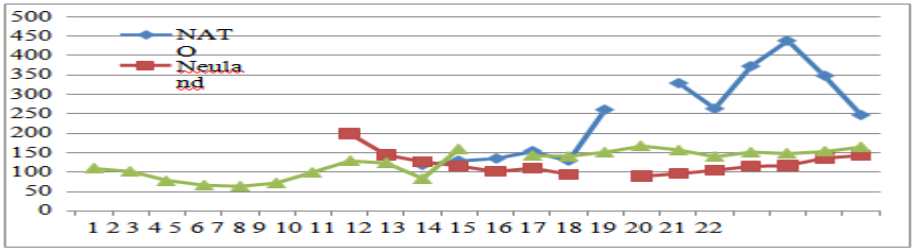

Figure 4 IHP Graph Comparison – Gap indicates implementation year

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

NATCO before SAP implementation, IHP initially stable and gradually increased but after SAP implementation IHP increased and then decreased which indicates increase in production and supply of finished goods due to growth of the company with good liquidity position.

Neuland before and after SAP implementation, IHP maintained stable with less fluctuations, which indicates stable production activity, increase in stock holding cost and maintaining constant liquidity position.

Dr Reddy Labs before SAP implementation IHP increased and after SAP implementation, IHP was stable which indicates efficiency in managing the inventory efficiently with less inventory holding costs and consistent liquidity position.

We can conclude from the graph and analyses, Dr Reddy Labs have consistent IHP for all the years post SAP implementation when compared to NATCO and Neuland.

Table 7 IHP Overview Table

Parameter	**Significant**		
Company	**NATCO**	**Neuland**	**Reddy**
IHP	Yes	No	Yes

VI. Conclusion

International market place is volatile and competitive. Organizations should efficiently utilize the inventory for sustenance, growth and generate profits. Low inventory holding strategy help firms to compete through usage of secured computer SAP systems. Business information systems are therefore important in fulfilling the business requirement by holding low inventory because of vulnerable global marketsplace.

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