

# 'Business' Benefits from BI

November 2008

Sanjay Shah

## Part I

### Introduction

I am very fascinated with finding out how business people react to BI reports. I had recently given a presentation to the MD of one of my client companies. I thought I had made a great sales analysis report. There were lots of bells and whistles, lots of graphs and tabulations and dashboards. As they say I had my 'collar-up' and I thought I was the greatest techie in the world when I went into the board room to give the presentation. I flashed all the various colorful reports to him. When I finished, he looked at me and said 'Sanjay, I already know what I have sold. I need to know what I have not sold, what opportunities have got missed out. How can you help me in that?'

The wind went out of my sails. This really set me thinking. What do business users really want? How can I design a BI report which shows people stuff that is not easily seen? How can a report make people see what is '*under the hood*'? How can I quickly take them to actionable points?

I realized that BI technologies should not be used just to automate the information process. They should be used to improve the information content and help decision makers get *business benefits* out of their investment in BI.

In this article I discuss four design principles which you can use to make actionable reports. These are :

- *Looking under the Hood*
- *Relative and not just absolute*
- *Give early warning signals*
- *Don't trust the law of averages*

These principles are explained in the following paragraphs with some examples and visuals.

### Looking Under the Hood

Suppose you are the CEO/CFO of a group of companies having various divisions and business lines. You have been given the Profit / Loss Report for the month of October, and on scanning the same you find that the top line is slightly below than the budgeted number. This report given to you is in Excel. If you

wish to see the company-wise or business-line wise breakup of sales, then you have to refer to another sheet. This is traditional MIS, and this is the MIS in most companies. The report you get is something like this :

PROFIT & LOSS A/C											Division : DEMO COMPANY	
											Month : XXXX	
											[Rs in Crores.]	
PARTICULARS	Current Month			Year to Date			For the Year					
	Actuals	Budget	PY	Actuals	Budget	PY	Target	Budget	PY			
1 Sales	0.00	1,481.00	1,096.14	4,673.56	5,686.98	4,390.52	28,943.22	28,943.22	14,756.			
11 Direct material	0.00	1,185.26	985.26	3,867.00	4,602.66	3,790.83	16,663.47	16,663.47	12,646.			
111 Export	0.00	142.47	72.14	308.20	504.80	420.19	2,227.22	2,227.22	1,217.			
112 Difference in exchange - Exports	0.00	0.00	(2.84)	(4.27)	0.00	1.65	0.00	0.00	3.			
113 Inter Debit	0.00	158.05	43.77	402.54	489.70	177.65	2,022.43	2,022.43	768.			
2 Excise duty expenses	0.00	0.06	0.89	1.34	3.13	(8.93)	15.70	15.70	13.			
3 Net Sales [1-2]	0.00	1,480.90	1,095.24	4,672.22	5,693.83	4,399.45	26,927.52	26,927.52	14,742.			
4 Operating Income	0.00	24.40	26.02	82.61	101.68	125.25	374.25	374.25	306.			
5 Material cost	0.00	1,101.83	880.46	3,537.33	4,146.99	3,247.98	15,482.43	15,482.43	10,784.			
51 Direct material	0.00	1,000.96	718.91	3,252.77	3,749.17	2,920.86	14,071.68	14,071.68	9,709.			
52 Subcon charges	0.00	90.87	161.55	284.56	397.82	327.12	1,410.75	1,410.75	1,075.			
53 Difference in exchange - Imports	0.00	0.11	(1.40)	(0.60)	0.39	(3.99)	1.06	1.06	1.			
54 Subcon charges	0.00	16.18	15.96	48.27	86.22	54.92	213.71	213.71	174.			
55 Indirect material	0.00	54.83	45.86	161.07	216.70	175.48	789.92	789.92	569.			
56 Freight inward & Subst	0.00	29.74	24.33	86.96	114.38	100.09	418.05	418.05	330.			
57 Inventory written off	0.00	0.50	0.03	0.94	1.13	0.83	8.00	8.00	8.			
6 Contribution [3 + 4 - 5]	0.00	403.47	320.80	1,227.50	1,558.52	1,276.72	5,818.38	5,818.38	4,354.			
7 Warrantly Cost	0.00	10.23	9.22	34.99	43.77	35.74	158.32	158.32	136.			
71 FCC Material	0.00	1.80	1.80	6.24	7.22	7.25	26.14	26.14	31.			
72 Warranty claims	0.00	8.33	7.42	28.86	36.55	28.49	133.18	133.18	98.			
8 Variable Cost	0.00	77.54	70.87	263.34	315.92	273.22	1,118.96	1,118.96	877.			
81 Power, fuel & water	0.00	19.85	20.19	66.11	81.47	81.47	298.08	298.08	227.			
82 Discount and Commission	0.00	21.23	17.33	75.98	84.18	83.07	288.55	288.55	188.			
83 Freight outward	0.00	28.55	17.73	69.31	79.42	88.95	248.13	248.13	240.			
84 Free Sensing	0.00	5.10	3.62	17.44	20.15	14.58	89.97	89.97	54.			
85 Royalty	0.00	3.22	3.49	10.89	13.60	13.12	61.01	61.01	11.			
86 Others	0.00	7.49	8.51	24.91	27.10	26.98	138.28	138.28	144.			
9 Contribution [6-7-8]	0.00	315.70	240.71	929.26	1,199.83	967.79	4,548.10	4,548.10	3,345.			

Figure 1

You have hired a whiz-kid BI team which creates a report which is similar to the one as above. However now you can get a color coded status of each item. You can now also drill down or filter to a company or business line level. At the lower level you can see if that division has been performing well or not. That's BI, but still not the full bang for the buck. This is what you will get :

Line Item	Division	FTM Act	FTM Budget	FTM PY	FTM Act %	FTM Budget %	FTM PY %	YTD Act	YTD Budget	YTD PY	YTD Act %	YTD Budget %	YTD PY %	FTV Act	FTV Budget	FTV PY	FTV Act %	FTV Budget %	FTV PY %
161-Sales	ALL	(4,898)	(6,871)	(8,871)	98.3%	98.5%	(98.8%)	(34,814)	(40,047)	(48,893)	98.1%	98.2%	(97.6%)	(259,942)	(261,369)	(261,369)	98.1%	98.1%	98.1%
	CSE	(3,606)	(4,423)	(5,871)	99.7%	99.7%	(99.7%)	(28,242)	(36,292)	(48,893)	99.7%	99.6%	(99.6%)	(225,889)	(225,889)	(225,889)	99.8%	99.8%	99.8%
	FIC	(1,272)	(1,394)	(2,000)	99.8%	99.5%	(99.7%)	(7,478)	(9,865)	(12,000)	99.6%	99.1%	(99.6%)	(12,650)	(12,650)	(12,650)	99.2%	99.2%	99.2%
	RL	(148)	(230)	(300)	98.5%	98.5%	(98.5%)	(1,290)	(2,000)	(2,300)	99.3%	99.1%	(99.3%)	(2,870)	(2,850)	(2,850)	99.3%	99.3%	99.3%
	RLI	(322)	(248)	(300)	100.0%	100.0%	(100.0%)	(4,850)	(2,450)	(2,450)	100.0%	100.0%	(100.0%)	(2,199)	(2,950)	(2,950)	100.0%	100.0%	100.0%
	PWR	(91)	(74)	(80)	97.8%	97.9%	(97.8%)	(796)	(585)	(585)	97.6%	97.9%	(97.6%)	(750)	(750)	(750)	97.9%	97.9%	97.9%
	ST	(114)	(229)	(229)	99.5%	100.0%	(100.0%)	(862)	(1,032)	(1,032)	97.6%	100.0%	(100.0%)	0	(1,480)	(1,480)	100.0%	100.0%	100.0%
	SWS	(80)	(26)	(26)	100.0%	100.0%	(100.0%)	(590)	(290)	(290)	100.0%	100.0%	(100.0%)	(227)	(350)	(350)	100.0%	100.0%	100.0%
	STD	(98)	(37)	(37)	99.9%	99.9%	(99.9%)	(677)	(325)	(325)	99.6%	99.8%	(99.6%)	(407)	(407)	(407)	99.8%	99.8%	99.8%
	STD	(14)	(8)	(8)	100.0%	100.0%	(100.0%)	(6)	(70)	(70)	100.0%	100.0%	(100.0%)	(43)	(86)	(86)	100.0%	100.0%	100.0%
162-Operating Income	ALL	(106)	(114)	(114)	100.0%	100.0%	(100.0%)	(1,158)	(1,132)	(1,132)	100.0%	100.0%	(100.0%)	(1,400)	(1,401)	(1,401)	100.0%	100.0%	100.0%
116-Direct Cost	ALL	3,651	4,389	5,871	-73.3%	-73.1%	(-73.3%)	24,814	34,871	48,893	-74.3%	-73.0%	(-74.3%)	163,319	163,319	163,319	-73.7%	-73.7%	(-73.7%)
	CSE	2,651	3,236	4,423	-72.5%	-73.0%	(-72.5%)	20,038	28,001	36,292	-70.7%	-70.8%	(-70.7%)	132,169	132,169	132,169	-70.6%	-70.6%	(-70.6%)
	FIC	885	999	1,394	-69.4%	-71.3%	(-69.4%)	6,048	8,848	12,000	-65.6%	-68.8%	(-65.6%)	5,775	8,775	12,000	-68.3%	-68.3%	(-68.3%)
	RL	88	145	300	-58.8%	-62.4%	(-58.8%)	77	1,246	1,605	-59.2%	-62.6%	(-59.2%)	888	1,728	2,100	-59.8%	-62.6%	(-59.8%)
	RLI	159	127	300	-49.4%	-51.7%	(-49.4%)	55	2,489	1,271	-51.3%	-51.7%	(-51.3%)	1,111	1,525	1,525	-51.7%	-51.7%	(-51.7%)
	PWR	61	51	80	-55.4%	-67.4%	(-55.4%)	30	541	400	-66.2%	-67.0%	(-66.2%)	246	513	513	-67.0%	-67.0%	(-67.0%)
	ST	101	185	229	-86.1%	-80.8%	(-86.1%)	0	558	863	-82.2%	-82.6%	(-82.2%)	0	1,223	1,223	-82.1%	-82.1%	(-82.1%)
	SWS	61	20	26	-76.9%	-74.6%	(-76.9%)	18	449	218	-78.4%	-76.3%	(-78.4%)	169	260	260	-74.4%	-74.4%	(-74.4%)
	STD	80	27	37	-82.0%	-73.0%	(-82.0%)	26	634	242	-78.6%	-74.4%	(-78.6%)	258	303	303	-74.4%	-74.4%	(-74.4%)
	STD	8	5	8	-59.6%	-63.2%	(-59.6%)	4	63	44	-68.9%	-63.2%	(-68.9%)	24	54	54	-63.2%	-63.2%	(-63.2%)
112-Variable SGA Expenses	ALL	209	211	211	-4.2%	-3.5%	(-4.2%)	1,759	1,829	1,829	-3.7%	-3.7%	(-3.7%)	1,380	2,308	2,308	-3.8%	-3.8%	(-3.8%)
	CSE	51	86	114	-1.4%	-1.9%	(-1.4%)	32	458	647	-1.6%	-1.8%	(-1.6%)	402	890	822	-2.0%	-2.0%	(-2.0%)
	FIC	14	14	14	-1.1%	-1.0%	(-1.1%)	12	106	119	-1.4%	-1.2%	(-1.4%)	90	147	147	-1.2%	-1.2%	(-1.2%)
	RL	8	8	8	-6.1%	-3.8%	(-6.1%)	6	70	84	-3.3%	-3.8%	(-3.3%)	47	96	100	-3.3%	-3.3%	(-3.3%)
	RLI	0	0	0	0.0%	0.0%	(0.0%)	0	0	0	0.0%	0.0%	(0.0%)	0	0	0	0.0%	0.0%	(0.0%)
	PWR	9	9	9	-9.6%	-9.9%	(-9.6%)	1	94	17	-9.6%	-9.9%	(-9.6%)	10	22	22	-9.9%	-9.9%	(-9.9%)

Figure 2

However, the user has to still drill each line to find out whether the lower level entities are performing well or not. While the user will be initially fascinated with the possibilities of such a report, soon he will find it rather tiresome to drill down each line to find which the underperforming segment is. Can we make his job even simpler ?

With a little bit of further work, we can bring an indicator on the top line to tell the user that there is some problem under the hood. If the indicator is green, it would mean that everything at the lower level is fine. But if the indicator is red, it would mean that the user needs to drill down .

company.sbu	Budget.	Actual.	Var.Indicator	Variance.
co1	220000	270000	↓	↑ 50000
co2	50000	60000	↑	↑ 10000
co3	15000	12000	↓	↓ -3000
<b>Grand Total</b>	<b>285000</b>	<b>342000</b>	↓	↑ 57000

Figure3

In the above screenshot for company 1 C6, you can see that the actual sales F6 is higher than the budgeted sales E6. Therefore there is a positive variance, indicated by a green up arrow in cell H6. However in the cell G6, you see a var. indicator showing a red down arrow. This is designed to mean that while the overall variance is positive, there are certain SBU's within the company, column D6, which are having an unfavorable variance. With this indicator, the user now knows that company 1 should be drilled down into its SBU's and checks their performance. When he expands company 1 the user sees the following :

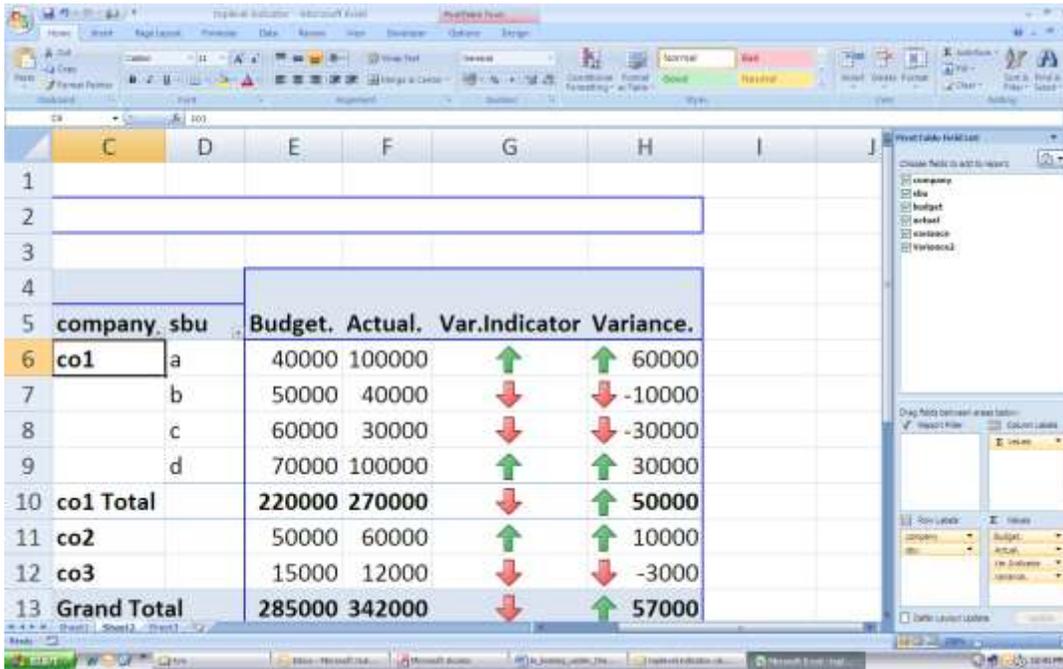


Figure 4

Here the user sees that within company 1, sbu b and sbu c are having an unfavorable variance. These types of indicators, which tell the user at a top level that there is a problem at a lower level are extremely useful.

### Relative and not just Absolute

While absolute numbers are necessary to appreciate the size and the reach of business, sometimes they can be misleading. The absolute numbers must be seen along with the relative numbers to truly understand the impact of business changes.

Suppose you are reading a Profit / Loss statement which have Budget, Actual and Variance columns. The variance is calculated as Actual – Budget. If the sales have reduced, the variance column will show a negative number, which is an unfavorable variance. If the COGS (cost of goods sold) has reduced, the variance column will show a positive number, which is a favorable variance. But hold on, is the reduction on COGS really a favorable or an unfavorable variance ? The absolute difference will not tell you the real story. Suppose the COGS to Sales ratio in budget was 65%, but the same COGS to Sales ratio in actual numbers is say 68%, it means that your relative cost has gone up, though your absolute amounts have reduced !

In the following report, you would see both the absolute as well as the relative indicators. This immediately highlights the problem area, and makes it actionable.

Line Item	FTM ACT	FTM Budget	FTM % to Sales	FTM Act % to Sales	FTM Budget % to Sales	FTM PY	YTD ACT	YTD Budget	YTD ACT % to Sales	YTD Budget % to Sales	YTD PY	FTY LE	Budget	FTY	FTY LE
101 Sales	(10,540)	(12,538)	99.0%	99.1%	(8,069)	(91,543)	(102,190)	98.8%	98.9%	(71,277)	(126,823)	(129,378)	(129,378)	(129,378)	98.9%
102 Operating Income	(106)	(114)	1.0%	0.9%	(100)	(1,168)	(1,132)	1.2%	1.1%	(1,038)	(1,400)	(1,401)	(1,401)	(1,401)	1.1%
103 Total Income	(10,646)	(12,652)	100.0%	100.0%	(8,169)	(92,701)	(103,322)	100.0%	100.0%	(72,316)	(128,223)	(130,779)	(130,779)	(130,779)	100.0%
110 Direct Cost	7,845	9,154	-71.8%	-72.4%	5,784	86,782	73,518	-70.9%	-71.2%	50,981	91,568	83,292	83,292	83,292	-71.4%
111 Variable SGA Expenses	284	322	-2.7%	-2.5%	210	2,415	2,704	-2.5%	-2.6%	1,929	3,473	3,408	3,408	3,408	-2.7%
112 Value Addition	(2,717)	(3,176)	25.5%	25.1%	(2,185)	(24,524)	(27,100)	25.5%	25.2%	(19,427)	(33,182)	(34,079)	(34,079)	(34,079)	25.9%
113 EHL	785	705	-7.4%	-6.0%	694	7,199	6,877	-7.8%	-6.7%	6,527	8,264	8,280	8,280	8,280	-6.4%
113 Other Mtg Expenses	188	220	-1.8%	-1.7%	166	2,183	1,965	-2.4%	-1.9%	1,696	2,382	2,428	2,428	2,428	-1.9%
114 Depreciation	145	233	-1.4%	-1.8%	108	1,362	1,723	-1.5%	-1.7%	1,081	1,683	2,208	2,208	2,208	-1.5%
116 Cost of Sales	9,048	10,834	-85.0%	-84.1%	6,833	78,910	86,788	-85.1%	-84.0%	61,193	107,570	109,616	109,616	109,616	-83.9%
115 Gross Profit	(1,598)	(2,017)	15.0%	15.9%	(1,327)	(13,790)	(16,534)	14.9%	16.0%	(11,123)	(20,652)	(21,163)	(21,163)	(21,163)	16.1%
140 Fixed SGA Cost	584	609	-5.5%	-4.8%	481	5,465	5,681	-6.9%	-5.6%	4,581	7,022	6,918	6,918	6,918	-5.5%
142 Fixed Cost	1,702	1,768	-16.0%	-14.0%	1,339	16,198	16,247	-17.5%	-15.7%	12,885	19,561	19,834	19,834	19,834	-15.2%
145 OPEX	(1,814)	(1,409)	9.5%	11.1%	(848)	(8,326)	(10,853)	9.5%	10.5%	(6,542)	(13,630)	(14,248)	(14,248)	(14,248)	10.8%
148 Finance Cost	131	181	-1.2%	-1.4%	79	1,040	1,482	-1.1%	-1.4%	764	1,431	1,826	1,826	1,826	-1.1%
149 OPEX	(884)	(1,228)	8.3%	9.7%	(767)	(7,286)	(9,391)	7.9%	9.1%	(5,777)	(12,200)	(12,419)	(12,419)	(12,419)	9.5%
152 Non-Op Income	(83)	(25)	0.8%	0.2%	(53)	(2,538)	(736)	2.7%	0.7%	(2,415)	(1,809)	(848)	(848)	(848)	1.4%
158 Non-Op Expense	21	11	-0.2%	-0.1%	1	331	503	-0.4%	-0.5%	565	591	567	567	567	-0.5%
160 Provision Year Income/Expense	0	0	0.0%	0.0%	0	6	0	0.0%	0.0%	6	6	6	6	6	0.0%
163 Profit before Tax	(945)	(1,243)	8.9%	9.8%	(829)	(9,486)	(9,824)	10.2%	9.3%	(7,821)	(13,412)	(12,700)	(12,700)	(12,700)	10.5%
167 Profit/Loss - Sale of Investment	(0)	(0)	0.0%	0.0%	(873)	(2,980)	(25)	3.2%	0.0%	(3,818)	(3,483)	(30)	(30)	(30)	2.7%
170 Profit before Tax	(945)	(1,243)	8.9%	9.8%	(829)	(12,467)	(9,549)	13.4%	9.3%	(11,438)	(16,895)	(12,730)	(12,730)	(12,730)	13.2%
171 Taxation	202	321	-1.9%	-2.5%	152	2,221	2,828	-2.4%	-2.7%	1,598	-3,333	3,693	3,693	3,693	-2.6%
175 Profit after Tax	(744)	(922)	7.0%	7.3%	(644)	(10,246)	(6,820)	11.1%	6.6%	(9,840)	(13,562)	(9,037)	(9,037)	(9,037)	10.6%
185 Appropriation	744	922	-7.0%	-7.3%	644	10,246	6,820	-11.1%	-6.6%	9,840	13,562	9,037	9,037	9,037	-10.6%

Figure 5

In this figure you can see that the sales B7 are lower than the budget C7, so cell D7 is showing a downward red arrow. However Variable Expenses in B11 are less than the budget and therefore the status indicator is a green up-arrow in D11. Cell E11 however is in orange. It indicates that the variable expenses as a percentage to sales are higher than what was budgeted. So in fact this is an unfavorable variance !

## Part II

### Give Early Warning Signals

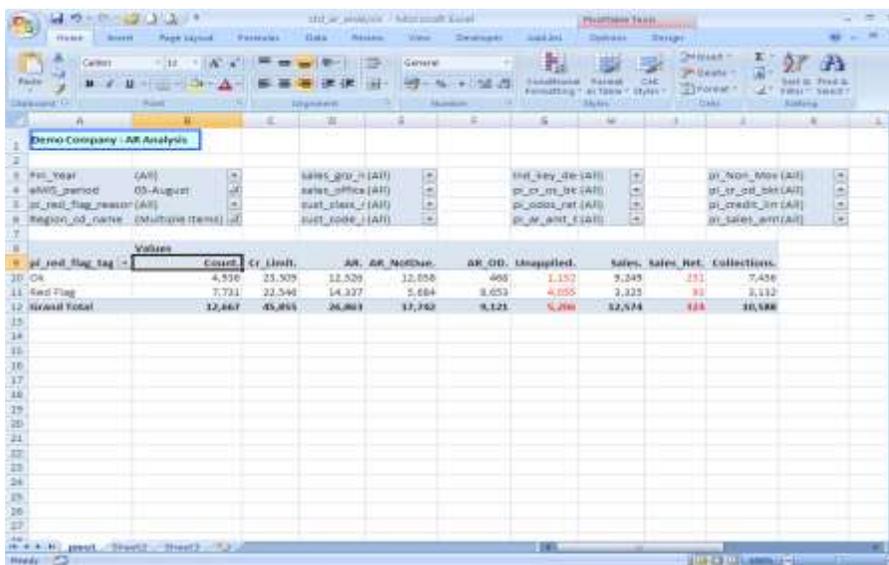
Giving early warning signals is like predicting weather, but as they say a stitch in time saves nine! What is the use of knowing a customer receivable has become doubtful . It is already too late.? If some warning signals were received a few months back, this could have been prevented. This is the story everywhere. Businesses want information on which they can act to prevent losses. By using BI technology intelligently, reports can be made more meaningful and actionable. For example in an AR Report of an organization which is geographically wide-spread and there are thousands of customers it would be very difficult to find out the culprits. It would be the proverbial needle in the haystack. However, it would be possible to apply business rules to 'red-flag' a customer. For example you could apply business rules like:

- If the overdue amounts are  $\geq 25\%$  of total dues, or
- If the total dues are  $> 25\%$  of credit limit, or
- If the potential interest loss is  $> 15\%$  of overdue amount, or
- If weighted average credit period is  $> 10\%$  of standard credit period, or
- If the sales trend for a customer is downwards, but the AR balances are flat, or
- If there are no sales or no receipts from a customer in a month,

If any of the above conditions are true, then the system will flag the customer as a red flag customer.

Such rules cannot be standardized. They have to be identified in consultation with the customer. The results of application of such rules can be startling. The report can single out the culprits amongst thousands of customers. You can then quickly take corrective action.

The following screenshot categorizes the customers into Red Flag and Ok customers based on several business rules.



The screenshot shows an Excel spreadsheet with a pivot table summarizing AR data. The pivot table is filtered by 'red\_flag\_tag' with categories 'Ok' and 'Red Flag'. The columns include 'Count', 'Cr. Limit', 'AR', 'AR\_NORMed', 'AR\_OD', 'Unapplied', 'Sales', 'Sales Ret.', and 'Collections'.

red_flag_tag	Count	Cr. Limit	AR	AR_NORMed	AR_OD	Unapplied	Sales	Sales Ret.	Collections
Ok	4,578	23,309	12,529	12,058	468	1,152	5,245	231	7,458
Red Flag	7,721	22,546	14,327	5,084	9,053	4,055	3,325	93	2,112
<b>Grand Total</b>	<b>12,299</b>	<b>45,855</b>	<b>26,856</b>	<b>17,142</b>	<b>9,121</b>	<b>5,207</b>	<b>8,570</b>	<b>324</b>	<b>9,570</b>

Figure 6

The following screen shot expands the Red Flag, and shows the reason wise flagging. For example row 15 is a summary of all customers who are classified as 'NM' meaning 'non-moving'. These are customers who have had no sale and no collections in a month.

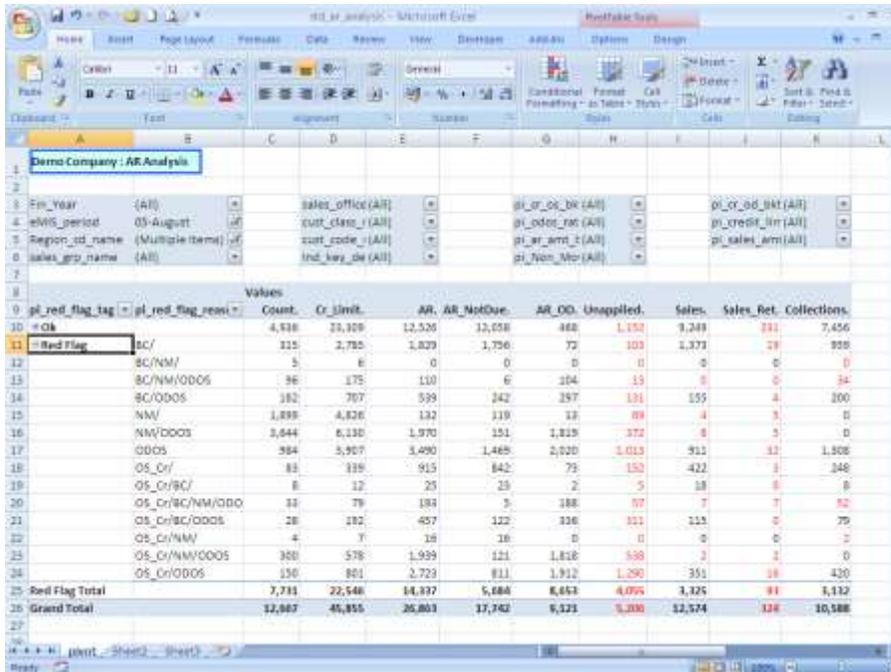


Figure 7

The user can then further drill down into any category to identify the customer, as shown below :

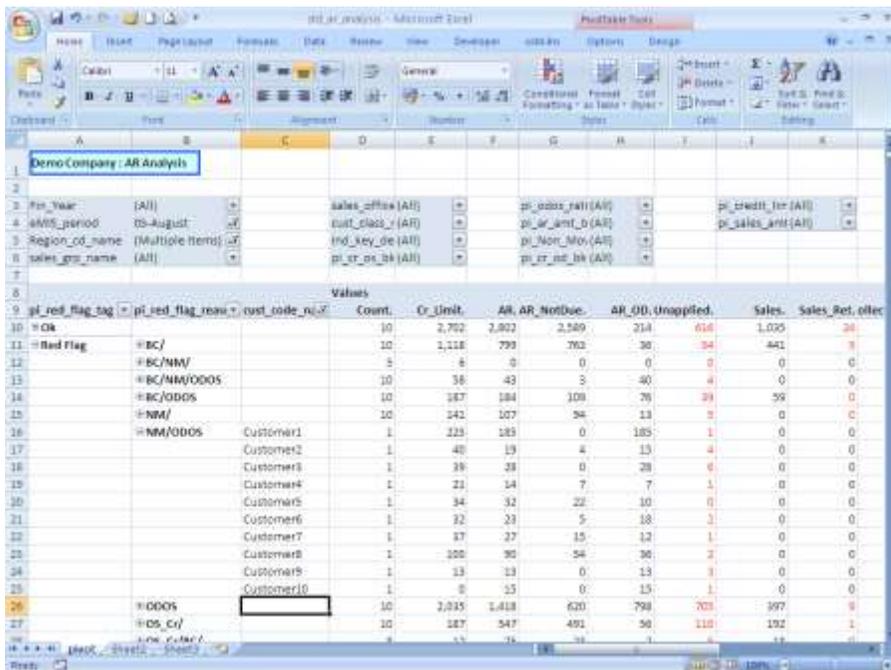


Figure 8

So, in a few clicks, from over 12000 customers, we are able to locate 10 for which action is to be taken!

### Don't Trust the Law of Averages

The law of averages does not help in finding the culprits. The report must let you study the base numbers from which the averages have been derived. Suppose you have a budgeted inventory turns (consumption in a period divided by stock) of 4, which translates to about 90 days inventory on hand. In actual also lets say that you get an inventory turns of 4. At the overall level, this may sound ok, but not so for many items which may be having a much lower inventory turns. The inventory report must be able to drill down to the item level (culprit) so that you can take corrective action.

A report such as the one given below can help you considerably :

Item	Val	% of Val	Stock	Days of Stock
B. Backs	0	0%	95,393,119	0.40
C. High	24,119,000	140%	326,341	211
D. Mixers	290,836,161	1685%	745,078	30
E. Low	177,817,439	1027%	77,571,992	4.29
Grand Total	592,982,700	3352%	17,214,000	4

Figure 9

The above report shows at a summary level, F13 that the overall inventory turns are 4. However the report below drills down to the item level, and shows a different story.

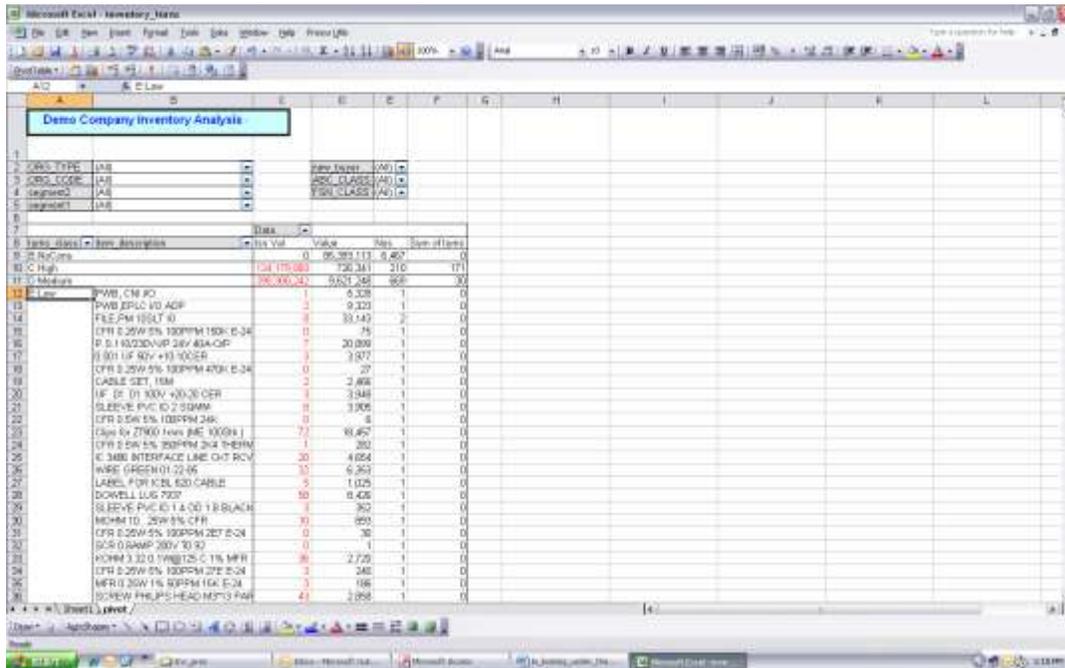


Figure 10

This report now shows that there are several items where the inventory turns is very low, and therefore a cause of concern !

(All the above examples are fictitious examples created for demonstration purposes. The data was created in MS-SQL Server on which business rules were applied and the report visualization was done in MS-Excel Pivot Tables.)

### Conclusion

The key to a good BI solution is very close interaction with the actual decision makers and identifying the way they read and act on that report. This will give clues to identify and apply business rules on raw data and create intelligent dimensions. The activity of identifying such intelligent dimensions, is a continuously evolving one. These intelligent dimensions are ultimately the difference between success and failure of a BI application from the business users' perspective.

- end

### About the Author:



Sanjay Shah (B.Com, CA) is the CEO of Prosys Infotech Private Limited, a Pune, India based company specializing in developing BI solutions on the Microsoft BI Platform. Prosys has

developed BI solutions for various companies like Honeywell Automation India Ltd., Alfa Laval India Limited, Tata Auto Components Ltd., Kirloskar Group Corporate Office, Kansai Nerolac Paints Limited etc. He can be contacted at [sanjay@prosysinfotech.com](mailto:sanjay@prosysinfotech.com).