Key Performance Indicators in Retail

It is common sense that Margin and Inventory Turns are Key Performance Indicators for a Retail business. But what are they exactly and what is the relationship between them? Is there some less known but even more important KPI? Does management programs calculate these indicators with sufficient detail and accuracy? Let's go in some details.

Margin

The Margin is the difference between revenues and costs. For each product is the difference between sales in a given period, net of discounts and promotions, and the cost of units sold. The Margin expressed in percentage is the ratio between Margin and Sales

$$Margin = Sale - Cost$$

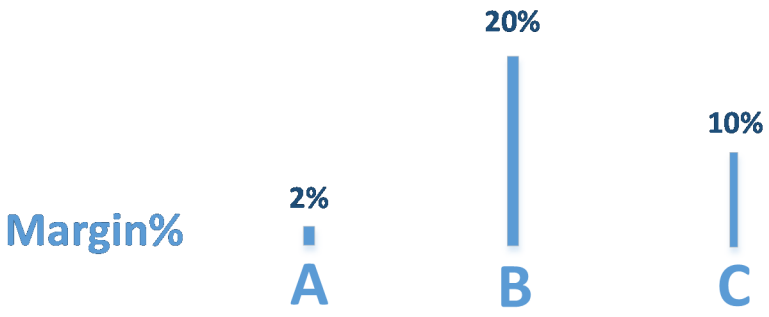
$$Margin\% = \frac{Margin * 100}{Sale}$$

When the cost can vary with each new purchase, it is not trivial to determine exactly the cost for each sale. Calculation methods include the continuous LIFO (Last In First Out) and the stock average cost, updated at each delivery, both more complex than criteria required by tax authorities for inventory valuation.

It is worth mentioning that Markup%, a parameter used in trade for the definition of sales prices, differs from the Margin% from being related to Cost instead than to Sales value (a product that cost 80 $ and is sold at 100 $, has a Margin of 20% and a Markup of 25%).

In essence, the Margin is the ability to purchase at the lowest price and sell at the highest price, but neglects matters such as finance, logistic and obsolescence related to longer or shorter permanence of the goods in the warehouse.

Take for example three products with different Margin%:



In addition to Margin%, the Margin value is also important because it is what finally support the business. The product A, despite having the lowest % of the three, may be so popular in comparison to others, to contribute most to cover business general cost and to make a profit.

Inventory Turns

Inventory turns is the ratio between q.ty sold within a year and the average q.ty in stock or better yet between Sales Value (Cost + Margin) and Average Inventory Cost, in the previous 12 months. Among q.ty and value criteria, our preference goes to the second because it is homogeneous with Margin% and for another reason which will be clear later.

$$InvTurns_v = \frac{SaleYear}{AvgInvCost}$$

Let's consider the same products of the previous example, but from the point of view of the Inv.Turns.

An Inv.Turns value of 10 for product A means, for example, that in the face of Sales of 10,000 or 200 $ in a year, the average Inventory Cost were respectively 1,000 or 20 $. The Inv.Turns concept is similar to that of harvests that can be obtained from a plot of land in a year.

The Inv.Turns is the ability to minimize the permanence of goods in warehouses and stores, and therefore the Inventory value. This requires the purchase of optimal q.ty and also at the right time, keeping in mind that increasing the frequency of supply can increase costs of product, transport and handling of goods. The increase of Inv.Turn reduces the use of capital and space, as well as the risk of obsolescence of the goods, but care is needed in order not to lose sales because of delivery delays or unexpected high sales.

Is more important Margin% or Inventory Turns?

The two indicators are equally important and very dissimilar because they quantify completely different and, in some respects, conflicting management skills. To give some examples, maximizing the Margin may require an assortment extension with an almost inevitable lowering of Inventory Turns, or maximizing Inv.Turns can require promotions, reducing the Margin.

What really matters is the product of Margin% and Inv.Turns, which coincides with a super-index named GMROII%, as we shall see below.

GMROII

The GMROII is the Gross Margin Return on Inventory Investment and is the ratio between Margin and the capital directly employed to generate it. It is usually expressed in % and considering the period of one year (12 months), in order to get a relation with other types of investment, although it is possible to analyze shorter periods, such as weeks or months.

$$GMROII\% = \frac{MarginYear * 100}{AvgInvCost}$$

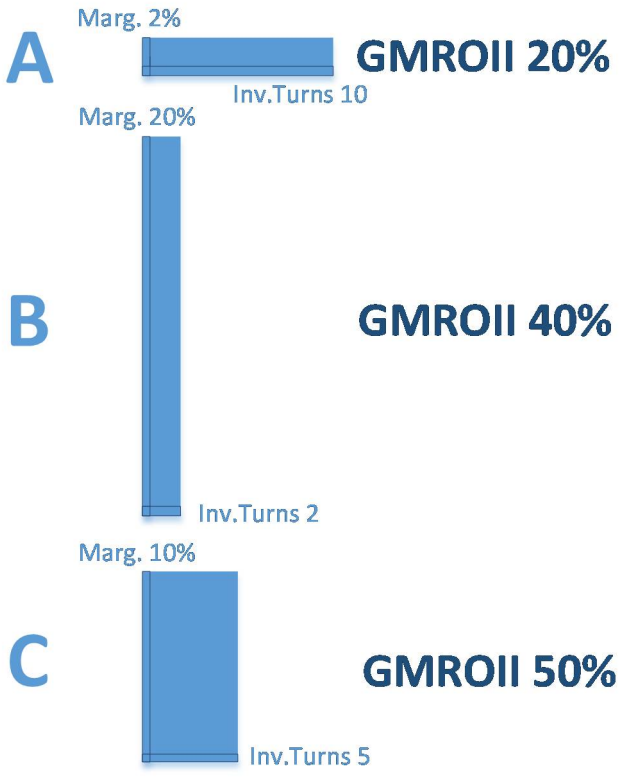
To demonstrate that GMROII% is also $Margin\% * InvTurns_v$ let's make explicit the respective formulas

$$\frac{MarginYear * 100}{SaleYear} * \frac{SaleYear}{AvgInvCost}$$

... as Sale in a Year is both the numerator and the denominator, the formula can be simplified to:

$$\frac{MarginYear * 100}{AvgInvCost}$$

... exactly what expresses GMROII%. On the other hand it is fairly intuitive that in order to make the most out of the investment is necessary to increase both the Margin% for each sale and the number of purchase and sale cycles per year. Let's represent visually the GMROII of the products previously considered:



The item A good Inv.Turns value is depressed by its low Margin and vice versa the product B good Margin is depressed by a low Inv.Turns. C has intermediate values both for Margin and Inv.Turns, but it is the one with highest return on investment. The GMROII% not consider indirect costs, such as storage space and staff time, related to each product. Since GMROII% is proportional to the rectangle area, the best result is obtained as the closer you get to the square, that is, the more balanced are Margin% and Inv.Turns.

Why GMROII is uncommon in business applications?

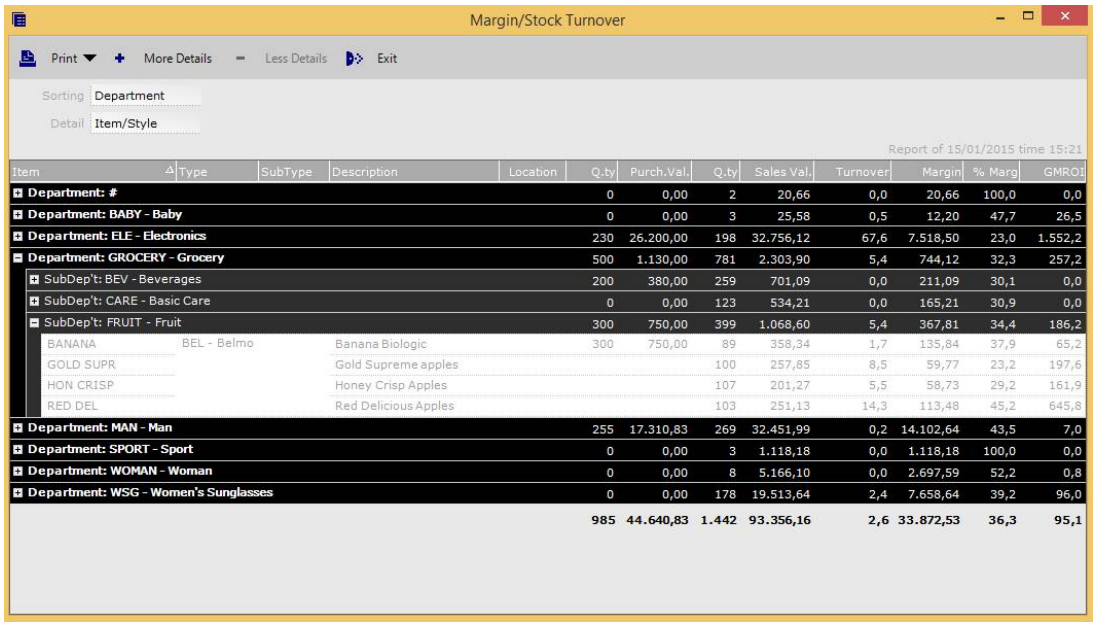
To make decisions on price lists, assortments and promotions, a way is to identify, with a top-down process, less profitable departments or brands, in which to find the worse sub-departments or lines where to locate the individual items on which to take priority action, whether on the Margin% or on Inv.Turns. An alternative bottom-up approach consists, for example, on displaying products in increasing Margin% and Inv.Turns order, to locate the ones on which to take action.

Unfortunately Retail Management Software rarely offer the ability to view Margin%, Inv.Turns and GMROII% down to the detail of each individual product because of the high bulk of calculations necessary to obtain sufficient accuracy.

Margin%, with purchases at different prices and sometimes recorded after the actual sale, as well as recording a posteriori of credit or debit notes, poses nontrivial problems in the calculation of the cost of product in each sale.

But even more problematic is the Inv.Turns, where the simple average of the initial and final values would give an Average Inventory Value too rough because, at the individual Item level, the stock can vary daily and with very irregular rhythms. A sort of weighted average must be adopted as that applied by the banks for the calculation of interest on deposits, which considers each balance change, the number of days from the previous change and the rate applied.

aKite exploits the tremendous power made available by Cloud Computing to calculate very precisely Margin%, Inv.Turns and then GMROII%, at the detail of each single item and up to the whole department, store and chain, to help make the best decisions



Item	Type	SubType	Description	Location	Q.ty	Purch.Val.	Q.ty	Sales Val.	Turnover	Margin	% Marg	GMROI
Department: #					0	0,00	2	20,66	0,0	20,66	100,0	0,0
Department: BABY - Baby					0	0,00	3	25,58	0,5	12,20	47,7	26,5
Department: ELE - Electronics					230	26.200,00	198	32.756,12	67,6	7.518,50	23,0	1.552,2
Department: GROCERY - Grocery					500	1.130,00	781	2.303,90	5,4	744,12	32,3	257,2
SubDep't: BEV - Beverages					200	380,00	259	701,09	0,0	211,09	30,1	0,0
SubDep't: CARE - Basic Care					0	0,00	123	534,21	0,0	165,21	30,9	0,0
SubDep't: FRUIT - Fruit					300	750,00	399	1.068,60	5,4	367,81	34,4	186,2
BANANA	BEL - Belmo		Banana Biologic		300	750,00	89	358,34	1,7	135,84	37,9	65,2
GOLD SUPR			Gold Supreme apples				100	257,85	8,5	59,77	23,2	197,6
HON CRISP			Honey Crisp Apples				107	201,27	5,5	58,73	29,2	161,9
RED DEL			Red Delicious Apples				103	251,13	14,3	113,48	45,2	645,8
Department: MAN - Man					255	17.310,83	269	32.451,99	0,2	14.102,64	43,5	7,0
Department: SPORT - Sport					0	0,00	3	1.118,18	0,0	1.118,18	100,0	0,0
Department: WOMAN - Woman					0	0,00	8	5.166,10	0,0	2.697,59	52,2	0,8
Department: WSG - Women's Sunglasses					0	0,00	178	19.513,64	2,4	7.658,64	39,2	96,0
					985	44.640,83	1.442	93.356,16	2,6	33.872,53	36,3	95,1