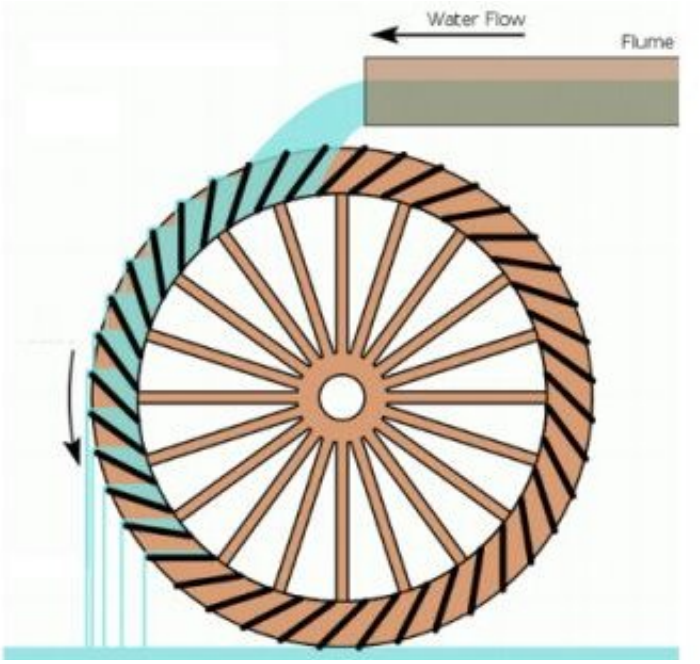

Holding Cost of Effective Flow (part 1)

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Understanding the necessary acting factors that will give an optimal flow of products, goods and materials is important step. Many of these acting factors are included in the theories about inventory management but what is sometimes missing is the inclusion of the margins being made, as these do directly influence return on the capital tied up in the supply chain.

As there are many values that represent the acting conditions of material flow in a supply chain, then these external factors influence both the optimal and actual supply chain performance. Changes in these factors impact on the inherent optimal performance figures of the supply chain. So when conditions change – the supply value chain itself changes and becomes different, due to the external conditions of the supply and demand functions of a supply chain.

If supply chain improvement is an optimization task and this is to be solved with a systematic approach, then we also need to figure out what might be the economic restrictions (such as directive service levels, warehouse size, inventory quantity in dollars and in volume, vehicle sizes, money tied up, order interval, and package sizes). They could be regulated by “hard” methods (like fixed time

between orders, minimum order quantities) and also by "soft" methods (through costs, coefficients of goodwill, holding costs etc.).

Both of these methods and restrictions modify and change the results from any optimization calculations on the flows in supply chain (for example, the what, when and how much should be produced, distributed etc). Therefore these methods should be chosen wisely and correctly. We now will turn to considering the holding costs of material flows.

A main supply chain factor is the cost of capital in all stages of supply chain, such as in different stockholding places and also in transit between these places. The holding costs parameter is widely used in optimization calculations in the Economic Order Quantity (EOQ) calculation in inventory management and the opportunity costs of capital is a part of this calculation. We have different names of it: the value of capital, the normative investment profitability, the best alternative value, the cost of not using capital in other ways (such as on building new warehouse, buying new vehicles, and so on). But why is it necessary to use those opportunity costs and what is the correct value and what happens if we miss to use the proper value?

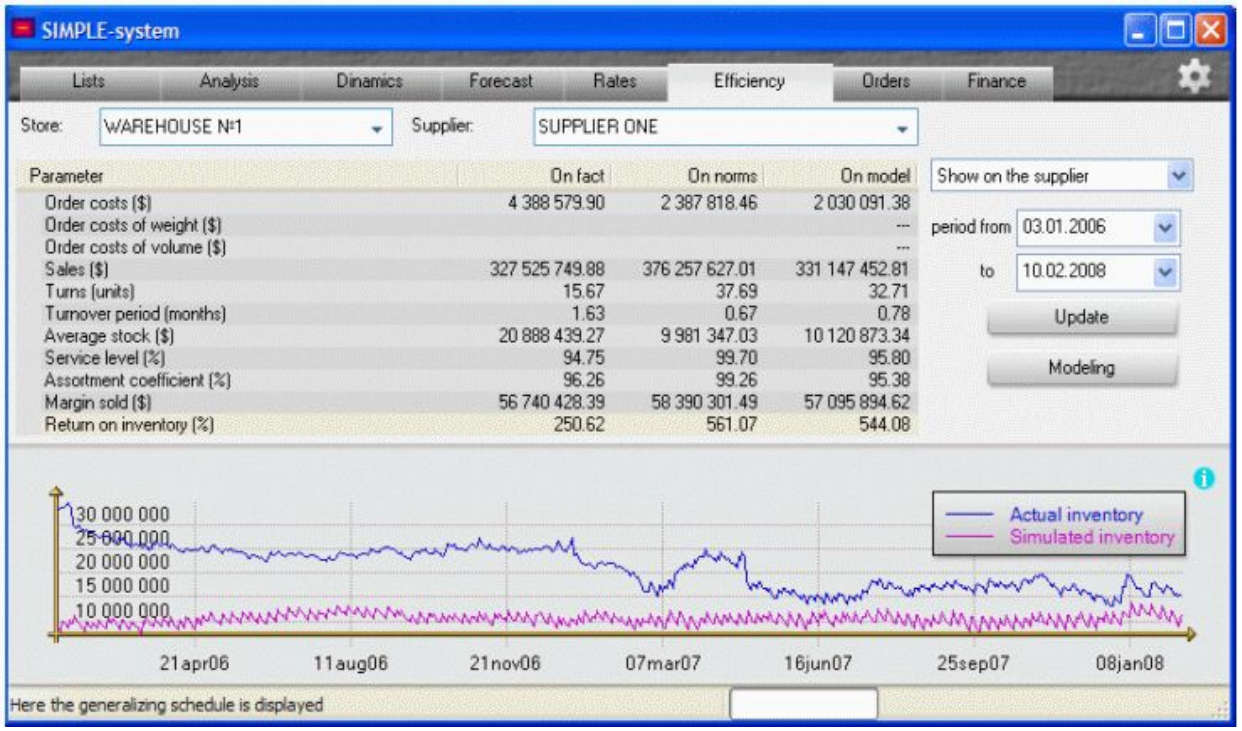
The matter of fact is that, available resources to be allocated in inventory are always limited, just as money is always limited. If however you imagine that no such limitations and restrictions exist, then we would just order inventory for several years (say for century) all at once. This of course is not practical and also does not represent the real world. So instead we need to allocate capital effectively, so that each dollar will bring us the maximum return at a minimum cost. What exactly then can determine our solution?

First of all, we might point out, that solutions are always possible when alternatives exist. We also might point out, that there is always an alternative for capital in inventory if, it could be used, to give us a higher return on inventory. The formula is (Margin Sold – Order Costs)/Average Capital in Inventory. Using an analogy in inventory management theory, we might then conclude that by investing capital to the material flow in a supply chain; then an organization is not actually using its capital alternatively. Not only could the directions of material flow change, but also the mix and consistency of material flow, as long as that alternative was more profitable. This conclusion is being also supported by theory of alternative value (see "marginalized capitalist" of J. Schumpeter).

Older books on the EOQ subject consider holding costs only as being the physical costs (deterioration, storage costs, and so on). Sometimes in addition, they will suggest considering opportunity costs but not the actual return on inventory. Probably this limits the usage of the well known Wilson EOQ

formula in practice. As our SIMPLE-system model indicates, old fashioned calculations, can lead to strange results and additionally don't optimize together, all of the criteria (see these results review in our previous article).

Picture 1. Actual and simulated (optimal) results of inventory management according to SIMPLE-system model



Let us also point out here, that the return on inventory already contains the physical part of holding costs, so there is no need to re-calculate them. Meanwhile, the order costs should be deducted from the margin on the sale. Therefore the Return on Inventory will contain all of those elements that are under the direct control of management.

To find the optimal state of this system of material flow we really do need to appreciate just if an additional investment to each position would bring more return than what was actually achieved before (by supplier, by warehouse, by country). As a result we could then see an optimal allocation of capital with an improvement of the base return on capital in the material flow. If any such optimization is possible then it can be achieved through this procedure. If optimization calculations show that capital in a particular position cannot bring necessary return, than it would be used in favor of the others and will lead to total optimization of flows and their consistency.

Effective management of capital in material flow is optimization task that is based on the

organizations common universal return rate.

to be continued

References: see also M.Porter. R. Handfield, G.Brodetsky