Using SKU Rationalization to Reduce Supply Chain Complexity

Nowadays, business environment as well as supply chain is becoming more complex. This article will explain some background about supply chain complexity from both theoretical and practical standpoint and how to reduce its impact through a method called SKU Rationalization

Theoretical Background

Complexity theory is so complex indeed. There are so many academic articles discuss about this but it doesn't seem to have a common ground. Then, I decide to turn to 2 of the most cited paper in this area to see what we can learn.

The first paper is "The Supply Chain Complexity Triangle: Uncertainty Generation in the Supply Chain" by Wilding 1998. This paper is often credited as the first article about this topic. According to Wilding, there are 3 types of complexity as below,

1 - Deterministic Chaos: it's simply the policy that creates disturbance in supply chain, for example, one company tries to maintain low inventory without considering about supplier lead-time. When they face with product shortage, they cause trouble to their suppliers.

2 - Parallel Interaction: problems shift from one supplier to another supplier in the same tier. The example is when one supplier has long production down-time, order will be switched to another supplier then they may not have enough capacity.

3 - Demand Amplification: demand fluctuation such as peak demand during promotion period and nothing for normal period.

Wilding called the results of these complexities "Uncertainty". Uncertainty, in this case, implies variability or demand/supply imbalance.

Another important work is "The impact of supply chain complexity on manufacturing plant performance" by Bozart et al 2009. They conduct an extensive survey to verify if complexity causes problems to supply chain. Complexity here is defined as downstream complexity (demand side), internal complexity (production) and upstream complexity (supply side). In short, if you have too many products, too many suppliers or you don't have clear understanding about customer's demand, these will create negative impact to corporate performance.

Reducing Complexity

There are some methods people use to reduce complexity. The examples are supply base reduction in procurement and Group Technology in manufacturing environment. Another important method is called SKU rationalization. In simplest term, SKU rationalization is usually be done by doing pareto analysis based on inventory dollars, sales volume or both then try to eliminate non-performing items.

Major research projects has been done at MIT by Lew 2010, Leiter 2011 and Hilliard 2012. Findings from these research are summarized and turn into clear and concise infographic as below,

Discussion

Do you need to quantify level of complexity in the first place? Yes, there are numerous methodologies for this but in my opinion, it's not quite necessary. The reason is that Bozart et al 2009 empirically tested the cause-effect relationship between complexity and impact to various KPIs already. So you can monitor the results of complexity reduction initiative through your existing KPIs.

Another point to discuss is data source. If it's cost related or performance related, source of data seems to be available internally. Anyway, something about demand needs lots of work to do because you may need to plot a graph to see demand pattern, SKU by SKU. This process is then called pruning.

Do you need to incorporate all of these characteristics or just dollars/volume suffice? Well, it depends. I think you know well about everything-is-important syndrome. Sometime, one SKU will fit in with multiple characteristics and it's the point to prove to marketing that these SKUs are real culprits. Moreover, when you incorporate supply side/production complexities into considerations, you reduce process complexity dramatically and you will gain support from related functions.

The most important thing about SKU rationalization project is that, is not the job of inventory controller alone. Cross functional team is required so company can eliminate bad SKUs without sacrificing value to customers.