



Ask The Experts!



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Don't be fooled by averages!

You may have heard the saying - "If you have your head in the oven, and your feet in the freezer, then on average you should feel pretty good!" I have yet to meet anyone that wanted to verify this statistic. And such is one of the troubles with simple averages. Just as we would not make a decision where to live based on the average annual temperature, we should not make decisions about our business processes based on simple annual averages.

I was recently asked by a client ***"How do we determine the right inventory levels to be sure that we don't have stock outs?"*** This, and questions like it, are common. A typical response is to determine average demand levels and stock to that demand. A possible problem with this approach is not understanding - or even recognizing - variance, and the impact it has on your business. Variance is inherent in any process. Understanding the patterns of variance in your processes is a critical factor in those processes delivering against your customer expectations. Similarly, understanding the variance in your customer expectations - such as demand and lead time - is just as critical for you to be able to run your processes effectively.

Let's look at a simplified example. Below is a chart that shows the actual demand for 6 companies over 5 time periods, as well as the average overall demand per period.

UNIT SALES	Company A	Company B	Company C	Company D	Company E	Company F
Period 1	50	48	40	30	2	1
Period 2	50	49	45	40	10	1
Period 3	50	50	50	50	50	1
Period 4	50	51	55	60	90	1
Period 5	50	52	60	70	98	246
Average	50	50	50	50	50	50

See the problem? Company A has it easy. They simply need a process with a capability of delivering 50 units per period - repeatedly and reliably. However, as you move to the right of the table, it becomes clear that the companies are going to have a harder and harder time keeping their processes stable, or in meeting customer demand without either excessive inventories or dramatic inventory shortages. By analyzing and understanding the variance in customer demand - we can establish levels of process capability and / or inventory that will provide a level of confidence in our ability to meet customer demand. We have great tools at our disposal to do this. Below I have used MS Excel to calculate the standard deviation - a measure of variance - for each of the company's demand levels. I have then established "confidence intervals" that provide the odds that the period demand will be within a certain range.

	Company A	Company B	Company C	Company D	Company E	Company F
SD	0	1	7	14	40	98
+/- 1 SD	50	49 - 51	43 - 57	36 - 64	10 - 90	-48 - 148
+/- 2 SD	50	48 - 52	36 - 64	22 - 78	-30 - 130	-146 - 246
+/- 3 SD	50	47 - 53	29 - 71	8 - 92	-70 - 170	-244 - 344

At each increasing confidence interval, I am more confident that the actual demand in that period would fall in the range provided according to the 68-95-99.7 rule, which states that nearly all values within a normal distribution lie within 3 standard deviations of the mean. It is worth noting that this rule applies in normal distributions. In the example above, Company F has a demand distribution that is not normal - and so they are in a different class altogether - so to speak.

Since we don't have the time or space here to get into a deep dive on understanding variance in your processes and how it affects your business, give us a call. We're happy to visit with you and explore how you can use an understanding of variance to improve your bottom line!