**Practice Problems**

**Supplement 11—Supply Chain Management Analytics**

**Problem S11.1**

Jack Byer is evaluating two sets of very similar suppliers. One set of suppliers, *Storm Set* is well established in a port city, but the port is hurricane susceptible, meaning there is a2% probability of a “super-event” (a storm), but a ‘unique event’ probability of only .3%. However, *Inland Set* has a “super-event” probability of .5% and a ‘unique event’ probability of .8%. Purchases cost for *Storm Set* is $300,000 and $350,000 for *Inland Set*. However, any disruption will double the cost to $600,000. and $700,000 respectively. *Storm Set* has 2 suppliers and *Inland Set* has 3 suppliers. Given these costs and probabilities which Set seems best?

**Problem S11.2** Calculating the Bullwhip.

Howard’s Furniture wants to determine if it is contributing to the Bullwhip in its supply chain.

Howard’s demand for its popular table lamp has a variance of 208 and its orders have a variance of 258.

Is Howard’s furniture contributing to an increase in ‘Bullwhip’?

**Problem S11.3** Evaluating New Suppliers

Cody Rx is evaluating new suppliers. They are looking internationally for new sources of it top of the line lipsticks. Shown below are the factors, weights, and ratings for 3 possible suppliers.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Factor** | **Weights** | **Tahiti Corp.** | **Mexico LLC.** | **Bali Inc.** |
| Quality | 20 | 4 | 7 | 5 |
| Reliability | 15 | 8 | 8 | 4 |
| Adherence to policies | 10 | 7 | 5 | 6 |
| Cost | 5 | 10 | 6 | 10 |

Which city should they choose?

**Problem S11.4** Shipping Options

Phil Carter, President of Carter Computer Components, Corp. has the option of shipping computer transformers from its Singapore plant via container ship or airfreight. The typical shipment has a value of $75,000. A container ship takes 24 days and costs $5,000; airfreight takes 1 day and costs $8,000. Holding cost is estimated to be 40% in either case. How should shipments be made?

**ANSWERS**

**Problem S11.1**

Probability of paying the disruption costn = Super Event + (1-Super Event) (Unique Eventⁿ)

*Storm Set*₂ = .02 + (1-.02) (.003²) = .02 + (.98) (.000009) = .02 + .000009 = .020009

$300,000. + $600,000 (.020009) = $300,000 + $12,005. = $312,005.

*Inland Set*₃ = .005 + (1-.005) (.008³) = .005 +. (.995) (.0000005) = .0050004

$350,000. + $700,000 (.005004) = $350,000 + 3,503. = $353,503.

The *Storm Set* appears the cheaper, hence a better choice.

**Problem S11.2**

Bullwhip = Variance of Orders/Variance of demand.

= 258 / 208 = 124

When the variance of orders is greater than the variance of demand the bullwhip is being increased. Therefore, we conclude that Howard’s furniture is contributing to the increase in Bullwhip.

**Problem S11.3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Weighted Ratings** | | |
| **Factor** | **Weights** | **Tahiti Corp.** | **Mexico LLC.** | **Bali Inc.** |
| Quality | .40 | 4 x .4 = 1.6 | 7 x .4 = 2.8 | 5 x .4 = 2.0 |
| Reliability | .30 | 8 x .3 = 2.4 | 8 x .3 = 2.4 | 4 x .3 = 1.2 |
| Adherence to policies | .20 | 7 x .2 = 1.4 | 5 x .2 = 1.0 | 6 x .2 = 1.2 |
| Cost | .10 | 10 x .1 =1.0 | 6 x .1 = .6 | 10 x .1 = 1.0 |
| **Totals:** | **1.00** | **6.4** | **6.8** | **5.4** |

Therefore, it appears that based upon the weights and rating, Mexico LLC should be chosen.

**Problem S11.4**

Cost via container ship:



Cost via airfreight:



Therefore, use the container ship as it has a lower total cost.