**Mint Company**

**Limitations of the Study:**

* Warehouse Locations, maintenance fees, etc. are unknown. It is assumed that warehouses are near to each other.
* Logistics were not considered.
* Sample Size Inefficiency. Sales are only available from 2003 to 2 quarters of 2005.

Applications used are SQL (for queries), Excel (for visualization), and Word(to indicate observations, show charts, and give recommendations).

**Charts:**

* Sum of all units stored, Sum of all ordered Units, and Sum of all Unsold Units based on each Warehouses. This chart displays data only for products with positive remaining stock levels and excludes any products where the calculation of remaining stock (quantity in stock minus total quantity ordered) results in a negative value.

o Classic Cars from Warehouse B are the most demanding product from customers based on other demands from other products stored in different warehouses. This is in terms of the sum of ordered Units. However, Classic Cars had the most unsold units stored in Warehouse B.

* Products’ Demand Growth Rate based on which warehouse it was stored. Classic cars have a relatively low demand growth rate compared to other products stored from their respective warehouses.

* Warehouse A

0

500

1000

1500

2000

2500

3000

1

2

3

4

1

2

3

4

1

2

2003

2004

2005

Motorcycles

Planes

|  |  |  |
| --- | --- | --- |
| **Year** | **Total Quantities**  **Ordered** | **Growth** |
| **2003** | 7864 | 0% |
| **2004** | 11796 | 50% |
| **2005** |  |  |

* Warehouse B

0

1000

2000

3000

4000

5000

6000

7000

8000

1

2

3

4

1

2

3

4

1

2

2003

2004

2005

Classic Cars

Classic Cars

|  |  |
| --- | --- |
| **Total Quantities**  **Year Ordered** | **Growth** |
| **2003** 12762 | 0% |
| **2004** 16085 | 26% |
| **2005** |  |

* **Warehouse C**

0

500

1000

1500

2000

2500

3000

3500

4000

4500

5000

1

2

3

4

1

2

3

4

1

2

2003

2004

2005

Vintage Cars

Vintage Cars

|  |  |  |
| --- | --- | --- |
| **Year** | **Total Quantities**  **Ordered** | **Growth** |
| **2003** |  | 7913 0% |
| **2004** |  | 10864 37% |
| **2005** |  |  |

* **Warehouse D**

0

500

1000

1500

2000

2500

2003

2004

2005

2003

2004

2005

2003

2004

2003

2004

1

2

3

4

Ships

Trains

Trucks and Buses

|  |  |  |
| --- | --- | --- |
| **Year** | **Total Quantities**  **Ordered** | **Growth** |
| **2003** | 7900 | 0% |
| **2004** | 10742 | 36% |
| **2005** |  |  |

* Table of Warehouses’ Stored Units

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **warehouseCode** | **productLine** | **totalQuantityOrdered** | **quantityInStock** | **remainingStock** |
| a | Planes | 11872 | 62287 | 50415 |
| a | Motorcycles | 12778 | 69401 | 56623 |
| b | Classic Cars | 35582 | 219183 | 183601 |
| c | Vintage Cars | 22933 | 124880 | 101947 |
| d | Trains | 2818 | 16696 | 13878 |
| d | Ships | 8532 | 26833 | 18301 |
| d | Trucks and Buses | 11001 | 35851 | 24850 |

* Chart of Cities along with their demand of the products stored in Warehouses A, B, C, and D.

* Chart of Countries along with their demand of the products stored in Warehouses A, B, C, and D
* Low Inventory, High Sales Table

|  |  |  |  |
| --- | --- | --- | --- |
| **warehouseCode** | **productCode** | **productName** | **remainingStock** |
| a | S24\_2000 | 1960 BSA Gold Star DBD34 | -1000 |
| a | S32\_1374 | 1997 BMW F650 ST | -836 |
| a | S700\_3167 | F/A 18 Hornet 1/72 | -496 |
| a | S50\_4713 | 2002 Yamaha YZR M1 | -392 |
| a | S18\_2581 | P-51-D Mustang | 75 |
| b | S12\_1099 | 1968 Ford Mustang | -865 |
| b | S12\_3891 | 1969 Ford Falcon | 84 |
| c | S32\_4289 | 1928 Ford Phaeton Deluxe | -836 |
| c | S18\_2795 | 1928 Mercedes-Benz SSK | -332 |
| c | S18\_2248 | 1911 Ford Town Car | -292 |
| d | S72\_3212 | Pont Yacht | -544 |
| d | S32\_3522 | 1996 Peterbilt 379 Stake Bed with Outrigger | -174 |
| d | S700\_1938 | The Mayflower | -161 |
| d | S50\_1392 | Diamond T620 Semi-Skirted Tanker | 37 |

* High Inventory, Low Demand Chart and Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **warehouseCode** | **productCode** | **totalQuantityOrdered** | **quantityInStock** | **remainingStock** |
| a | S12\_2823 | 1028 | 9997 | 8969 |
| a | S700\_2466 | 984 | 9653 | 8669 |
| a | S32\_2206 | 906 | 9241 | 8335 |
| a | S700\_4002 | 1085 | 8820 | 7735 |
| a | S10\_1678 | 1057 | 7933 | 6876 |
| a | S18\_3782 | 959 | 7689 | 6730 |
| a | S700\_2834 | 973 | 7106 | 6133 |
| a | S24\_1578 | 1033 | 7003 | 5970 |
| a | S24\_2360 | 947 | 6840 | 5893 |
| a | S24\_3949 | 1051 | 6812 | 5761 |
| a | S10\_2016 | 999 | 6625 | 5626 |
| a | S24\_2841 | 940 | 5942 | 5002 |
| a | S700\_1691 | 894 | 5841 | 4947 |
| a | S10\_4698 | 985 | 5582 | 4597 |
| a | S18\_1662 | 1040 | 5330 | 4290 |
| a | S72\_1253 | 960 | 4857 | 3897 |
| a | S18\_2625 | 945 | 4357 | 3412 |
| b | S18\_1984 | 917 | 9772 | 8855 |
| b | S24\_3432 | 894 | 9446 | 8552 |
| b | S18\_3482 | 915 | 9127 | 8212 |
| b | S12\_3380 | 925 | 9123 | 8198 |
| b | S18\_1589 | 914 | 9042 | 8128 |
| b | S18\_3685 | 948 | 8990 | 8042 |
| b | S18\_1889 | 972 | 8826 | 7854 |
| b | S18\_3233 | 0 | 7733 | 7733 |
| b | S18\_2870 | 855 | 8164 | 7309 |
| b | S24\_1628 | 915 | 8197 | 7282 |
| b | S24\_3371 | 969 | 7995 | 7026 |
| b | S24\_4620 | 941 | 7869 | 6928 |
| b | S24\_2972 | 912 | 7723 | 6811 |
| b | S18\_3232 | 1808 | 8347 | 6539 |
| b | S10\_1949 | 961 | 7305 | 6344 |
| b | S12\_4675 | 992 | 7323 | 6331 |
| b | S12\_3148 | 963 | 6906 | 5943 |
| b | S700\_2824 | 997 | 6934 | 5937 |
| b | S10\_4962 | 932 | 6791 | 5859 |
| b | S24\_4048 | 867 | 6582 | 5715 |
| b | S24\_3856 | 1052 | 6600 | 5548 |
| b | S12\_3990 | 900 | 5663 | 4763 |
| b | S18\_4027 | 945 | 5545 | 4600 |
| b | S24\_3191 | 870 | 4695 | 3825 |
| b | S18\_2238 | 986 | 4724 | 3738 |
| b | S24\_1444 | 976 | 4074 | 3098 |
| b | S18\_1129 | 947 | 3975 | 3028 |
| b | S18\_4933 | 767 | 3209 | 2442 |
| c | S18\_2325 | 957 | 9354 | 8397 |
| c | S24\_3151 | 991 | 9173 | 8182 |
| c | S18\_1367 | 960 | 8635 | 7675 |
| c | S18\_1342 | 1111 | 8693 | 7582 |
| c | S18\_4522 | 990 | 8290 | 7300 |
| c | S18\_3320 | 992 | 7913 | 6921 |
| c | S24\_1937 | 937 | 7332 | 6395 |
| c | S50\_1341 | 1074 | 7062 | 5988 |
| c | S24\_3816 | 923 | 6621 | 5698 |
| c | S18\_4409 | 866 | 6553 | 5687 |
| c | S18\_4668 | 995 | 6645 | 5650 |
| c | S18\_3136 | 907 | 5992 | 5085 |
| c | S18\_2957 | 985 | 5649 | 4664 |
| c | S24\_4258 | 983 | 4710 | 3727 |
| c | S18\_2949 | 1038 | 4189 | 3151 |
| c | S18\_3140 | 883 | 3913 | 3030 |
| d | S32\_3207 | 934 | 8601 | 7667 |
| d | S18\_2319 | 1053 | 8258 | 7205 |
| d | S700\_2610 | 1020 | 7083 | 6063 |
| d | S18\_3259 | 918 | 6450 | 5532 |
| d | S12\_4473 | 1056 | 6125 | 5069 |
| d | S700\_3962 | 896 | 5088 | 4192 |
| d | S32\_1268 | 911 | 5099 | 4188 |
| d | S18\_3029 | 966 | 4259 | 3293 |

**Observations:**

1. **Very High and Low Inventories but Low and High Demand respectively.** 
   * There are several products with very high inventory levels but low demand, resulting in large amounts of unsold stock. This scenario is particularly evident in warehouses A, B, C, and D across various product lines such as Motorcycles, Classic Cars, Vintage Cars, and Ships.
   * Some products have high demand but insufficient inventory, leading to negative remaining stock values. This issue is seen in all warehouses and various product lines.
2. **Classic Cars (Warehouse B):**
   * Classic Cars are the most in-demand product based on the sum of ordered units.
   * Despite high demand, Classic Cars have the highest number of unsold units.
   * The demand growth rate for Classic Cars is relatively low compared to other products.
3. **Other Warehouses:**
   * Warehouse A (Motorcycles and Planes) and Warehouse C (Vintage Cars) also show significant sales but with better demand growth rates.
   * Warehouse D (Trucks, Buses, Trains, and Ships) has moderate sales and high unsold units.

**Analysis Based on Key Questions:**

1. **Where are items stored, and if rearranged, could a warehouse be eliminated?**
   * Items are currently stored based on product types in four different warehouses.
   * Given the high storage capacity of Warehouse B (219,000 units), it is feasible to reorganize and consolidate products from Warehouse D into Warehouses A and C.
2. **How are inventory numbers related to sales figures? Do the inventory counts seem appropriate for each item?**
   * Inventory counts for Classic Cars are disproportionately high compared to their sales figures.
   * Motorcycles, Planes, and Vintage Cars have more balanced inventory-to-sales ratios, indicating more efficient stock management.
   * Several products have very high inventory levels but low demand and very low inventory levels but high demand.
3. **Are we storing items that are not moving? Are any items candidates for being dropped from the product line?**
   * Despite being popular, Classic Cars have many unsold units, indicating overproduction or potential issues with product appeal or marketing.
   * Trucks, Buses, Trains, and Ships in Warehouse D also have high number of unsold units, suggesting a need for review.
   * The chart below is a box and whisker plot. The rectangle represents the interquartile range (IQR) showing the middle 50% of the data, with the line inside indicating the median quantity ordered. The whiskers extend to the smallest and largest values within 1.5 times the IQR. The dots represent outliers, which are unusually high or low quantities ordered.

This doesn’t indicate that we should drop the dots from the product line. The company can optimize inventory levels that will meet the demand and supply.



**Recommendations:**

1. **Optimize Inventory Levels.**

* Align the production of the products, particularly the Classic Cars Product with the actual sales demand.
* Monitor all the inventory levels and adjust production rates to prevent overstocking.
* Consider reducing the production or procurement of these products to align inventory levels with demand. Implement targeted marketing strategies to boost sales or consider phasing out products with consistently low demand.
* Increase production or procurement for these high-demand products to meet customer demand and avoid stockouts. Improve inventory management to ensure a balanced supply that meets the market demand.

1. **Consolidate Warehouse D.**

- Assume that warehouses are near to each other, logistics is not an issue, and warehouses can accommodate 219,000 units (based on Warehouse B).

- Reorganize and place the products from Warehouse D to Warehouses A and C respectively, effectively removing Warehouse D.

* + - **Motorcycles and Planes (Warehouse A)** can take on additional inventory from Trucks and Buses.

- **Vintage Cars (Warehouse C)** can absorb inventory from Trains and Ships.