IKEA PLANNING AND DECISION MAKING IN SUPPLY CHAIN

The report explores aspects of IKEA's quality control processes, including

- **Calculating Supply Chain Cost**
- **Prevention of missing items, and**
- **Damage management.**

Identifying and analyzing missing parts/damage to products through control charts

- Identify 20% of items that contribute to 80% of missing parts. This helps prioritize efforts towards the most impactful areas.
- Analyzing if specific product lines, suppliers, or storage locations have a higher incidence of missing parts through the Pareto chart Analysis for patterns.
- Plot the percentage of missing parts or damage across different stages of the production and delivery process, like assembly, packaging, shipping, etc.
- Focus efforts on implementing quality control measures like SPC, Poke-Yoke, or employee training at the critical stages identified by the p-Bar chart.
- Inventory control management is a crucial aspect of any business operation. It involves overseeing the flow of goods, from procurement to storage and finally, to sales.
- Implement inventory control, supplier quality management, or packaging adjustments for the identified high-impact items. IKEA utilizes a WMS to manage the flow of goods through its distribution centers, ensuring efficient storage, picking, and packing.

Steps For Depicting the Supply Chain

1. Identify the Suppliers

2. Add the Costs for Each Supplier:

For each supplier, add the transportation cost, manufacturing cost, and warehousing cost.

Finding the Total Supply Chain Cost of the Supplier

Supplier	Transportaion Cost($)	Manufacturing Cost($)	Warehousing Cost($)	% Product Supply	Ordered Quantity
China	30000	70000	10000	25%	25000
Poland	20000	40000	7000	10%	10000
Italy	8000	25000	6000	12%	12000
Germany	8000	23000	12000	15%	15000
Sweden	5000	18000	8000	8%	8000
India	15000	60000	6500	7%	7000
Brazil	6000	20000	7000	12%	12000
Turkey	8000	28000	10000	11%	11000

Total Ordered Quantity	100,000

The formula is:

Total Supply Chain Cost = Transportation Cost+Manufacturing Cost+Warehousing Cost

3. Perform the Calculation:

Apply the formula to each supplier to find their total supply chain cost.

For Example, let's consider China's order quantity of 25,000:

Total Supply Chain Cost (China)= $30,000+$70,000+$10,000

4. Repeat this process for each supplier.

5. Display the Results:

Present the calculated total supply chain costs for each supplier.

Here are the results based on the provided data for China:

Total Supply Chain Cost (China) = $30,000+$70,000+$10,000 = $1,10,000

These values represent the total supply chain costs for each supplier based on the provided transportation, manufacturing, and warehousing costs.

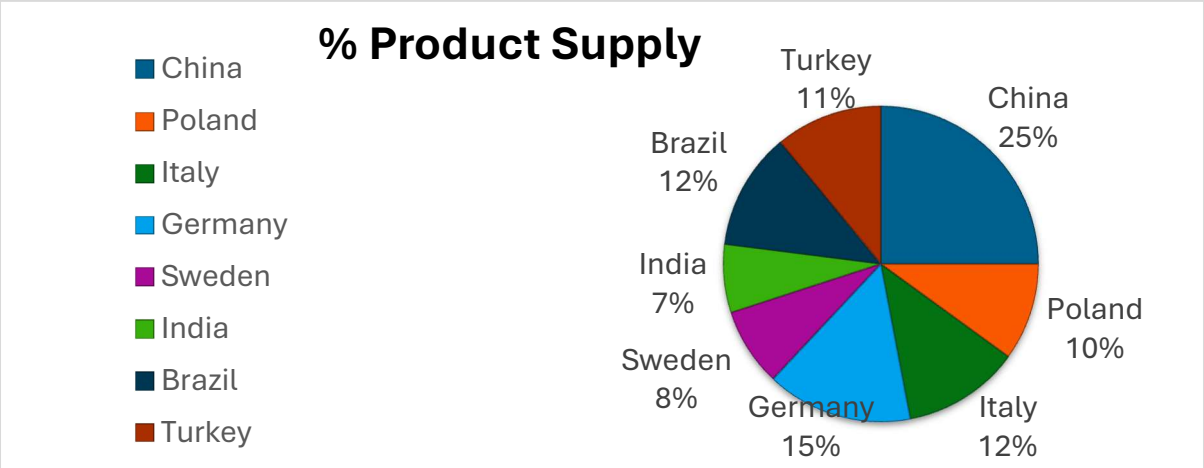
To get the unit price for China:

Unit price for China = Manufacturing Cost ($) of China /Quantity supplied by China

= 70000/25000

= $2.80

IKEA has more than 1200 furniture suppliers around the world, as well as 100 food product suppliers and 275 transport service providers



Understand the Data:

Review the column headers and understand the meaning of each variable (e.g., Product ID, Product Name, Missing Part ID, Missing Part Name, Quantity Ordered, Quantity Received, Quantity Missing, Fraction nonconformed per Sample size, LCLp, UCLp, cl).

Data Cleaning:

Ensure that the data types of each column are appropriate for the analysis.

Descriptive Statistics:

Calculating summary statistics, such as the standard deviation for key variables, to get a sense of the overall distribution.

Calculated p-bar = sum (overall quantity missing values)/sample size * No.of samples

Calculated standard deviation with the formula =SQRT (p-bar*(1-p- bar)/sample size)

The data includes control chart limits (LCLp and UCLp). You can use these limits to identify whether the process is in control.

LCUp = MAX(0,p-bar-3*standard deviation)

UCLp = =p-bar+3*standard deviation

4. Calculate Nonconformance Rate:

Compute the nonconformance rate for each product

Non-conformance = Quantity Missing / Sample size

5. **Visual Inspection:**

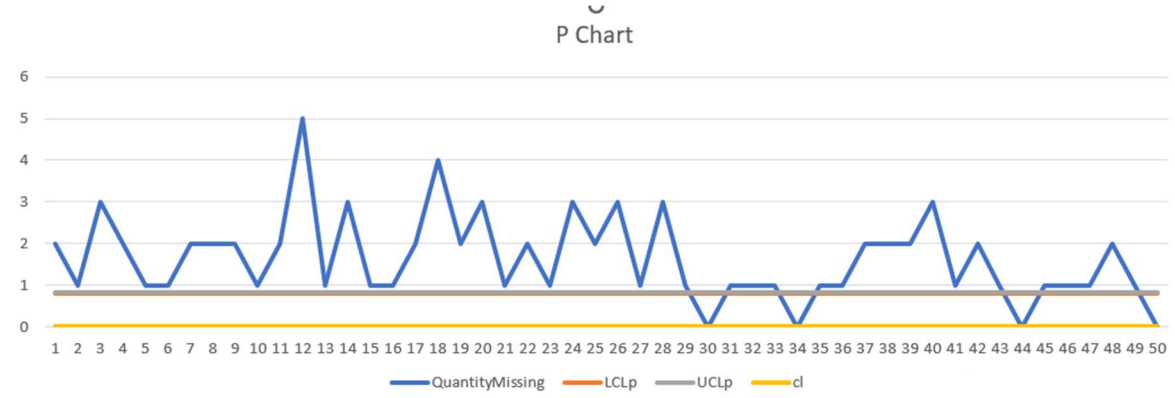
Created a p-bar chart to visualize nonconformance rates for each product. This could help in quickly identifying products with high nonconformance rates.

Missing parts:

Missing items parts

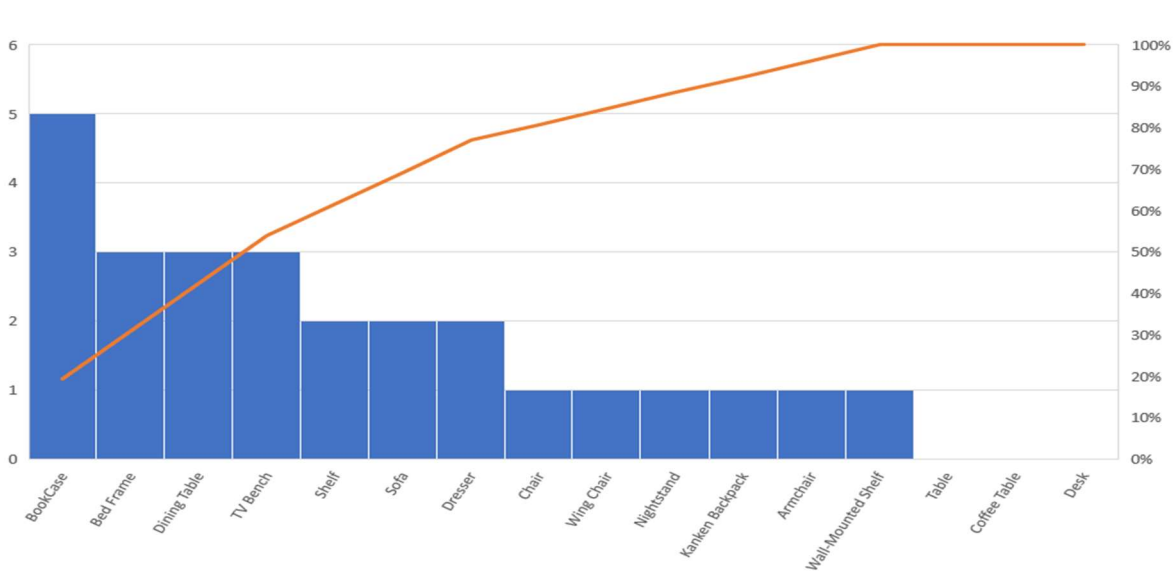
Sample Size	5000.00
Number of samples	50.00
p-bar	0.82
standard Deviation	0.005433231
LCLp	0.803700307
UCLp	0.836299693

ProductID	ProductName	MissingPartID	MissingPartName	QuantityOrdered	QuantityReceived	QuantityMissing	Fraction nonconf	LCLp	UCLp	cl
1	Hemnes Dresser	4101	Drawer Handle	50	48	2	0.0004	0.803700307	0.8363	0.005433
2	Hemnes Dresser	4102	Drawer Runner	30	29	1	0.0002	0.803700307	0.8363	0.005433
3	Ektorp Sofa	4201	Back Cushion	30	27	3	0.0006	0.803700307	0.8363	0.005433
4	Ektorp Sofa	4202	Armrest Cover	15	13	2	0.0004	0.803700307	0.8363	0.005433
5	Rast Nightstand	4301	Drawer Knob	40	39	1	0.0002	0.803700307	0.8363	0.005433
6	Rast Nightstand	4302	Bottom Panel	25	24	1	0.0002	0.803700307	0.8363	0.005433
7	Expedit Bookshelf	1001	Shelf	50	45	2	0.0004	0.803700307	0.8363	0.005433
8	Expedit Bookshelf	1002	Side Panel	50	48	2	0.0004	0.803700307	0.8363	0.005433
9	Ekenas Armchair	2001	Seat Cushion	30	28	2	0.0004	0.803700307	0.8363	0.005433
10	Ekenas Armchair	2002	Armrest	30	29	1	0.0002	0.803700307	0.8363	0.005433
11	Brimnes Bed Frame	3001	Bed Slats	40	38	2	0.0004	0.803700307	0.8363	0.005433
12	Brimnes Bed Frame	3002	Headboard	40	35	5	0.001	0.803700307	0.8363	0.005433
13	Lisabo Desk	4001	Tabletop	25	24	1	0.0002	0.803700307	0.8363	0.005433
14	Lisabo Desk	4002	Leg	25	22	3	0.0006	0.803700307	0.8363	0.005433
15	Söderhamn Sofa	5001	Back Cushion	20	19	1	0.0002	0.803700307	0.8363	0.005433
16	Söderhamn Sofa	5002	Leg	20	19	1	0.0002	0.803700307	0.8363	0.005433
17	Expedit Shelving Unit	1001	Shelf	30	28	2	0.0004	0.803700307	0.8363	0.005433



Damaged goods:

SL.No	ProductID	Category	ProductName	PartID	PartName	QuantityOrdered	QuantityReceived	QuantityDamaged	Nonconformed Product
1	A1	BookCase	Billy Bookcase	101	Shelf	100	95	5	4
2	A1	BookCase	Billy Bookcase	102	Side panel	100	98	2	1
3	B1	Table	Lack Coffee Table	201	Table top	50	48	2	0
4	B1	Table	Lack Coffee Table	202	Leg	50	49	1	0
5	C1	Shelf	Kallax Shelf Unit	301	Cube Divider	80	75	5	2
6	C1	Shelf	Kallax Shelf Unit	302	Back Panel	80	78	2	0
7	D1	Chair	Poäng Armchair	401	Seat Cushion	25	22	3	1
8	D1	Chair	Poäng Armchair	402	Frame	25	24	1	0
9	E1	Bed Frame	Malm Bed Frame	501	Bed Slats	30	28	2	1
10	E1	Bed Frame	Malm Bed Frame	502	Headboard	30	29	1	1
11	E1	Bed Frame	Malm Bed Frame	601	Lamp base	40	38	2	1
12	E1	Bed Frame	Malm Bed Frame	602	Lamp Shade	40	39	1	0
13	F1	Sofa	Ektorp Sofa	701	Seat Cushion	35	34	1	1
14	F1	Sofa	Ektorp Sofa	702	Armrest	35	35	0	0
15	G1	Dining Table	Norden Dining Table	801	Table top	60	58	2	1
16	G1	Dining Table	Norden Dining Table	802	Table Leg	60	59	1	1
17	H1	Dresser	Hemnes Dresser	901	Drawer	45	43	2	0
18	H1	Dresser	Hemnes Dresser	902	Frame	45	44	3	2
19	I1	Wing Chair	Strandmon Wing Chair	1001	Seat Cushion	20	19	1	1
20	I1	Wing Chair	Strandmon Wing Chair	1002	Frame	20	20	0	0
21	J1	Nightstand	Kullen Nightstand	1101	Drawer	30	29	1	0
22	J1	Nightstand	Kullen Nightstand	1102	Frame	30	30	0	1
23	K1	TV Bench	Fjällbo TV Bench	1201	Shelf	25	24	1	0
24	K1	TV Bench	Fjällbo TV Bench	1202	Leg	25	25	0	1
25	L1	Dining Table	Lerhamn Dining Table	1301	Table Top	40	38	2	1
26	L1	Dining Table	Lerhamn Dining Table	1302	Table leg	40	39	1	0



- Analysis can be done on the distribution of damage severity or quantity of missing goods to understand the range and frequency of issues.

- Comparing IKEA's supplier performance metrics against industry standards or top competitors to identify areas for improvement.
- Analyze discrepancies by supplier, product category, or delivery batch to identify specific underperforming suppliers or areas.
- Mapping the entire order fulfillment process can lead to pinpointing potential gaps or inefficiencies where items might go missing.
- By strategically integrating these quality tools into each phase of the action plan, IKEA can gain deeper insights as well as can prioritize its actions effectively to track its success.
- Operations management's focus on achieving the best possible outcomes for businesses
- The significance of Excel's data manipulation capabilities for identifying problems and giving operations managers information in the event of anomalous circumstances.
- After analyzing data using the supply chain management and p charts, we discovered how to apply control charts for continuous data, such as product damage and missing goods.
- Through the study of inventory management, one has gained an understanding of how to store the resources needed for production and use supply chain management to oversee the entire production process.

References:

"Where Are IKEA Products Manufactured?" *Where Are IKEA Products Manufactured? - IKEA*, www.ikea.com/es/en/customer-service/knowledge/articles/4g3g7c5c-f5c1-4g22-808f-9bb81g8b3ecb.html. Accessed 1 Dec. 2023.

Bozarth, C. C., & Handfield, R. B. (2019). *Introduction to operations and Supply Chain Management*. Pearson Education Limited.

(N.d.). Retrieved from https://www.bbb.org/us/pa/conshohocken/profile/furniture-stores/ikea-us-llc-0241-80001648/complaints

(2022). Retrieved from https://quickbooks.intuit.com/r/ikeas-inventory-management-strategy-ikea/

Lu, C. (2020). Retrieved from https://www.supplychain247.com/article/how_does_ikeas_inventory_management_supply_chain_strategy_work

Image(1) - (N.d.-a). Retrieved from https://archive.org/details/encrypted-tbn-2-gstatic-com-images-2

Image(2) - Moitra, R. (2020). Retrieved from https://forums.fast.ai/t/solved-problem-downloading-images-from-google-images/66243

Image(3) - alejandro collazosalejandro collazos 9611 gold badge22 silver badges55 bronze badges, furasfuras 136k1212 gold badges108108 silver badges152152 bronze badges, & RiveredRivered 75177 silver badges3030

bronze badges. (1966). Retrieved from https://stackoverflow.com/questions/63220432/download-images-from-encrypted-tbn0-gstatic-com-using-python