Worldwide Importers – Product Analysis

A Strategic Approach to Enhancing Business Operations

(an Exploratory Data Analysis)

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An Exploratory Data Analysis – Product Focused

For any organization, products are central to connecting business operations—such as sales, purchasing, and inventory management—with key stakeholders, including customers, suppliers, and employees. Grasping a solid understanding of product performance, top-performing and underperforming products, cost versus sales, and performance variations by attributes like size, color, and region is crucial. Such insights allow for a better understanding of customer preferences, supplier performance, and stock management. As such, decision-makers can make informed pricing, marketing efforts, and supplier negotiation decisions, eventually driving operational efficiency and overall business performance (Young, 2020).

Stock Item Profitability Over Years

To begin addressing these aspects, the first step in the analysis focuses on examining how the financial performance of each stock item—encompassing revenue, profit, and sales volume—has evolved over the past years.

How have sales and profit performance of stock items changed from 2013 to 2015?

Table 1: Stock Item performance from 2012-2015 – sales volume, revenue and profit (partial result set)

	StockItemID	Stock Item Name	SalesVolume 2013	SalesVolume 2014	SalesVolume 2015	Revenue 2013	Revenue 2014	Revenue 2015	Profit 2013	Profit 2014	Profit 2015	Profit Growth% 2013-2014	Profit Growth% 2014-2015
1	114	Superhero action jacket (Blue) XXL	1602	1369	1887	48060.00	41070.00	56610.00	12816.00	10952.00	15096.00	-14.544300	37.837800
2	176	Bubblewrap dispenser (Red) 1.5m	1662	1519	2089	398880.00	364560.00	501360.00	216060.00	197470.00	271570.00	-8.604000	37.524600
3	57	IT joke mug - hardware: part of the computer that ...	1814	1463	1991	23582.00	19019.00	25883.00	15419.00	12435.50	16923.50	-19.349500	36.090200
4	207	Permanent marker blue 5mm nib (Blue) 5mm	19008	18516	24900	51321.60	49993.20	67230.00	19008.00	18516.00	24900.00	-2.588300	34.478200
5	69	Ride on toy sedan car (Blue) 1/12 scale	1587	1507	1978	365010.00	346610.00	454940.00	134895.00	128095.00	168130.00	-5.040900	31.254100
6	64	RC vintage American toy coupe with remote contr...	1450	1562	2028	43500.00	46860.00	60840.00	21750.00	23430.00	30420.00	7.724100	29.833500
7	22	DBA joke mug - it depends (White)	1700	1522	1965	22100.00	19786.00	25545.00	14450.00	12937.00	16702.50	-10.470500	29.106400
8	115	Superhero action jacket (Blue) 3XL	1596	1563	2008	54264.00	53142.00	68272.00	15960.00	15630.00	20080.00	-2.067600	28.470800
9	125	Ogre battery-powered slippers (Green) XL	1574	1539	1967	50368.00	49248.00	62944.00	36989.00	36166.50	46224.50	-2.223600	27.810200
10	72	Ride on toy sedan car (Pink) 1/12 scale	1622	1553	1978	373060.00	357190.00	454940.00	137870.00	132005.00	168130.00	-4.254000	27.366300

The 227 Stock Items' sales volume, revenue, and profit from 2013 to 2015 were analyzed. Table 1 presents a snapshot of the top 10 stock items with the highest profit growth from 2014 to 2015; it reveals an interesting trend: for these top-performing items, there is a decline in sales volume in 2014, followed by a significant rebound in 2015, with volumes surpassing those of 2013. The same pattern is observed in revenue figures.

The sales volume decline in 2014 could have been influenced by pricing adjustments, increased costs, or shifts in demand. Despite this, most stock items experienced profit growth between 2014 and 2015. On average, across all 227 stock items, the profit growth is about 8.7%, with nearly 107 stock items with profit growth greater than the average growth, indicating an increase in sales. The complete result set lists stock items with declining profit and allows for comparisons between sales volumes for further analysis.

Next Steps: For WWI managers, as most stock items see growth increment, it suggests that products are generating more profit relative to their costs, indicating financial stability. For the items with declining profit growth, a cost analysis can help identify areas of improvement. Then it can be followed up with cost-control measures (i.e., negotiating better prices) to improve the bottom line. Lastly, the dip in sales volume followed by an increase could reflect changing seasonal trends. So, understanding such fluctuations can

help plan inventory and maintain stock levels (or adjust re-order points and target stock levels) to better align with the changing customer demand.

Final Query:

```
SELECT
    si.StockItemID,
    si.StockItemName AS 'Stock Item Name',

    -- sales volume by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity ELSE 0 END) as 'SalesVolume
2013',
       SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity ELSE 0 END) as
'SalesVolume 2014',
       SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity ELSE 0 END) as
'SalesVolume 2015',

    -- revenue by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice ELSE 0 END)
as 'Revenue 2013',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice ELSE 0 END)
as 'Revenue 2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity * il.UnitPrice ELSE 0 END)
as 'Revenue 2015',

    -- profit by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.LineProfit ELSE 0 END) as 'Profit
2013',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.LineProfit ELSE 0 END) as 'Profit
2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.LineProfit ELSE 0 END) as 'Profit
2015',

    -- Profit % growth by year
     ISNULL(((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.LineProfit ELSE 0 END)
    - SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.LineProfit ELSE 0 END))
    / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.LineProfit ELSE 0 END), 0))
* 100, 0) as 'Profit Growth% 2013-2014',

    ISNULL(((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.LineProfit ELSE 0 END)
    - SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.LineProfit ELSE 0 END))
    / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.LineProfit ELSE 0 END), 0))
* 100, 0) as 'Profit Growth% 2014-2015'

FROM Sales.InvoiceLines il
JOIN Sales.Invoices i ON il.InvoiceID = i.InvoiceID
JOIN Warehouse.StockItems si ON il.StockItemID = si.StockItemID
GROUP BY si.StockItemID, si.StockItemName
ORDER BY [Profit Growth% 2014-2015] DESC;
```

Supplier Purchase and Order Trend Analysis

Additionally, understanding supplier relations is crucial for maintaining a stable and high-quality supply of stock items. Mainly, assessing the financial contribution of each supplier to our company's overall revenue.

What are the trends in purchase orders for each supplier over the period from 2013 to 2016?

Table 2: Order Count Details by Supplier (2013-2016)

SupplierID	SupplierName	Average OrderQty	2013 OrderCount	2014 OrderCount	2015 OrderCount	2016 OrderCount	First Order Date	Last Order Date
4	Fabrikam, Inc.	1309	309	309	309	128	2013-01-01	2016-05-31
7	Litware, Inc.	1094	267	295	301	122	2013-01-01	2016-05-31
12	The Phone Company	106	5	0	0	0	2013-01-01	2013-01-07
10	Northwind Electric Cars	69	10	0	0	0	2013-01-01	2013-01-26
5	Graphic Design Institute	34	13	0	0	0	2013-01-01	2013-01-19
1	A Datum Corporation	22	0	0	0	5	2016-01-02	2016-01-06
2	Contoso, Ltd.	19	1	0	0	0	2013-01-01	2013-01-01

Table 3: Order Quantity Details by Supplier (2013-2016)

SupplierID	SupplierName	2013 OrderQty	2014 OrderQty	2015 OrderQty	2016 OrderQty	Total OrderQty	2013-2014 Growth (%)	2014-2015 Growth (%)
4	Fabrikam, Inc.	593797	1872633	3300777	1828587	7595794	215.370000000000	76.260000000000
7	Litware, Inc.	82494	550607	1309350	767719	2710170	567.450000000000	137.800000000000
12	The Phone Company	1595	0	0	0	1595	0.000000000000	0.000000000000
5	Graphic Design Institute	1442	0	0	0	1442	0.000000000000	0.000000000000
10	Northwind Electric Cars	1256	0	0	0	1256	0.000000000000	0.000000000000
1	A Datum Corporation	0	0	0	221	221	0.000000000000	0.000000000000
2	Contoso, Ltd.	57	0	0	0	57	0.000000000000	0.000000000000

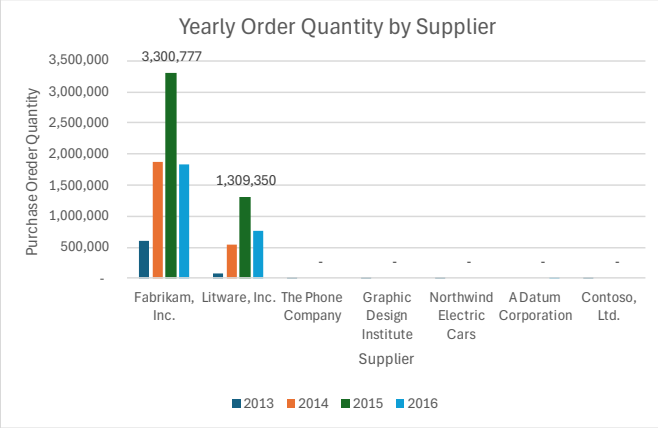

Figure 1: Yearly Purchase Order Quantity by Supplier

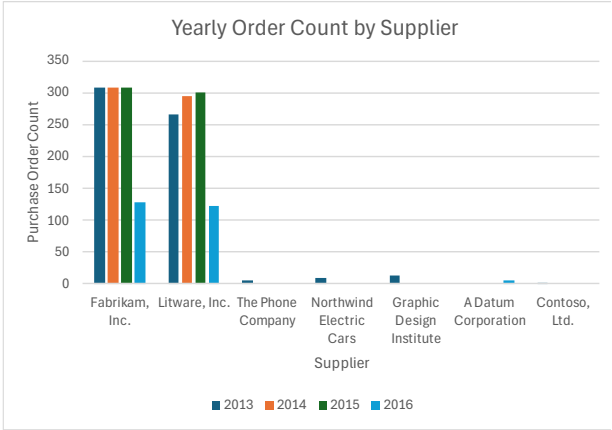

Figure 2: Yearly Order Count by Supplier

Table 2 presents each supplier's average order quantity and order counts over the years. From 2014 onwards, WWI's supplier base has significantly reduced from six to just two: Fabrikam and Litware. The increase in the number of orders placed with Litware over the years suggests a growing relationship, while a consistent order count with Fabrikam suggests their reliability (*Figure 2*). In 2016, a new supplier, Datum, was added,

indicating an increase in the supplier base. For the remaining suppliers, like The Phone Company and Graphic Design Institute, there is zero growth after 2013, this is evident from their last order dates.

In terms of total order quantities placed with the 2 major suppliers, *Table 3 and Figure 1* indicate that Fabrikam had the most units ordered, nearly 7.6 million since 2013, of which 3.3 million units in 2015 alone. For Litware, it showed the highest growth in order quantity of 567.45% from 2013 to 2014, possible due to orders shifting from other suppliers to Litware. For 2016 quantities, the data is limited till May 2016. Hence, it is not to be misunderstood as a decline in order quantity but rather a data limitation.

Next Steps: Relying on just two suppliers makes the firms' supply chain highly vulnerable to disruptions. While it can be advantageous to negotiate prices with bulk volumes, any financial or operational issues these two suppliers face could drastically affect the firm's ability to maintain a reliable stock supply. To minimize this risk, WWI may re-kindle relationships with some of the discontinued suppliers and diversify its supplier base more to ensure stability and efficiency in its supply chain. Lastly, with the new supplier, Datum, in 2016, it is crucial to closely monitor product quality and ensure timely deliveries to avoid potential disruptions and maintain supply chain integrity.

Final Query: *answered with 2 queries*

Query 1: purchase order trend by supplier from 2013-2016

```
SELECT
    s.SupplierID,
    s.SupplierName,
    AVG(pol.OrderedOuters) as 'Average OrderQty',
    COUNT(DISTINCT CASE WHEN Year(po.OrderDate)= 2013 THEN po.PurchaseOrderID END) as
'2013 OrderCount',
    COUNT(DISTINCT CASE WHEN Year(po.OrderDate)= 2014 THEN po.PurchaseOrderID END) as
'2014 OrderCount',
    COUNT(DISTINCT CASE WHEN Year(po.OrderDate)= 2015 THEN po.PurchaseOrderID END) as
'2015 OrderCount',
       COUNT(DISTINCT CASE WHEN Year(po.OrderDate)= 2016 THEN po.PurchaseOrderID END) as
'2016 OrderCount',
    MIN(po.OrderDate) as 'First Order Date',
    MAX(po.OrderDate) as 'Last Order Date'
FROM Purchasing.PurchaseOrderLines pol
JOIN Purchasing.PurchaseOrders po ON pol.PurchaseOrderID = po.PurchaseOrderID
JOIN Purchasing.Suppliers s ON po.SupplierID = s.SupplierID
GROUP BY s.SupplierID, s.SupplierName
ORDER BY 'Average OrderQty' DESC;
```

Query 2: order quantity trend by supplier from year 2013-2016

```
SELECT
    s.SupplierID,
    s.SupplierName,
    ISNULL(SUM(CASE WHEN Year(po.OrderDate)= 2013 THEN pol.OrderedOuters END),0) as '2013
OrderQty',
    ISNULL(SUM(CASE WHEN Year(po.OrderDate)= 2014 THEN pol.OrderedOuters END),0) as '2014
OrderQty',
    ISNULL(SUM(CASE WHEN Year(po.OrderDate)= 2015 THEN pol.OrderedOuters END),0) as '2015
OrderQty',
       ISNULL(SUM(CASE WHEN Year(po.OrderDate)= 2016 THEN pol.OrderedOuters END),0) as
'2016 OrderQty',
    ISNULL(SUM(pol.OrderedOuters), 0) as 'Total OrderQty',
```

```sql
        -- 2013 to 2014 growth%
    ISNULL(ROUND((SUM(CASE WHEN Year(po.OrderDate) = 2014 THEN pol.OrderedOuters END)
        - SUM(CASE WHEN Year(po.OrderDate) = 2013 THEN pol.OrderedOuters END)) * 100.0
        / NULLIF(SUM(CASE WHEN Year(po.OrderDate) = 2013 THEN pol.OrderedOuters END), 0),
2), 0) as '2013-2014 Growth (%)',

        -- 2014 to 2015 growth% --
    ISNULL(ROUND((SUM(CASE WHEN Year(po.OrderDate) = 2015 THEN pol.OrderedOuters END)
        - SUM(CASE WHEN Year(po.OrderDate) = 2014 THEN pol.OrderedOuters END)) * 100.0
        / NULLIF(SUM(CASE WHEN Year(po.OrderDate) = 2014 THEN pol.OrderedOuters END), 0),
2), 0) as '2014-2015 Growth (%)'

FROM Purchasing.PurchaseOrderLines pol
JOIN Purchasing.PurchaseOrders po ON pol.PurchaseOrderID = po.PurchaseOrderID
JOIN Purchasing.Suppliers s ON po.SupplierID = s.SupplierID
GROUP BY s.SupplierID, s.SupplierName
ORDER BY 'Total OrderQty' DESC;
```

Supplier Financial Performance Analysis

Parallelly, it is important to evaluate each supplier's financial contribution to our company's overall revenue. This will help us understand supplier dependency, and its impact on product performance.

How does the profit margin by supplier change between 2014-2015 inclusive?

Table 4: Supplier Performance Overview by Cost, Sales Price, and Profit (2014-2015)

SupplierID	SupplierName	Average Cost Price 2014	Average Cost Price 2015	Average Sales Price 2014	Average Sales Price 2015	Profit Margin 2014	Profit Margin 2015	Total Quantity Sold - 2014	Total Quantity Sold - 2015	Profit 2014	Profit 2015
7	Litware, Inc.	9.7014298491099	10.4380843022417	18.263814	19.802129	51.155100	51.533800	1649422	1765233	14980300.95	16394346.15
4	Fabrikam, Inc.	3.2250424358158	3.5504522066624	6.973742	7.652609	47.126700	46.990000	771357	817394	6437811.50	6797109.50
10	Northwind E...	24.2675186143528	26.8674288430057	41.080688	45.517241	40.941700	40.945400	30134	33085	1737240.00	1942499.50
12	The Phone ...	6.3439076690211	6.9296796165489	16.832429	18.417570	58.516000	59.101900	40835	42068	1019521.50	1112078.50
5	Graphic Des...	1.2964869775893	1.4344841510195	3.745406	4.144065	65.384600	65.384600	70384	77268	598264.00	656778.00
2	Contoso, Ltd.	1.6663470757430	1.6522850751038	4.847555	4.806647	65.625000	65.625000	5269	5218	55324.50	54789.00
1	A Datum Cor...	0.0000000000000	0.0000000000000	0.000000	0.000000	0.000000	0.000000	0	0	0.00	0.00

From a financial standpoint, from 2014 to 2015, Litware was the top-performing supplier between the two major suppliers. Their stock items had a noticeable increment in profit, from 14.98 million in 2014 to 16.39 million in 2015 (Figure 3) and with the highest quantity sold (Figure 4). In Table 4, their stock items show a marginal increase in average cost and sales prices from 2014 to 2015. Their profit margin remained stable at around 51.5%, indicating that Litware's products significantly bring in profits to the firm.

Similarly, Fabrikam's products maintained stable profits; it increased marginally to $697,109 in 2015 (*Figure 3*), with increased quantity (*Figure 4)*. The profit margin dipped slightly alongside a marginal average cost and sales price increment. These marginal increments in cost prices call for a close look at cost analysis.

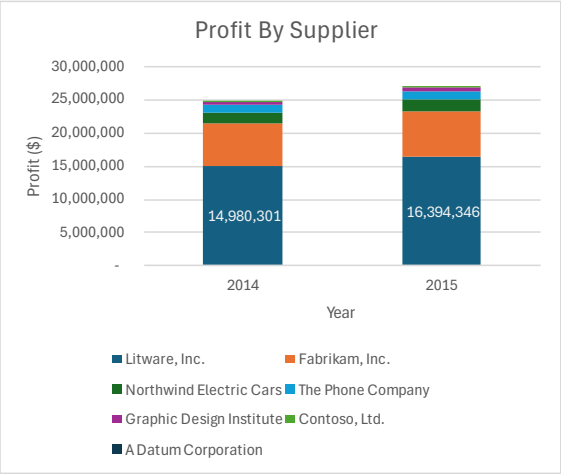

Figure 3: Yearly Profit by Supplier

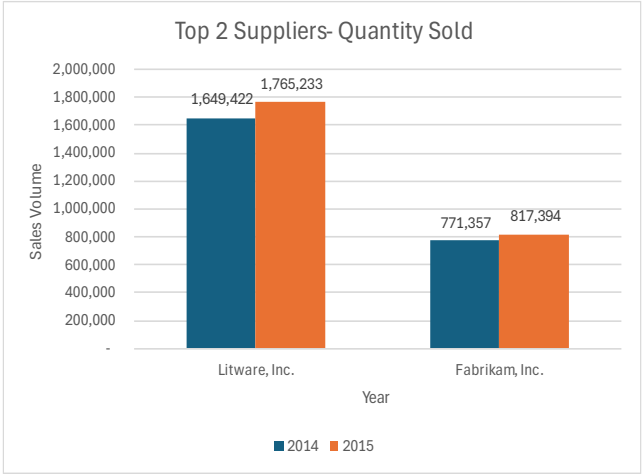

Figure 4: Sales Volume by Supplier

Lastly, Northwind Electric provides high-cost, high-priced items; this is evident as the total quantity sold for their products increased despite the rise in the average sales price, producing a noticeable profit of 1.9 million in 2015.

Next Steps: Managers can prioritize strengthening relationships with Litware as their products are profitable. With Fabrikam, marketing efforts should focus on boosting the sales volume of their products. Given the bulk volumes, managers can negotiate competitive cost prices with both suppliers to improve

profit margins. With Northwind, new strategies should be explored to continue their partnership and increase the quantity of high-priced items sold.

Final Query:

```
SELECT
    s.SupplierID,
    s.SupplierName,

    -- calculate cost price from LineProfit and UnitPrice => CostPrice = (UnitPrice -
(LineProfit/Quantity))
    AVG(CASE WHEN YEAR(i.InvoiceDate) = 2014
        THEN il.UnitPrice - (CASE WHEN il.Quantity <> 0 THEN il.LineProfit / il.Quantity
ELSE 0 END)
        ELSE 0 END) as 'Average Cost Price 2014',

    AVG(CASE WHEN YEAR(i.InvoiceDate) = 2015
        THEN il.UnitPrice - (CASE WHEN il.Quantity <> 0 THEN il.LineProfit / il.Quantity
ELSE 0 END)
        ELSE 0 END) as 'Average Cost Price 2015',

    -- avg sales price by year
    AVG(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.UnitPrice ELSE 0 END) as 'Average
Sales Price 2014',
    AVG(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.UnitPrice ELSE 0 END) as 'Average
Sales Price 2015',

       ---- profit margin by year using LineProfit
       ISNULL((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.LineProfit ELSE 0 END)
    / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END), 0)) * 100, 0) as 'Profit Margin 2014',

       ISNULL((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.LineProfit ELSE 0 END)
    / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity * il.UnitPrice
ELSE 0 END), 0)) * 100, 0) as 'Profit Margin 2015',

        -- total quantity sold in each year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity ELSE 0 END) as 'Total
Quantity Sold - 2014', -- the average quantity of stockitems sold per invoice line for
the year 2014 --
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity ELSE 0 END) as 'Total
Quantity Sold - 2015',

     -- profit earned in each year using LineProfit
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.LineProfit ELSE 0 END) as 'Profit
2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.LineProfit ELSE 0 END) as 'Profit
2015'

FROM Warehouse.StockItemHoldings sih
JOIN Warehouse.StockItems si ON sih.StockItemID = si.StockItemID
JOIN Purchasing.Suppliers s ON si.SupplierID = s.SupplierID
JOIN Sales.InvoiceLines il ON si.StockItemID = il.StockItemID
JOIN Sales.Invoices i ON il.InvoiceID = i.InvoiceID
GROUP BY s.SupplierID, s.SupplierName
ORDER BY [Profit 2015] DESC;
```

Top Performing Stock Items and Customer Categories by Revenue Change (2013-2015)

Lastly, it is also insightful to know about the characteristics of the top performing stocks items in relation to customer categories. This will help with knowing any similar patterns across categories, and how to best market similar stock items to drive more sales.

How does the performance of stock items and their sales vary by customer category over multiple years?

Table 5: Query 1 - Sales Volume and Revenue by Customer Category

CustomerCategoryName	Total Qty	Qty Sold 2013	Qty Sold 2014	Qty Sold 2015	Revenue 2013	Revenue 2014	Revenue 2015	Revenue Change 2013-2014%	Revenue Change 2014-2015%
Gift Store	518647	156551	170022	192074	2960882.25	3223255.25	3899282.10	8.861300	20.973400
Corporate	512245	148223	172392	191630	2733029.45	3329523.65	3848964.80	21.825300	15.601000
Computer Store	508910	145733	166421	196756	2663830.95	3334273.60	3766956.30	25.168300	12.976800
Supermarket	626242	176783	216674	232785	3413886.10	4291807.90	4669590.90	25.716200	8.802400
Novelty Shop	5543280	1774367	1841892	1927021	33935559.25	35750626.80	37806696.35	5.348500	5.751100

Table 6: Query 2 - Top 10 Revenue growth Stock Items and their Customer Category (2014-2015)

	StockItemName	CustomerCategoryName	Volume 2013	Volume 2014	Volume 2015	Revenue 2013	Revenue 2014	Revenue 2015	Revenue Growth 2013-2014%	Revenue Growth 2014-2015%
1	"The Gu" red shirt XML tag t-shirt (White) XS	Supermarket	264	288	936	4752.00	5184.00	16848.00	9.090900	225.000000
2	IT joke mug - keyboard not found ... press F1 to co...	Corporate	64	61	185	832.00	793.00	2405.00	-4.687500	203.278600
3	Developer joke mug - Oct 31 = Dec 25 (White)	Supermarket	95	78	233	1235.00	1014.00	3029.00	-17.894700	198.717900
4	20 mm Double sided bubble wrap 50m	Computer Store	880	480	1420	95040.00	51840.00	153360.00	-45.454500	195.833300
5	Ride on toy sedan car (Blue) 1/12 scale	Computer Store	63	72	201	14490.00	16560.00	46230.00	14.285700	179.166600
6	IT joke mug - hardware: part of the computer that c...	Gift Store	120	51	140	1560.00	663.00	1820.00	-57.500000	174.509800
7	Ride on vintage American toy coupe (Red) 1/12 sc...	Gift Store	143	56	153	40755.00	15960.00	43605.00	-60.839100	173.214200
8	Furry animal socks (Pink) M	Corporate	1272	840	2268	6360.00	4200.00	11340.00	-33.962200	170.000000
9	Superhero action jacket (Blue) XS	Corporate	82	54	144	2050.00	1350.00	3600.00	-34.146300	166.666600
10	Plush shark slippers (Gray) L	Gift Store	114	76	201	3648.00	2432.00	6432.00	-33.333300	164.473600

Regarding sales volume from 2013-2015, *Table 5* and *Figure 5* reveal that novelty shops lead with over 5.5 million units sold, followed by Supermarkets, with 626,000 units, and Gift Stores, with roughly 518,000 units. This trend holds true for each year as well. For 2014-2015 specifically, in terms of revenue growth, *Table 5* and *Figure 6* indicate that Gift Stores had the highest growth of 21%, followed by Corporate at 15.6%. Despite high sales volume, Novelty Shops and Supermarkets show slower revenue growth at 8.80% and 5.75%, indicating a stable but less aggressive revenue growth. Overall, Gift Stores offer a reliable stream of income. While Corporate and Computer Store customers have moderate revenue growth, it opens up the potential for additional measures to drive revenue growth.

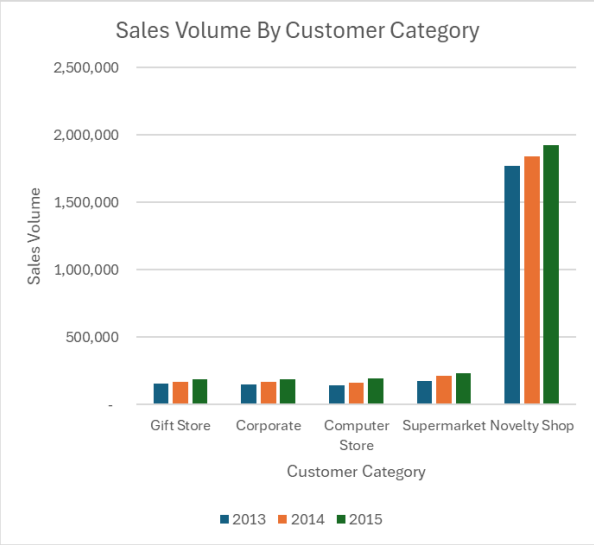

Figure 5: Sales Volume by Customer Category

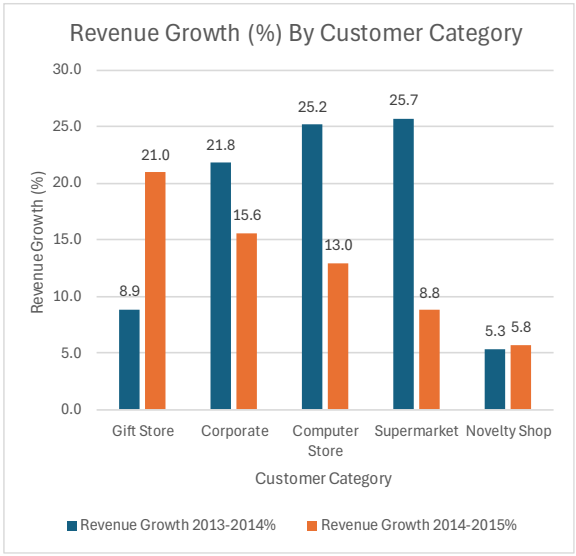

Figure 6: Revenue Change by Customer Category

Additionally, Table 6 highlights the top 10 high-performing products across customer categories. The "The Gu" red shirt XML tag t-shirt (White) XS from Supermarkets ranks at the top with 225% revenue growth (revenue increasing from $5,184 to $16,848 from 2014 to 2015), sales volume increasing from 288 to 936 units. As top second, the IT joke mug belonging to Corporate has seen a 203.28% revenue growth, driven by a sharp increase in sales from 61 to 185 units from 2014-2015. Most top-performing stock items belong to Corporate, Computer Stores and Gift Stores. Corporate is a valuable channel for revenue opportunities for specific novelty or niche items.

Next Steps: To capitalize on these findings, marketing, and sales should focus on the high-growth segments of Gift Stores, Corporate, and Computer Stores to maximize revenue; this could involve promoting top-performing stock items like mugs, t-shirts, and toys. Finally, reassessing the product strategy for Novelty Shops will help better translate their high sale

Final Query: *2 queries to answer this*

Query 1: Sales Performance by Customer Category

```
SELECT
    cc.CustomerCategoryName,
       SUM(il.Quantity) as 'Total Qty',
    -- sales volume by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity ELSE 0 END) as 'Sales
Volume 2013',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity ELSE 0 END) as 'Sales
Volume 2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity ELSE 0 END) as 'Sales
Volume 2015',

    -- total revenue by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice ELSE 0 END)
as 'Revenue 2013',
```

```
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice ELSE 0 END)
as 'Revenue 2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity * il.UnitPrice ELSE 0 END)
as 'Revenue 2015',

    -- percentage change in revenue
    CASE WHEN SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice
ELSE 0 END) = 0 THEN NULL -- if 2013 rev is zero, return NULL to avoid division by zero
errorr
        ELSE
            ((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END)
            - SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice
ELSE 0 END))
            / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity *
il.UnitPrice ELSE 0 END), 0)) * 100 -- if 2013 rev is 0, denominator = NULL to avoid
division by zero error
    END as 'Revenue Change 2013-2014%',

    CASE WHEN SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END) = 0 THEN NULL
        ELSE
            ((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity * il.UnitPrice
ELSE 0 END)
            - SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END))
            / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity *
il.UnitPrice ELSE 0 END), 0)) * 100
    END as 'Revenue Change 2014-2015%'

FROM Sales.InvoiceLines il
JOIN Warehouse.StockItems si ON il.StockItemID = si.StockItemID
JOIN Sales.Invoices i ON il.InvoiceID = i.InvoiceID
JOIN Sales.Customers c ON i.CustomerID = c.CustomerID
JOIN Sales.CustomerCategories cc ON c.CustomerCategoryID = cc.CustomerCategoryID
WHERE Year(i.InvoiceDate) BETWEEN 2013 AND 2015
GROUP BY cc.CustomerCategoryName
ORDER BY [Revenue Change 2014-2015%] DESC;
```

Query 2: Sales Performance by Stock Item and Customer Category

```
SELECT TOP 10
    si.StockItemName,
    cc.CustomerCategoryName,

    -- sales volume by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity ELSE 0 END) AS 'Volume
2013',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity ELSE 0 END) AS 'Volume
2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity ELSE 0 END) AS 'Volume
2015',

    -- total revenue by year
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice ELSE 0 END)
AS 'Revenue 2013',
```

```sql
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice ELSE 0 END)
AS 'Revenue 2014',
    SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity * il.UnitPrice ELSE 0 END)
AS 'Revenue 2015',

    -- percentage change in revenue
    CASE WHEN SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice
ELSE 0 END) = 0 THEN NULL -- if 2013 rev is zero, return NULL to avoid division by zero
errorr
        ELSE
            ((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END)
            - SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity * il.UnitPrice
ELSE 0 END))
            / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2013 THEN il.Quantity *
il.UnitPrice ELSE 0 END), 0)) * 100 -- if 2013 rev is 0, denominator = NULL to avoid
division by zero error
    END AS 'Revenue Growth 2013-2014%',

    CASE WHEN SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END) = 0 THEN NULL
        ELSE
            ((SUM(CASE WHEN YEAR(i.InvoiceDate) = 2015 THEN il.Quantity * il.UnitPrice
ELSE 0 END)
            - SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity * il.UnitPrice
ELSE 0 END))
            / NULLIF(SUM(CASE WHEN YEAR(i.InvoiceDate) = 2014 THEN il.Quantity *
il.UnitPrice ELSE 0 END), 0)) * 100
    END AS 'Revenue Growth 2014-2015%'

FROM Sales.InvoiceLines il
JOIN Warehouse.StockItems si ON il.StockItemID = si.StockItemID
JOIN Sales.Invoices i ON il.InvoiceID = i.InvoiceID
JOIN Sales.Customers c ON i.CustomerID = c.CustomerID
JOIN Sales.CustomerCategories cc ON c.CustomerCategoryID = cc.CustomerCategoryID
GROUP BY si.StockItemName, cc.CustomerCategoryName
ORDER BY [Revenue Growth 2014-2015%] DESC, cc.CustomerCategoryName;
```