



## DEMAND SEGMENTATION

*How less inventory and improved service levels  
go hand-in-hand*

### Industry Week Best Plants Conference

co-presented by Carlisle Tire & Wheel and TBM Consulting Group, Inc.

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# Agenda

- Introductions
- Demand Segmentation overview
  - What is it?
  - Why use it?
- Carlisle Tire & Wheel case study
  - Deployment approach
  - Example and results
- Summary



# What is Demand Segmentation?

- Analytical tool and process to segment demand
- Enhances traditional ABC stratification
- Considers volume / volatility and its impact on operations





## Why Use Demand Segmentation?

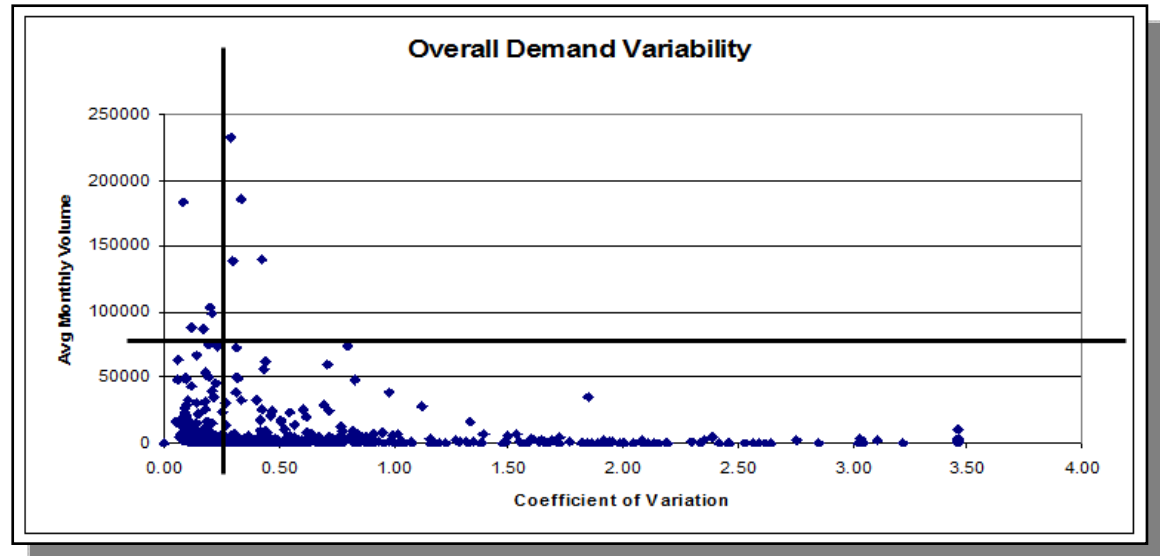
- Identify appropriate actions to optimize manufacturing, sourcing and distribution of each segment
- Understand control system options (Pull, Make-to-Order) for each demand segment
- Identify opportunities for demand shaping and product portfolio management





# Volume and Variability

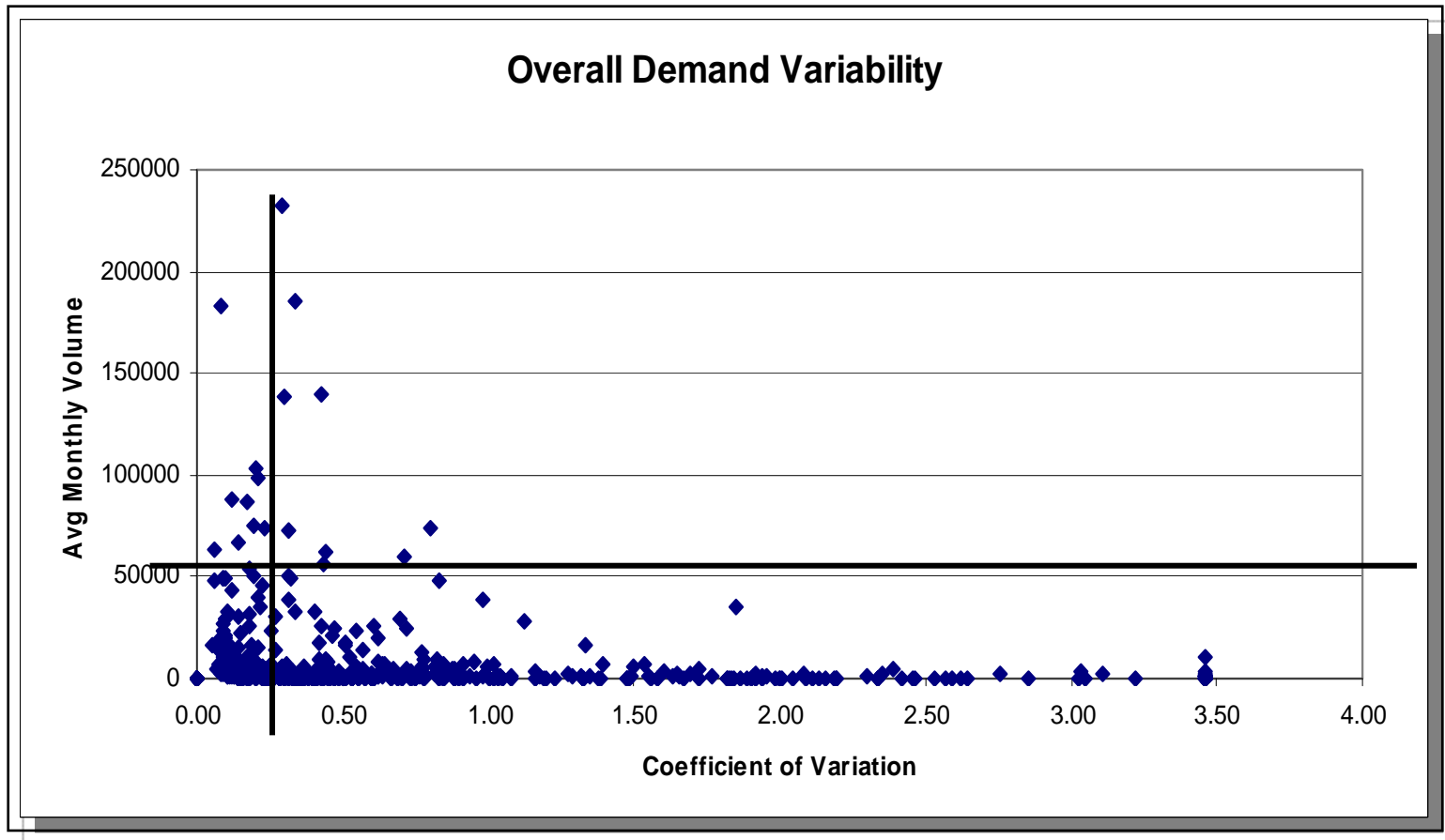
- Gather data (52 weeks)
  - Historical orders
  - Historical shipments
  - Historical forecast



- Validate the data
- Calculate the “Variability” =  $\text{Std Dev} / \text{Historical Mean}$ 
  - Low Variability  $<.25$
  - High Variability  $>.25$



# Demand Segmentation Plot

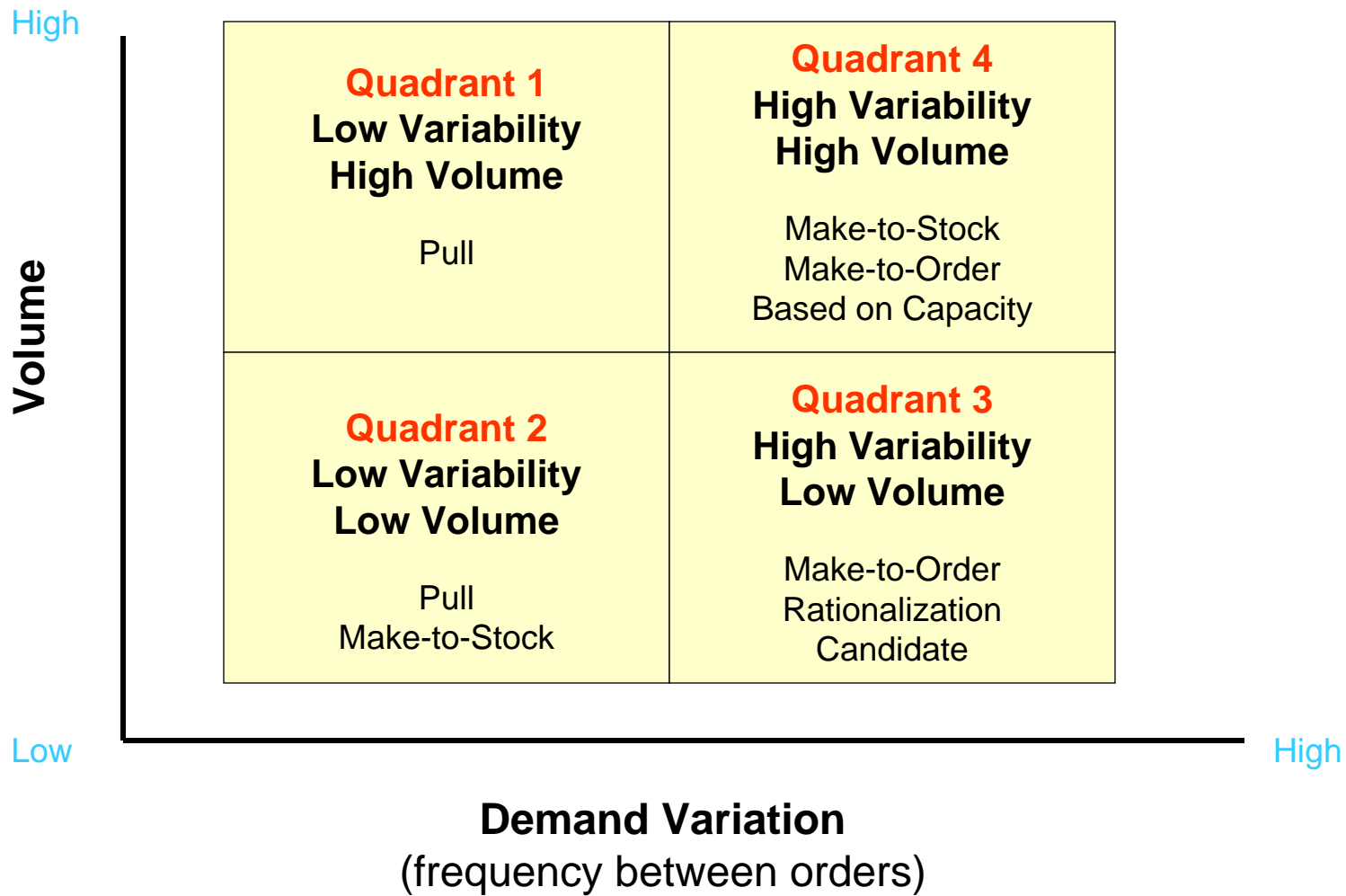


Coefficient of Variation = Std Deviation / Historical Mean

**Each plot point is an specific item (SKU)**



# Demand Segmentation & Service Strategies





# Use key metrics by quadrant to identify impacts of decisions

Quadrant 1		Quadrant 4	
Gross Sales \$'s	\$ 5,876,739	Gross Sales \$'s	\$ 2,467,049
% Total Gross Sales \$'s	68.8%	% Total Gross Sales \$'s	28.9%
Gross Sales Lbs	29,602,370	Gross Sales Lbs	19,513,640
% Gross Sales Lbs	48.2%	% Gross Sales Lbs	31.8%
Inventory \$'s		Inventory \$'s	
% Total Inv \$'s		% Total Inv \$'s	
Inventory Lbs	10,989,339	Inventory Lbs	12,438,304
% Total Inv Lbs	28.2%	% Total Inv Lbs	31.9%
DOS (28 days)	10.39	DOS (28 days)	17.85
# Items	26	# Items	60
% Total Items	2.8%	% Total Items	6.6%
Gross Margin \$'s	\$ 630,973	Gross Margin \$'s	\$ 421,207
% Total Gross Margin \$'s	58.4%	% Total Gross Margin \$'s	39.0%
Avg GM %	10.7%	Avg GM %	17.1%
Quadrant 2		Quadrant 3	
Gross Sales \$'s	\$ 76,501	Gross Sales \$'s	\$ 127,106
% Total Gross Sales \$'s	0.9%	% Total Gross Sales \$'s	1.5%
Gross Sales Lbs	1,695,309	Gross Sales Lbs	10,600,129
% Gross Sales Lbs	2.8%	% Gross Sales Lbs	17.3%
Inventory \$'s		Inventory \$'s	
% Total Inv \$'s		% Total Inv \$'s	
Inventory Lbs	1,645,466	Inventory Lbs	13,866,465
% Total Inv Lbs	4.2%	% Total Inv Lbs	35.6%
DOS (28 days)	27.18	DOS (28 days)	36.63
# Items	123	# Items	706
% Total Items	13.4%	% Total Items	77.2%
Gross Margin \$'s	\$ 9,825	Gross Margin \$'s	\$ 18,910
% Total Gross Margin \$'s	0.9%	% Total Gross Margin \$'s	1.7%
Avg GM %	12.8%	Avg GM %	14.9%



# Carlisle Tire & Wheel Overview

- Carlisle Tire & Wheel sells tires and wheel assemblies to OEM's and dealers, mostly in lawn & garden, ATV, golf, high-speed trailer and replacement markets
- OEMs require high levels of service with short lead time
- OEMs and Dealers have driven SKU proliferation to over 2,000 active SKUs



# Current Situation

- Proliferation of SKUs
  - Very little differentiation between SKUs
  - New SKUs for each customer
- Large levels of inventory
  - Yet we always seemed challenged to have the right inventory
- Operations was setup to run high volume, low variety products



## Demand Segmentation Deployment Approach

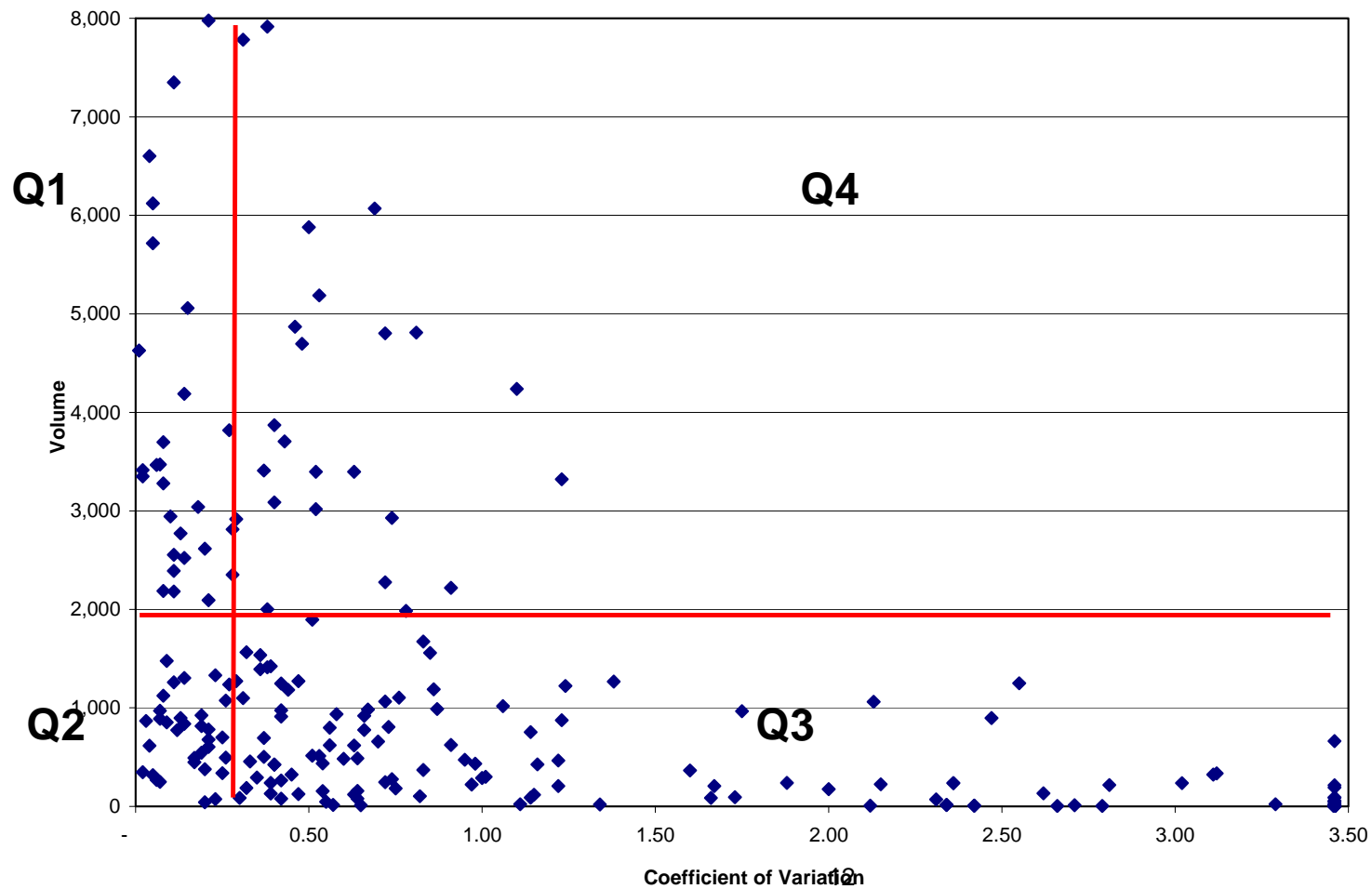
- Conducted 3- or 4-day events by product line
  - ATV-Styled Wheels
  - Lawn & Garden-High Speed
- Cross-functional team
  - Sales/Marketing
  - Product Management
  - Supply Chain
  - Operations





# Example "Before" Demand Segmentation Plot

Q1 - 80% Volume < 0.25 CV  
Q2 - 20% Volume < 0.25 CV  
Q3 - 20% Volume > 0.25 CV  
Q4 - 80% Volume > 0.25 CV





# Key Performance Metrics By Quadrant - **BEFORE**

Quadrant 1	
Sales Volume	\$143,390
% Total Sales	35%
# SKUs	28
% Total SKUs	12%
Inventory	\$38,408
% Total Inventory	21%
Days on Hand	97.8
Inventory Turns	2.35

Quadrant 4	
Sales Volume	\$186,247
% Total Sales	46%
# SKUs	34
% Total SKUs	15%
Inventory	\$49,831
% Total Inventory	27%
Days on Hand	97.6
Inventory Turns	3.76

Quadrant 2	
Sales Volume	\$20,171
% Total Sales	5%
# SKUs	28
% Total SKUs	12%
Inventory	\$15,911
% Total Inventory	8.6%
Days on Hand	288
Inventory Turns	1.08

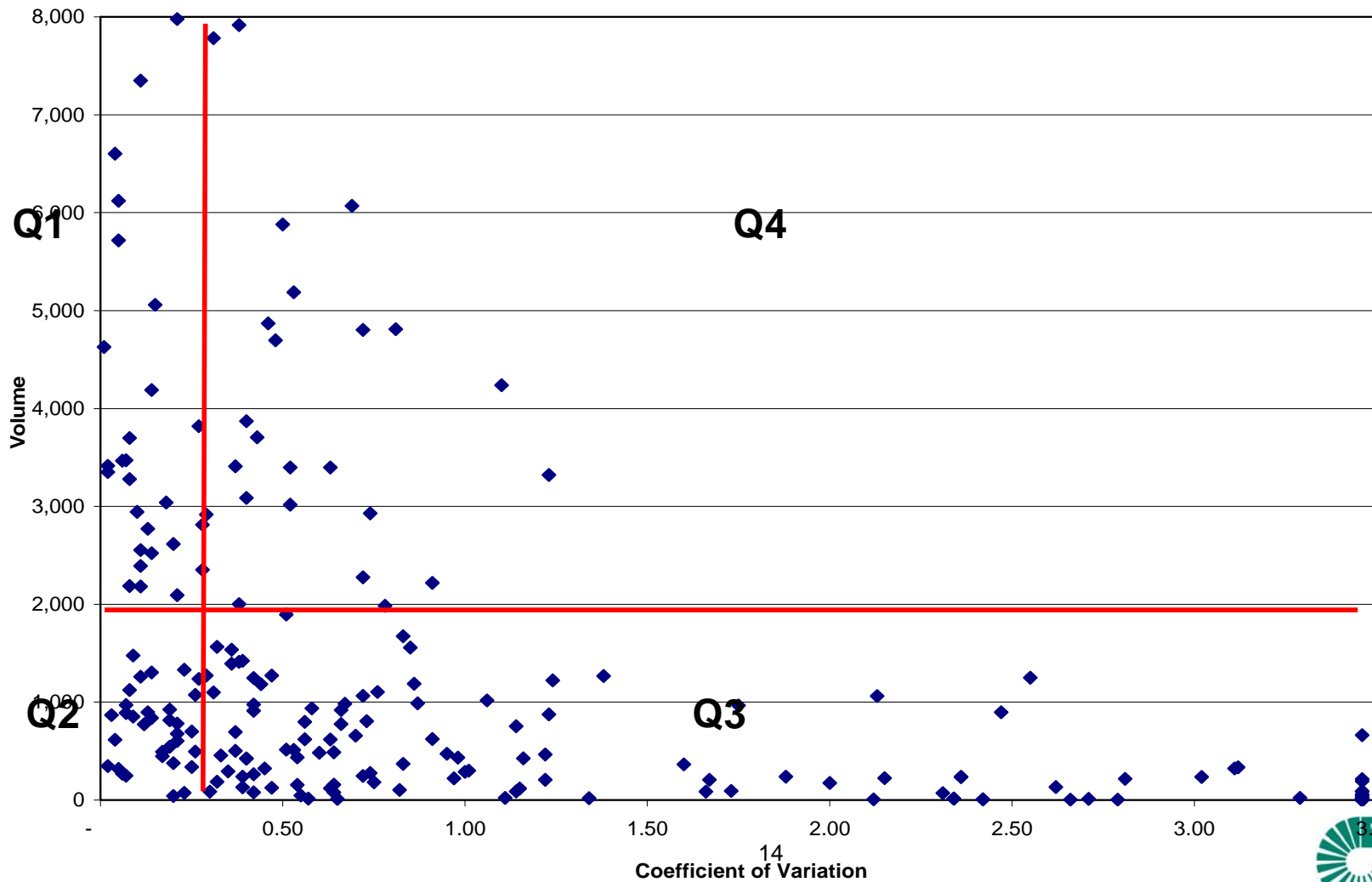
Quadrant 3	
Sales Volume	\$62,462
% Total Sales	15%
# SKUs	141
% Total SKUs	62%
Inventory	\$79,911
% Total Inventory	43%
Days on Hand	467
Inventory Turns	0.57





# Example “After” Demand Segmentation Plot

Q1 - 80% Volume < 0.25 CV  
Q2 - 20% Volume < 0.25 CV  
Q3 - 20% Volume > 0.25 CV  
Q4 - 80% Volume > 0.25 CV





# Key Performance Metrics By Quadrant - **AFTER**

Quadrant 1	
Sales Volume	\$119,560
% Total Sales	35%
# SKUs	21
% Total SKUs	15%
Inventory	\$29,348
% Total Inventory	21%
Days on Hand	89.6
Inventory Turns	2.59

Quadrant 4	
Sales Volume	\$168,5487
% Total Sales	49%
# SKUs	30
% Total SKUs	21.6%
Inventory	\$45,104
% Total Inventory	32%
Days on Hand	97.6
Inventory Turns	3.78

Quadrant 2	
Sales Volume	\$7,988
% Total Sales	2.4%
# SKUs	11
% Total SKUs	7.9%
Inventory	\$5,757
% Total Inventory	4%
Days on Hand	263
Inventory Turns	1.29

Quadrant 3	
Sales Volume	\$43,670
% Total Sales	12.8%
# SKUs	77
% Total SKUs	55%
Inventory	\$60,950
% Total Inventory	43%
Days on Hand	509
Inventory Turns	0.64



## **CARLISLE** Results



- 37% SKU reduction
- 20% inventory reduction
- 15% increase in inventory turns

# Manufacturing & Sales Strategy

- Quadrants 1 & 2: **Pull**
- Quadrants 3 & 4: **Make-to-order**
- SKUs in Quadrant 1 are good candidates for cellular manufacturing

## More Information

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Questions & Answers?

**Thank you!**

