Visualization in Market Analysis

Market Regulation and Consumer Affairs (D) Committee
NAIC Summer National Meeting
August 15, 2023
Agenda

• Why Visualize Data?
• Data Needs
• Effective Visualizations
• Picking the Right Visualization
• Best Practices
• Adding Value
• Market Analysis Examples
• Things to Consider
• Questions
How Many Nines Are There?

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How Many Nines Are There?

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Why Visualize Data?

• Leverages Human Perception Skills
  • Absorb More
  • Easier to Remember
  • Analyze More, Faster
  • Grasp Difficult Concepts

• Digest “Huge” Amounts of Data
  • Internal & External Data
  • Single Data Source
  • Multiple Data Sources

• Identify New
  • Trends
  • Patterns
  • Anomalies
Why Visualize (Continued)

• Today’s Technology
  • Allows For Interactive/Investigative Analysis
  • Reduces Data Silos
  • Reduces IT Dependency

• Allows Regulators to ‘Notch It Up’
  • Added Value Over Process
  • Better Understanding of What is Going On
  • Data Based Decisions
    • Remove subjectivity from process
    • Create repeatable outcomes

• Application of Advanced Analytics
  • Text Analytics
  • Machine Learning
  • Predictive Analytics
  • Network Analysis
Data Needs To Be:

- Available
- Accessible
- Usable
  - Relevant
  - Timely
  - Granularity
- Consumable
- Reliable
- Consistent
- Complete
Effective Visualizations Are:

• Geared to the Audience
• Answers the Questions
• Tells the Story
  • Reveal Patterns, Trends
  • Won’t Mislead
• Knowing Where You Are Going
  • Comparison
  • Relationship
  • Distribution
  • Composition
Comparison

- Among Items
  - Few Categories
  - Many Categories
- Over Time
  - Number of Periods
  - Cyclical/Seasonal
  - Few/Many Variables

- Good Chart Types
  - Bar Chart
  - Column Chart
  - Area Chart
  - Line Chart
  - Distribution Chart
Relationships

• Number of Variables

• Good Chart Types
  • Scatter Plot
  • Bubble Chart
  • Tree Map
  • Gantt Chart
Distribution

• Number of Variables
• Number of Data Points

• Good Chart Types
  • Column Histogram
  • Line Histogram
  • Stacked Ratio Chart
  • Scatter Plot
  • 3D Area Chart
Composition

- **Nature of Data**
  - Static
  - Change Over Time
  - Number of Periods
  - Number of Categories

- **Comparison Type**
  - Relative Difference
  - Absolute Difference
  - Share of Total
  - Accumulation

- **Good Chart Types**
  - Pie Chart
  - Donut Chart
  - Tree Map
  - Stacked Column/Bar Chart
  - Stacked Area Chart
  - Waterfall Chart
Picking The Right Chart

- 65.41% Member
- 12.21% Regulator Non-Member
- 0.29% Student
- 18.02% Sustaining Member
- 2.62% Industry Non-Member
Picking The Right Chart  (Continued)
Picking The Right Chart (Continued)
Best Practices

• Avoid the ‘Kitchen Sink Syndrome’
  • No Single Best Way
  • Keep It As Simple As Possible
  • Include Necessary Items Only
  • Provide Options To Investigate

• Direct Focus
  • Conditional Formatting
  • Reference Lines
  • Highlight Trends
  • Project Forecasts

• Help the End User
  • Provide Context
  • Chart Titles/Descriptions
  • Annotate
  • Labels/Axis
  • Pre-sort When Possible

• Colors Have Meaning
  • Categorical
  • Sequential
  • Diverging
Adding Value

- Trending
- Comparisons

Filings Received

3,978
Received YTD

4,665
PYTD

▼14.7%
vs. PYTD
Adding Value  (Continued)

• Brings Together Information from a Variety of Sources
Adding Value (Continued)

• Seeing the Bigger Picture
Adding Value (Continued)

- Tell the Whole Story
- Add Annotations

### Grievance Report

**Number of Companies Reporting for 2018 (Click on a Plan Type to Display Information About It)**

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<th>2016</th>
<th>2017</th>
<th>2018</th>
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<td>Medicare Supplement</td>
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<td>Preferred Provider Plan</td>
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**Plan Type Being Displayed**

Health Maintenance Organization

**Grievances Received**

- 2016: 5,072
- 2017: 4,869
- 2018: 4,134

**By Grievance Type**

- Benefit Denial: 4,596, 4,295, 3,692
- Plan Administration: 436, 503, 353
- Quality of Care: 40, 71, 89
- Grand Total: 5,072, 4,869, 4,134

**Percentage of Grievances Received By Grievance Type & Year**

- 2016: 91%
- 2017: 9%
- 2018: 1%

**Grievance Types**

- Benefit Denial: Grievances about the denial or partial denial of a benefit.
- Plan Administration: Grievances about policyholder service, premium billing, or similar administrative disputes.
- Quality of Care: Grievances about the medical services provided by plan providers.

**Select A Company to View**

Unity Health Plans Insurance Corporation

**Grievances Received**

- 2016: 746
- 2017: 736
- 2018: 817

**By Grievance Type**

- Benefit Denial: 710, 655, 773
- Plan Administration: 36, 81, 44
- Quality of Care: 0, 0, 0
- Grand Total: 746, 736, 817

**Grievance Index (Per 10,000 Average Monthly Enrollees)**

- 2016: 0.8
- 2017: 0.8
- 2018: 0.7

**Grievance Index**

The grievance index compares the number of grievances received by a company to the total number of grievances received by all companies in the same plan type.

- A company with a grievance index of:
  - 1.0 received an average number of grievances
  - Less than 1.0 received fewer than the average number of grievances
  - More than 1.0 received more than the average number of grievances
Adding Value  (Continued)

• Easier To Read
Adding Value (Continued)

• Allows for Investigation
• Drill Down Interactive Visualizations
Adding Value (Continued)
Adding Value (Continued)

- Add Context for Better Understanding
• Know Your Audience
Adding Value  (Continued)

• Save the Details For Those That Need to See It
Adding Value (Continued)

• Direct Focus
Market Analyst Prioritization Tool (MAPT)

- Baseline Analysis / Prioritization Tool
  - ≈ 2005 / 2006
  - State & National Data

- Content (Data Points) Compiled from Independent Systems
  - Complaints
  - Regulatory Actions
  - Premium & Loss
  - Examinations
  - Company Demographics

- Missouri Data Points:

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<td>36,808</td>
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MAPT Challenges

- Cannot See Whole Picture
- Excel Spreadsheet
- Additional Work Needed to Identify Companies of Interest
  - Sorting
  - Formatting
- Decisions May Not Be:
  - Traceable
  - Repeatable
- No Benchmarks/Context Provided
- True Outliers May Be Masked
Company Premium Data: Private Passenger Auto

National Premium Subcomponents
- Ntl Prem Volume Scr: 12
- Ntl Mkt Share Scr: 26
- Ntl Iris Ratio Scr: 24

State Premium Subcomponents
- St Prem Volume Scr: 73
- St Mkt Share Scr: 70

Top 5 Premium States
- Midwest: PA
- Northeast: AL
- Southeast: CT
- Western: WA
- National Data: LA

Direct Premium Written (DPW)
- CY: 96%
- PY: 94%
- PY1: 95%

State DPW as % of National
- CY: 10%
- PY: 20%
- PY1: 30%

State DPW: 40M, 50M, 60M, 70M, 80M, 90M, 100M
Market Conduct Annual Statement (MCAS)

- Market Regulation Monitoring Tool
  - Since 2002/2003
  - 50 Participating Jurisdictions

- Provides Market Regulators With Information Not Otherwise Available

- Content (Data Points) Complaints
  - Claims/Loss
  - Premium & Underwriting
  - Complaints/Lawsuits

- Data Reported By
  - Jurisdiction
  - Line of Business
  - Coverage Type
MCAS Challenges

• Prioritization Tool & Individual Reports
• Missouri Homeowners MCAS MAPT
  • 180 Columns * 840 Rows = 151,200 Cells
• Granularity of Data Varies
  • Claims [At Coverage Type & Rolled Up to All Coverages]
  • Underwriting [At Line of Business & Repeated Within Spreadsheet]
  • National/State
• Limited Benchmarks/Context Provided in Reports
• Cannot See Whole Picture
• Additional Work Needed to Identify Companies of Interest
• Decisions May Not Be Traceable/Repeatable
• True Outliers May Be Masked
MCAS Ratio Analysis: Homeowners

To view the underlying data for a specific company, enter the company NAIC CoCode to the right and hit the Enter key before proceeding to the other dashboards.

Click on the logo above to access the NAIC MCAS State Report Cards.

Select desired display options.

State
Missouri

Number of Years
3

Ratio
- Ratio 1
- Ratio 2
- Ratio 3
- Ratio 4
- Ratio 5
- Ratio 6
- Ratio 7

Minimum Policies Inforce
From 0

Market Segment
All

Companies Reporting
1st Tier 2nd Tier 3rd Tier

Jitter Control
50

Highlight A Group
No items highlighted

Highlight A Company
No items highlighted
MCAS Ratio Analysis: Homeowners

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- Ratio 1
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- Ratio 6
- Ratio 7

Minimum Policies Inforce
From 0

Market Segment
- 1st Tier
- 2nd Tier
- 3rd Tier

Displaying Ratio 1

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Companies Reporting

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Unmasking Potential Outliers
Spotting Data Integrity Issues

**Dwellings vs. Policies In Force**

- Number of Policies in Force
- Number of Dwellings with Policies in Force
- Direct Premium Written

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Seeing Trends
Seeing Trends (Continued)
Things to Consider

• Value Added
  - Is there real value?
  - Will it yield any real insights?
  - What will this help drive?

• Costs vs Benefits
  - What benefits will be derived?
  - Is existing data readily available?
  - What are the costs/benefits of obtaining/creating new data sources?

• Fundamental Change
  - Process
  - Mindset

• Skill Set Differential
  - Examiner vs Analyst
  - Transaction Based vs Big Picture
Questions?

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