

Diagnosing Metric Declines: A Systematic Approach

This presentation outlines a structured method for investigating and addressing unexpected drops in key metrics. We'll cover diagnostic analysis, hypothesis formation, and validation techniques.



Metrics Decline Overview

1 Diagnostic Analysis

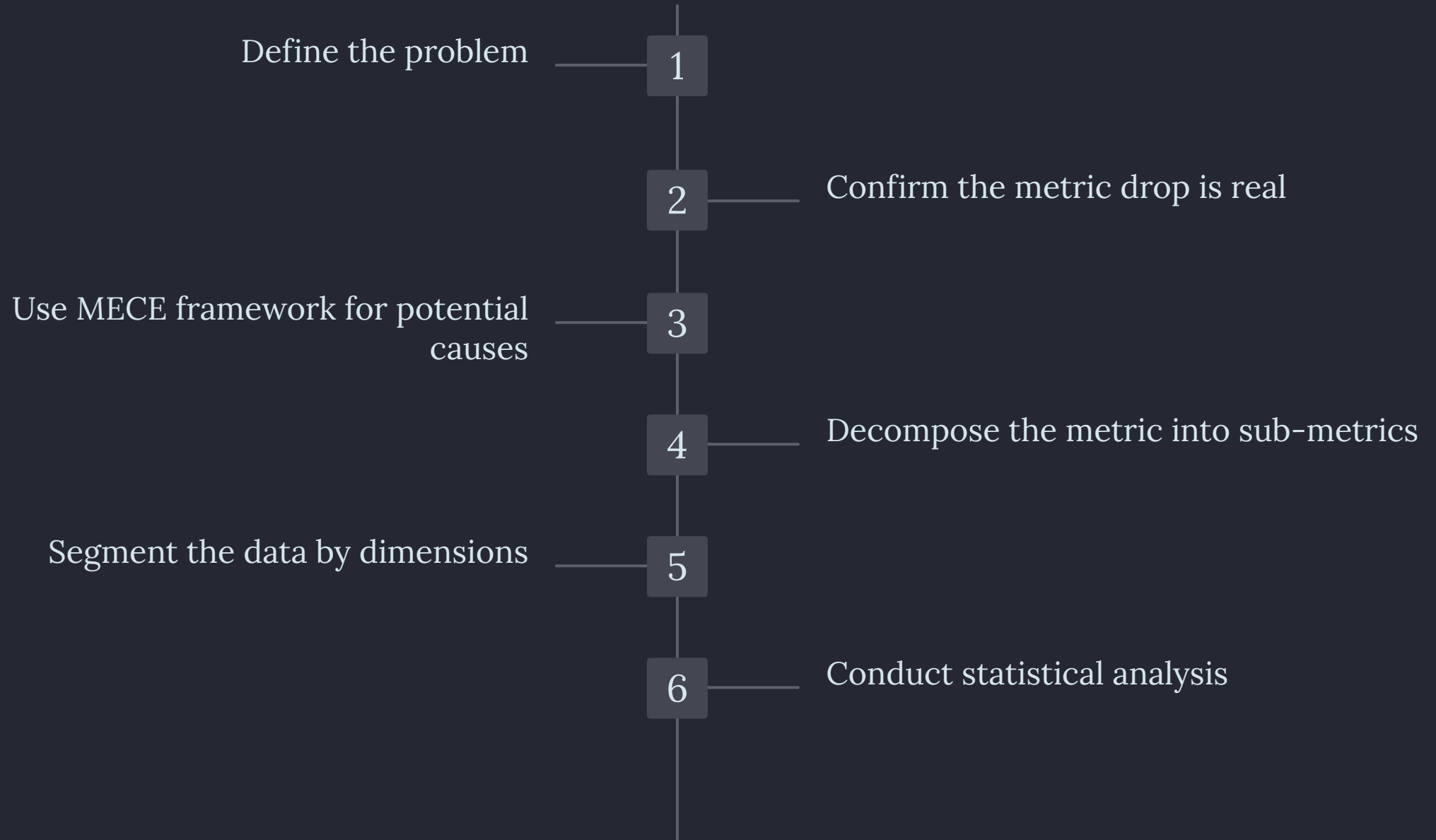
Dive deep when key metrics change unexpectedly. Uncover root causes behind drops or spikes.

2 Key Idea

Use systematic steps to form and validate hypotheses. Then, use A/B testing to confirm what's driving the change.



Hypothesis Formation & Validation Overview



Step 1 – Clearly Define the Problem



Identify the Metric

Determine which key metric has dropped.
Quantify the change.

Example: "Facebook Friend Requests Sent per Day dropped by 10% overnight."



Document the Context

Note the time frame, affected user segments,
and recent changes.

Step 2 – Confirm That the Drop Is Real



1

Check Historical Data & Seasonality

Compare with previous periods and known seasonal patterns. Assess statistical significance.

2

Verify Data Integrity

Ensure tracking systems and analytics pipelines are working. Look for recent changes.

3

Key Questions

Has this drop happened before? Is this within normal variance?

Step 3 – Use the MECE Framework to Identify Causes



Goal: Cover all bases without overlap

Step 4 – Identify Other Metrics That Affect the Main Metric

1

Metric Decomposition

Break down the main metric into its components (sub-metrics)

2

Investigate Influencing Metrics

For conversion rate drop: check add-to-cart rate, checkout completion, payment success

3

Example Analysis

E-commerce Conversion Rate: Add-to-Cart Rate dropped from 20% to 12%

Step 5 – Segment the Data Using Dimensions and Measures

Dimensions (Qualitative)

- User attributes (age, gender, device type)
- Geography (country, region, urban/rural)
- Traffic source (organic, paid, referral)
- Time periods (day of week, time of day)

Measures (Quantitative)

- Engagement metrics (time spent, actions taken)
- Conversion metrics (completion rates, abandonment)
- Financial metrics (revenue, cost per action)
- Performance metrics (load time, error rates)

Purpose: Break down your data into meaningful segments to isolate where the metric changes are most pronounced. This helps pinpoint specific user groups, behaviors, or conditions that are driving the overall trend.

Step 6 – Conduct Statistical Analysis

After identifying potential factors affecting your metrics, it's crucial to validate these relationships through robust statistical analysis.

1

Correlation Analysis

Measure the strength and direction of relationships between your main metric and potential influencing factors.

2

Significance Testing

Determine if observed changes are statistically significant using appropriate statistical tests (t-tests, chi-square, etc.).

3

Regression Analysis

Build models to understand how different variables contribute to metric changes and predict future behavior.

4

Causal Analysis

Use techniques like A/B testing or difference-in-differences to establish causation versus correlation.

Remember: Statistical analysis helps distinguish between real trends and random fluctuations, enabling data-driven decision making.



Final Steps: Validate and Act

Step 7: Validate Hypotheses

Use A/B testing, before/after analysis, and user feedback.

Step 8: Prioritize & Act

Focus on high-impact, easy-to-fix issues. Implement changes and monitor metrics.

Final Takeaway

1

Start with the Basics

Always begin by clearly defining the problem and confirming that the metric drop is real before taking action.

2

Use Structured Investigation

Follow the MECE (Mutually Exclusive, Collectively Exhaustive) framework to systematically analyze all possible angles.

3

Consider All Factors

Examine both internal and external factors that could impact your metrics to ensure a comprehensive analysis.

Remember: A systematic approach to diagnosing metric declines leads to more accurate solutions and better business outcomes.