Model Fragility in Turbulent Times
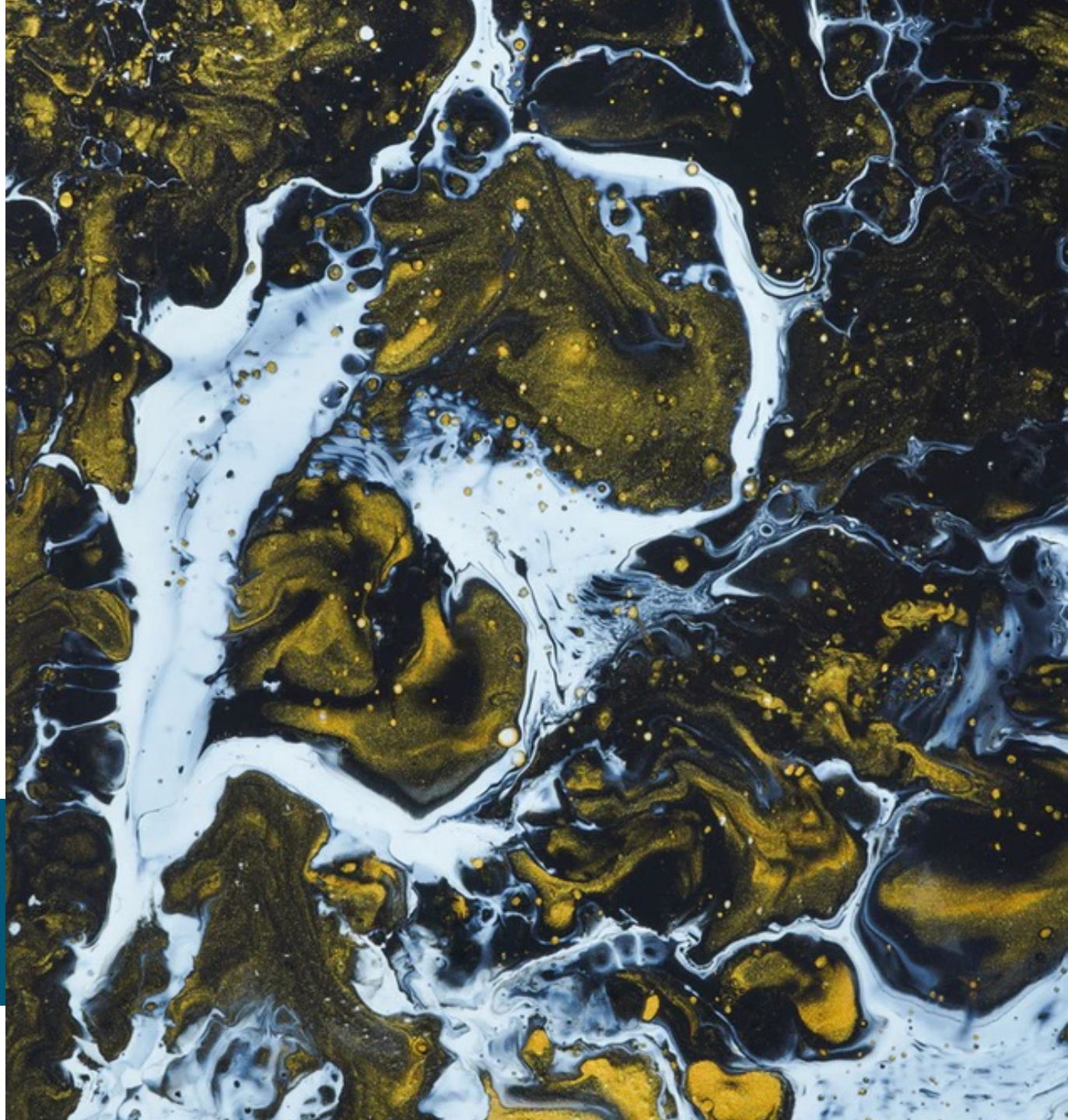
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MMA | IMPACT | VIRTUAL
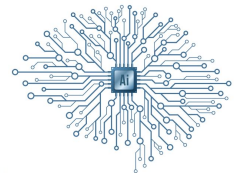THE FUTURE OF MODERN MARKETING
APRIL 6-7, 2021

Spectrum of Analytics

Mainstream investment in analytics

- Strong growth over the past decade
- Sustained during pandemic
- Improved technology
- Lower cost of entry

Trickledown Analytics

SMEs have invested in assets that deliver consistent value

- LTV
- Customer Segmentation
- Bid Optimization
- Media Mix Modeling
- Audience Management
- Content Personalization
- Lead scoring
- Market scoring

Firms of all size rely on predictive models

We discuss 3 core questions they face:

1. Can we trust these models after a disruptive event?
2. How do we find out?
3. What can we do to protect our models from future disruptions?

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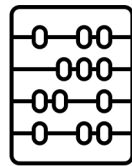INTELLIGENCE

Prove That You Don't Have a Problem

Big shifts in the market require hard looks

- Sunk costs in activating models
- They appear to be sufficient
- Relied on external expertise: black box
- Can feel panicky or reactive
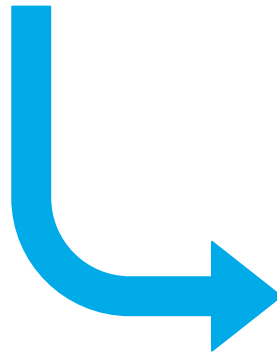
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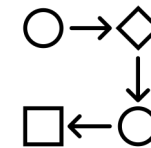
Core Attributes of a Model
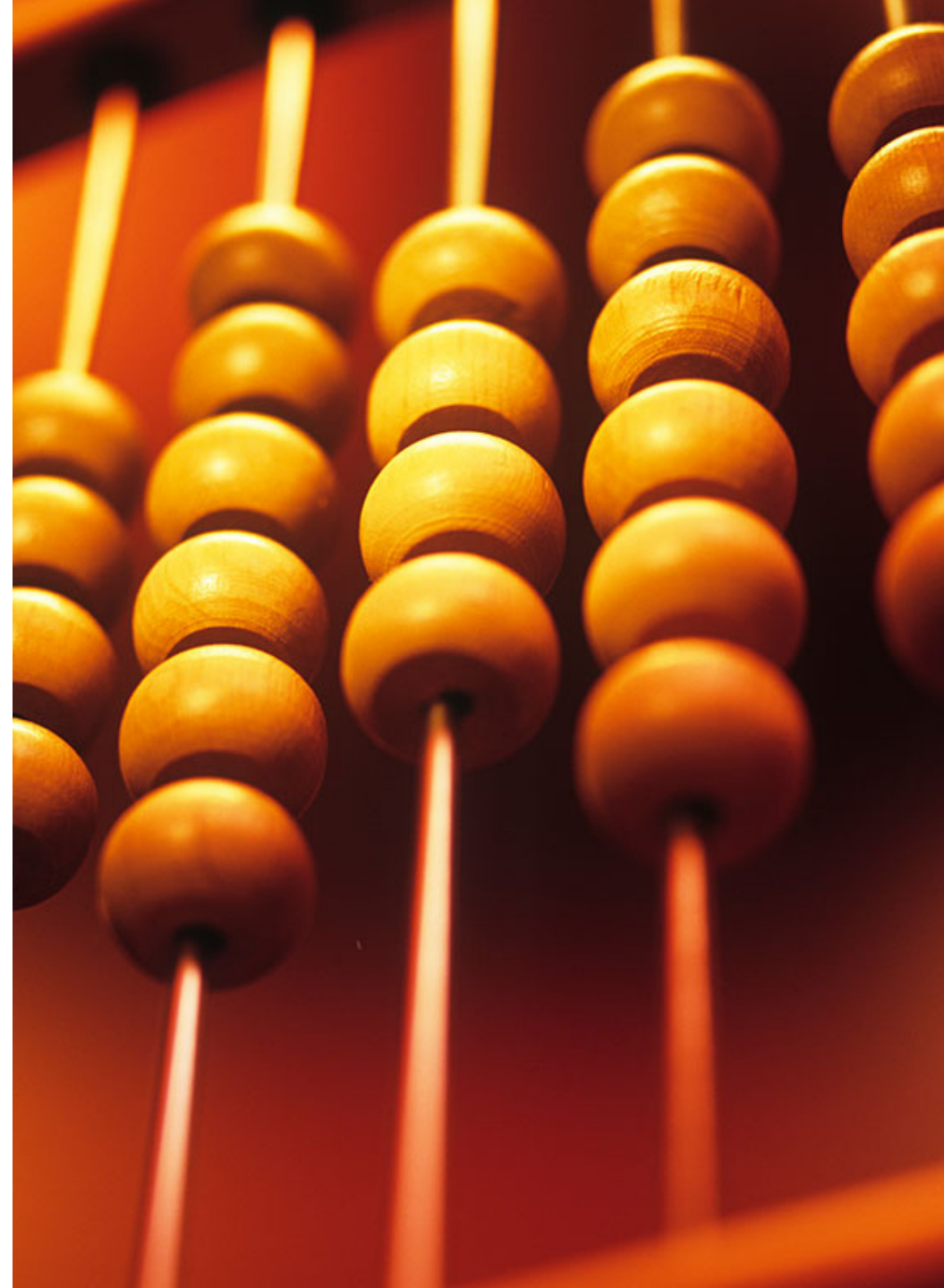
Counts & Measurement

Descriptions & Relationships

Mathematic Iteration

Counts: Built Using Data, Which is Made

Data collection is a counting process

- Technology enables rapid high-volume counting
- Counts are snapshots of an activity
- Context behind each count
- Some context is captured, some isn't

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Relationships, Found in the Data

Relationships in the data describe the system being studied

- Patterns found between counts
- Discovered by analysts and machines
- Using familiar data
- Define **the physics of the system** being studied (i.e. assumed rules of the system)
- Drives reporting diagnostics, decisions and predictions

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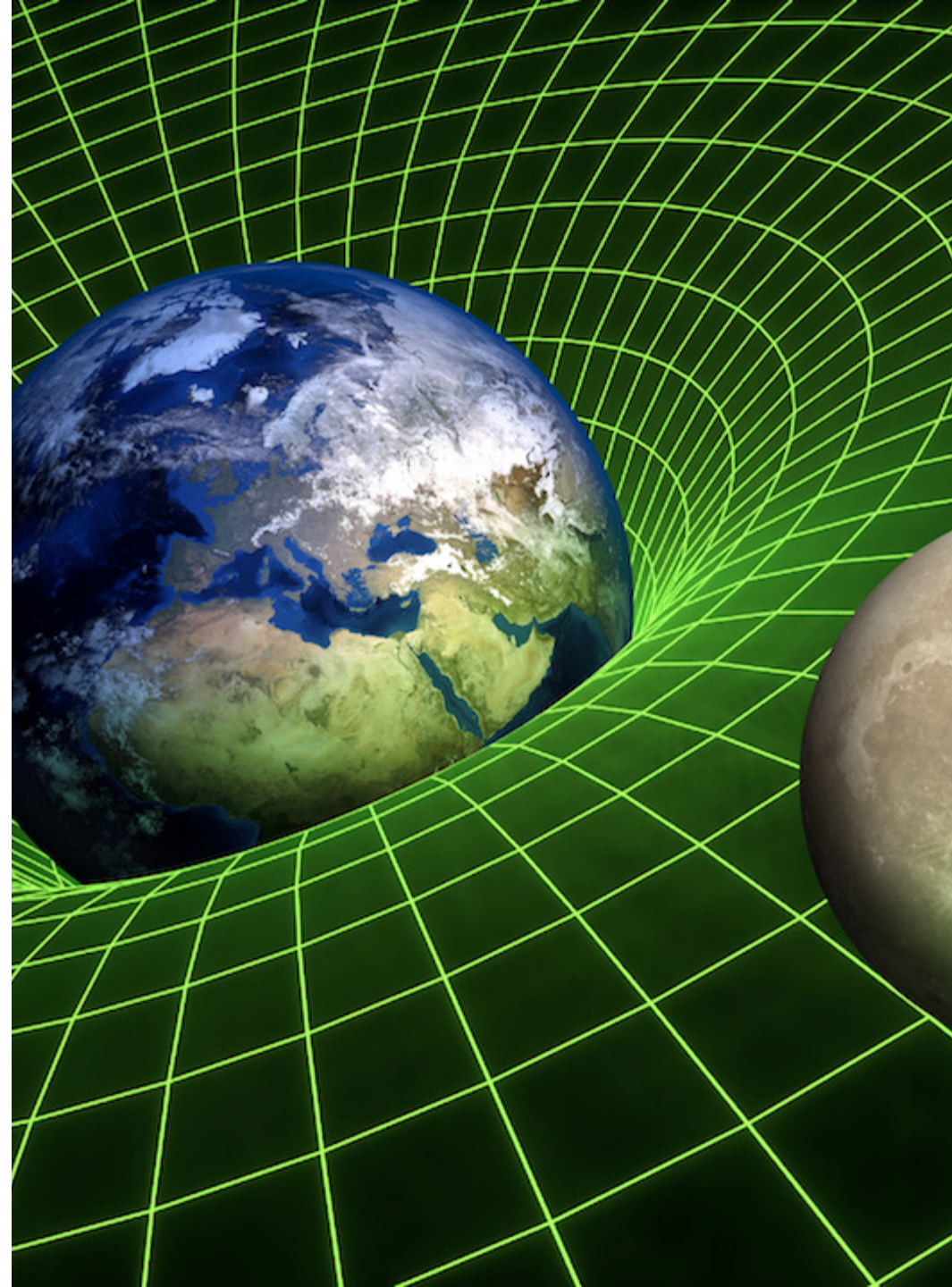
Iteration to Improve Fit

We tune models to catch up to the systems they describe

- Tweak parameters and redefine features
- Arrive at a set of assumptions that adequately define the system
- Implicit assumption of a semi-static (non-evolving) system

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Disruptive Events Can Change Context & Relationships

- System thrown into flux
- Complex dynamics
- Volatile outcomes

What Do We Look For?

Examine Counts

Look for invisible shifts in context.

- Signals generated are different or new
- Peaks and valleys mean different things
- Counting stops, starts, stops, starts….

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Review Relationships

Look for reorganization.

- Existing groups fracture/disperse
- New correlations surface
- Old rhythms break or change

Customer Segments

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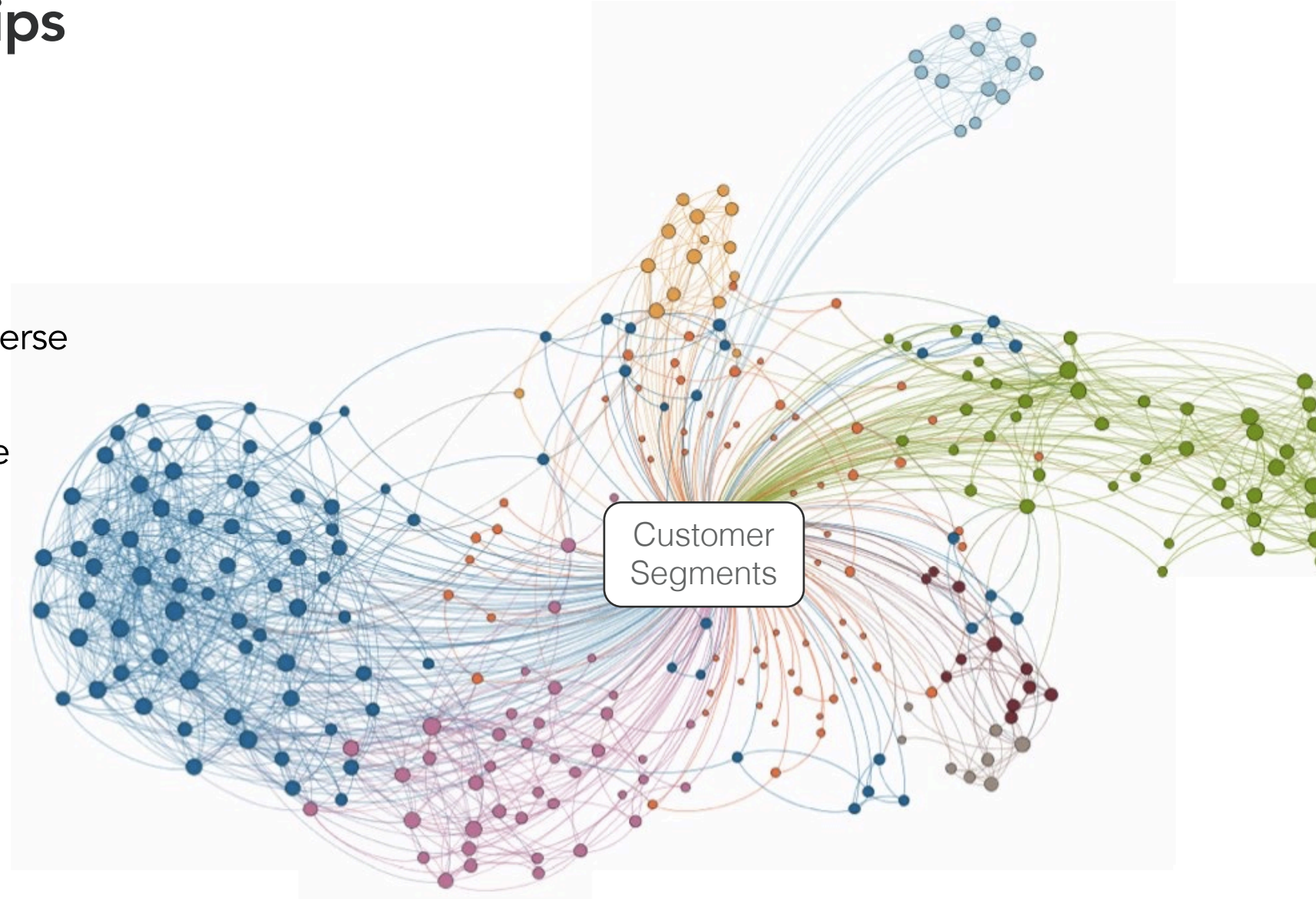
A Dynamic System

Look at system evolution.

- Model may appear stable when system is not
- Volatile initial reactions may not persist
- Tiny fluctuations can become enormous long-run differences
- New, permanent forces are introduced to the system to introduce stability (e.g. legislation)

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How to Isolate Problem Areas

How, and where to invest?

- Capturing new data/context
- Testing old relationships
- Finding new relationships
- Assessing and accounting for system dynamics

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Catalog Assumptions

A creative, collaborative exercise

- Don't jump to complex data analysis or model diagnostics: use summary statistics

- Discuss implicit assumptions in counting, relationships, and system

- Gather a multi-disciplinary jury of stakeholders and subject matter experts

- Workshop to build and scrutinize list

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A Practical Case

Persona Development for Media Activation

- 2M customers, E-commerce, 4 Years data
- Clusters defined on transactional behavior and demographic features:
  - Product category (e.g. travel & accessory), discounts applied, device, media performance, geography (Urban/Rural), age, season
- Activation Tactics: Email content, media copy, bid optimization, landing page content

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Counting Review

Observed Shift in Counts:

- Facebook paid ads performance soars for return customers
- Site visit spike, avg time on site increase for older segments
- Discount usage increase
- Seasonal shoppers break pattern
- Purchase frequency drop
- Many new customers in new age groups

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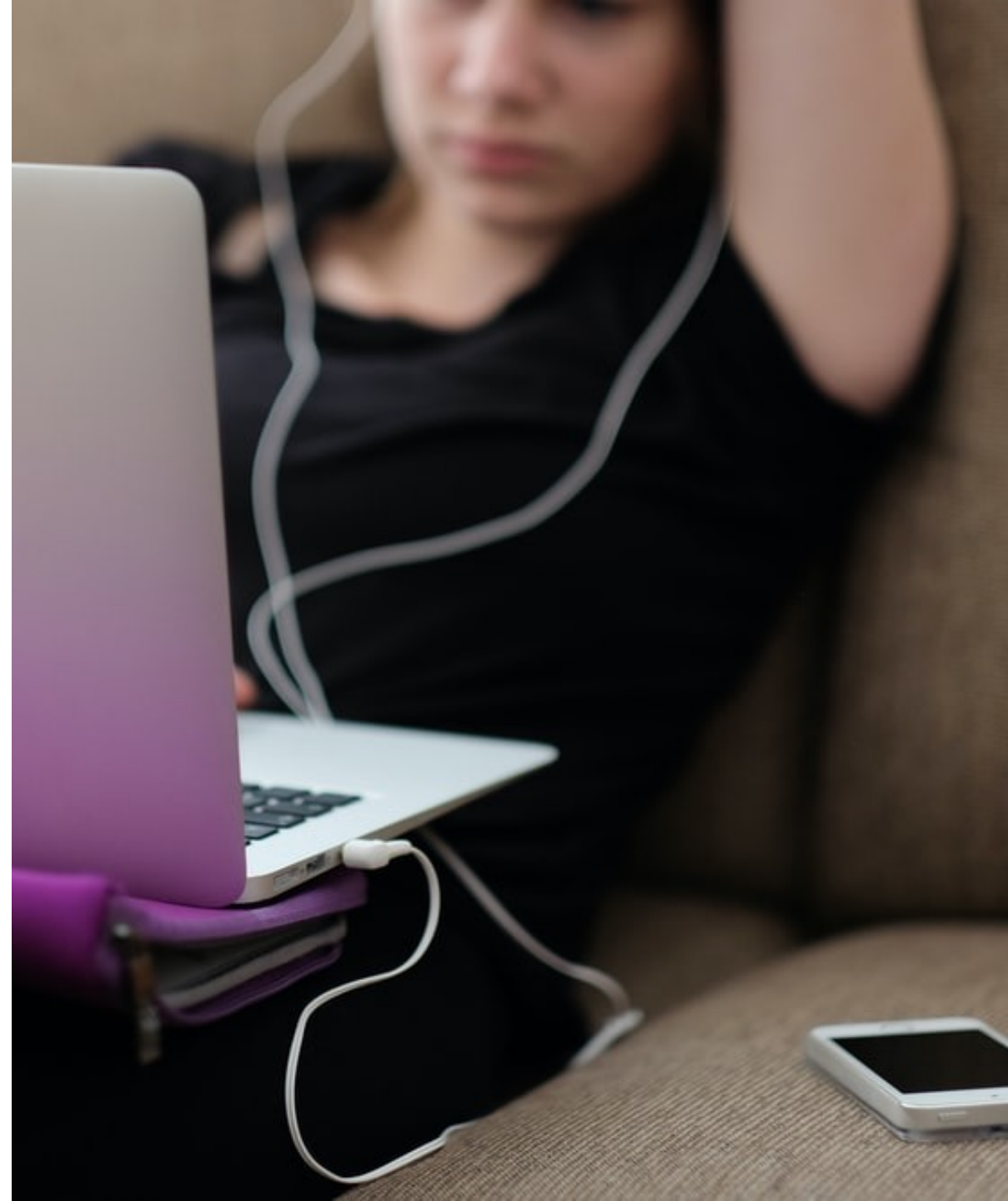
Count Assumption Review

Shift in Counting Context :

- Facebook usage is generally way up during pandemic: uncertain

- Seasonality means much less: temporary

- E-commerce growth in older segment: may be permanent

- Frequency drop: uncertain

- Discount usage: a function of boredom?

- New customers purchased masks: temporary

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Relationships Review

Observed Relationship Changes

- Site engagement signals correlate less to sales
- Shipping costs signal more significantly
- Add to carts are worth less
- Products correlate differently: (e.g. sportswear and floral patterns)
- Urban and Rural transact similarly

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System Dynamics

Observed system changes

- Travel category will rebound, unpredictably by region in short term
- Mask purchase will decline
- Purchase frequency will rebound
- Seasonal purchases will return in 2023
- E-commerce adoption will remain for older age groups

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Revaluating Segmentation Model

Evaluating parameters with new context

- Revisit cluster definitions relying on:
  - Mask/Travel products
  - Purchase frequency & season
  - Basket value
- Institute temporary clusters
  - 6 clusters moved to 7
  - Revisited in 2023

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Resilient Modeling Workflow

Prepare For Future Events

- Reimagine your model ASSETS as a model PROCESS
- Remember the **TEAR** model:
    Transparent
    Expandable
    Adjustable
    Revisited

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TEAR Framework

T — TRANSPARENT
Clarity is Pervasive

- Assumptions, definitions in a centralized and readily accessible living document.
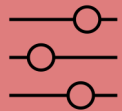- Captured in plain language.

E — EXPANDABLE
Modularity First

- First-party data is increasingly critical
- External data sources more important than ever
- Process to add/remove
- Diagnostics for impact on model performance

A — ADJUSTABLE
Set it - DON'T forget it

- Assumptions can be easily changed by non-technical experts
- Stress tests/scenarios easily produced

R — REVISITED
Come Back Soon!

- Regularly schedule meetings to validate/challenge/evaluate assumptions in the model, as well as the performance of the outcomes.

Summary

Invest in evaluating models, now!

1. Breakdown models into basic components
2. Extract assumptions implicit summary statistics
3. Adjust models accordingly
4. Embed TEAR in planning BAU

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Thank You