

Business Analytics Examples: Patterns, Strengths, and Pitfalls



- Concrete examples beat abstractions: patterns repeat, pitfalls are predictable



- Roadmap: descriptive, diagnostic, predictive, prescriptive



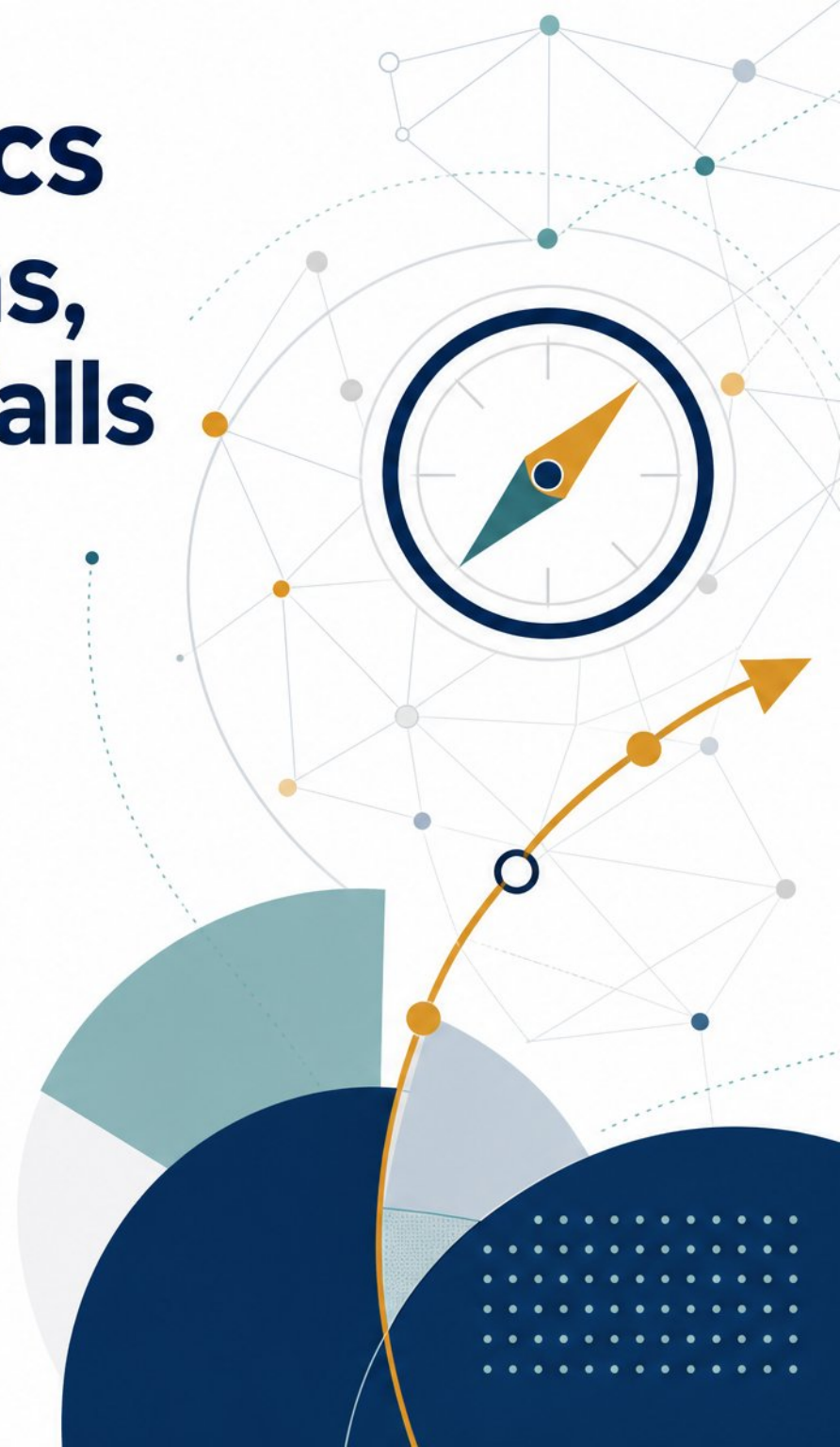
- Every case read as business question, data, method, impact, failure modes



- Analysts get evaluation craft; managers get decision framing



- Educators get a rubric, students worked cases, leaders risk signals



The Four Analytics Families and What Each One Answers

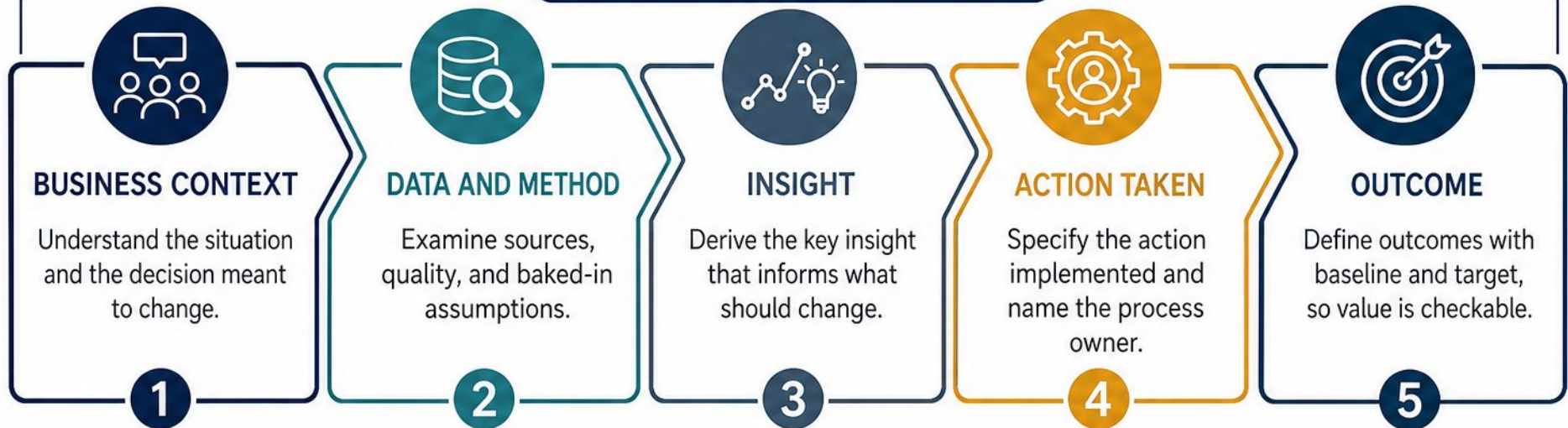


- **Prescriptive:** what should we do — adds objective, constraints, and optimization
- **Predictive:** what is likely to happen — scores or forecasts unseen cases
- **Diagnostic:** why it happened — explains root causes, bridging past and future strategy
- **Descriptive:** what happened — the shared factual baseline for every later layer

 Complexity and data maturity rise across the ladder; prescriptive is hardest to sustain.

Reading a Case: The Five-Part Evaluation Template

Five-Part Case Card Frame



- Part 1: business context and the decision meant to change
- Part 2: data and method – sources, quality, and baked-in assumptions
- Parts 3-4: insight and action taken, with a named process owner
- Part 5: outcome with baseline and target, so value is checkable
- Predictions that change no decision create zero business value

Strength Lens and Pitfall Lens: A Reusable Scoring Rubric



STRENGTH LENS

- ✓ Five strength criteria: real decision, data quality, method fit, actionability, measurable value
- ✓ Four pre-build questions, 0-2 points each: decision, impact, adoption, simpler alternative
- ✓ Parsimony test: can a rule, threshold alert, or process redesign solve 80% of it?
- ✓ Score the case, then defend the score to a skeptical stakeholder





PITFALL LENS

- ✗ Pitfall checklist: bias
- ✗ Pitfall checklist: leakage
- ✗ Pitfall checklist: overfitting
- ✗ Pitfall checklist: confounding
- ✗ Pitfall checklist: misaligned incentives
- ✗ Pitfall checklist: resistance



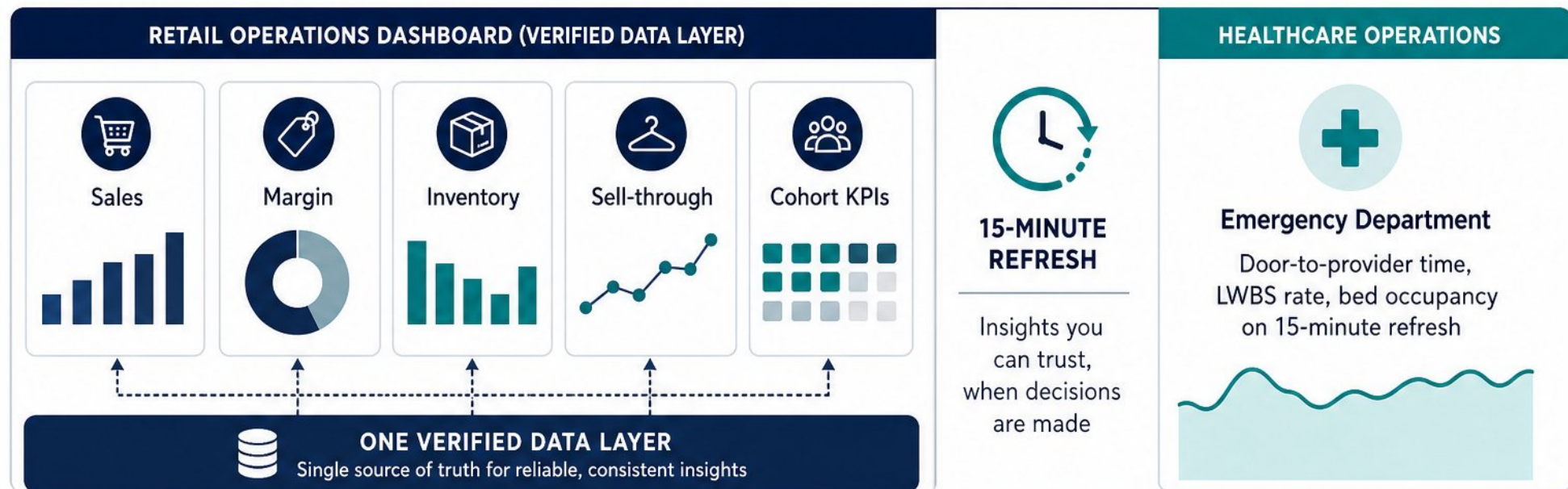
Parsimony test: can a rule, threshold alert, or process redesign solve 80% of it?



Score the case, then defend the score to a skeptical stakeholder



Descriptive Analytics Examples: Seeing the Business Clearly



- **Retail dashboard:** sales, margin, inventory, sell-through, and cohort KPIs flag underperformers
- **Healthcare operations:** door-to-provider time, LWBS rate, bed occupancy on 15-minute refresh
- **Consistency pattern:** one verified data layer means teams argue about problems, not numbers
- **Strength pattern:** shared truth, fast visibility, simple adoption, leadership answers in 30 seconds
- **Pitfall pattern:** vanity metrics, stale snapshots, dashboards that trigger no decision



Diagnostic Analytics Examples: Explaining Why It Happened

CAUSAL INVESTIGATION MAP



FIVE-PART CASE CARD FRAME

01



- SaaS churn rose from 3.2% to 4.8%; causal path gave 89% churn probability

02



- Automated onboarding and rebalanced CSMs cut churn to 2.9% in 90 days

03



- Dana axle: isolating 5-10 of 200+ signals cut rework 65%, saved \$2.5-3M

04



- Float glass: AI causal RCA cut investigation from 6.8 hours to 53 minutes

05



- Pitfall: correlation-based methods misdiagnose; proximate triggers mistaken for causes

Predictive Analytics Examples: Forecasting What Comes Next



- **Demand forecasting:** XGBoost-LSTM hybrid cut MAPE 21.4% to 15.0% across 12,000 SKUs



- **Retail replenishment:** accuracy 61% to 94%; \$4M stockout loss eliminated



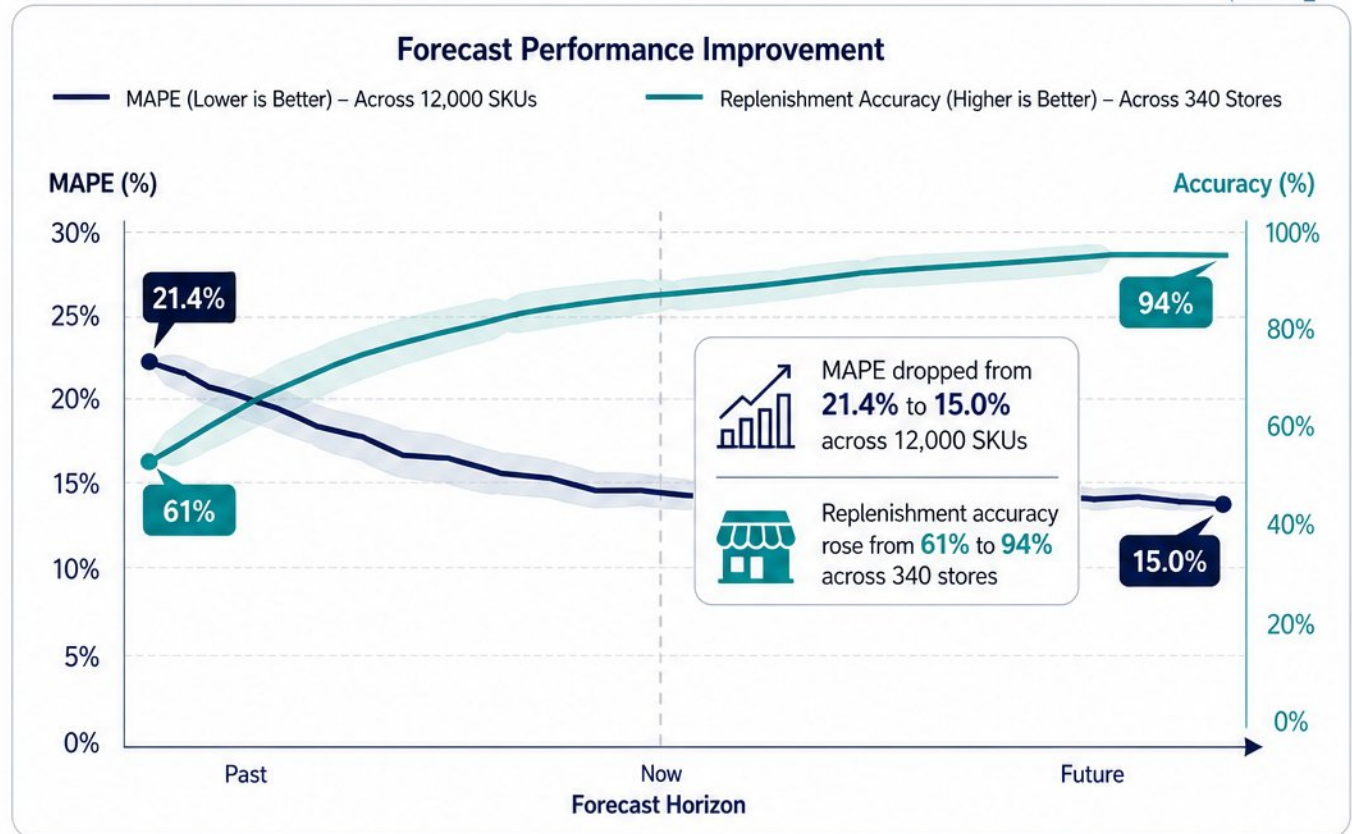
- **Credit risk:** governed engine cut exposure R\$13.5M yearly, 100% auto re-evaluated



- **Strength pattern:** forward-looking decisions, resource optimization, cold-start handling



- **Pitfall pattern:** overfitting, concept drift, uncorrected stockout bias, ignored base rates



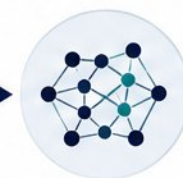
Signal-to-Decision Pipeline



Signal Ingestion



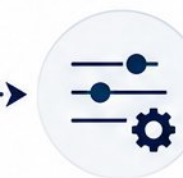
Data Preparation



Feature Engineering



Predictive Modeling



Evaluation & Governance



Decision & Action

Prescriptive Analytics Examples: Choosing the Best Action



- **Retail pricing:** ML demand curves + mixed-integer solver price 1.2M variables nightly; ~5% sales lift, 20% inventory cut



- **Price research:** controlled complexity gave 8.2% gross-profit gain; unregularized version overstated at 19.1%



- **Supply chain:** GPU optimization cut what-if cycles from a day to under 10 minutes (144%); 6x planner productivity



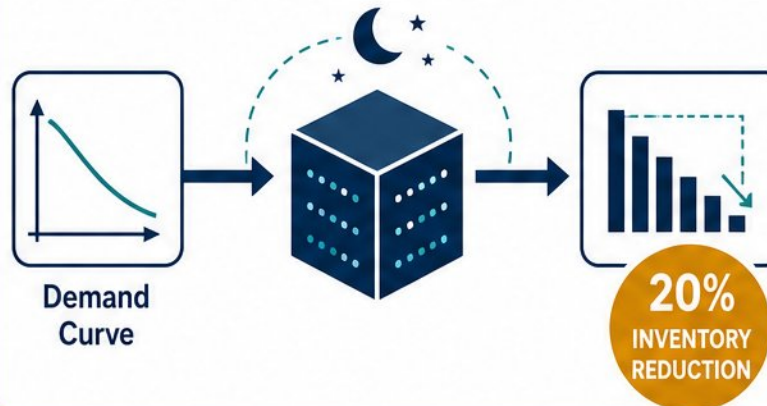
- **Freight:** cost-based recommendations saved ~\$10M in two months via early risk alerts and alternate sourcing



- **Watch for:** brittle optimization, missing constraints, unmodeled cross-price effects, unexplained recommendations

MIXED-INTEGER SOLVER

Pricing 1.2M variables nightly



FREIGHT NETWORK WITH ALTERNATE SOURCING



FOUR-LAYER ANALYTICS LADDER



DESCRIPTIVE

What happened?



DIAGNOSTIC

Why did it happen?



PREDICTIVE

What is likely to happen?

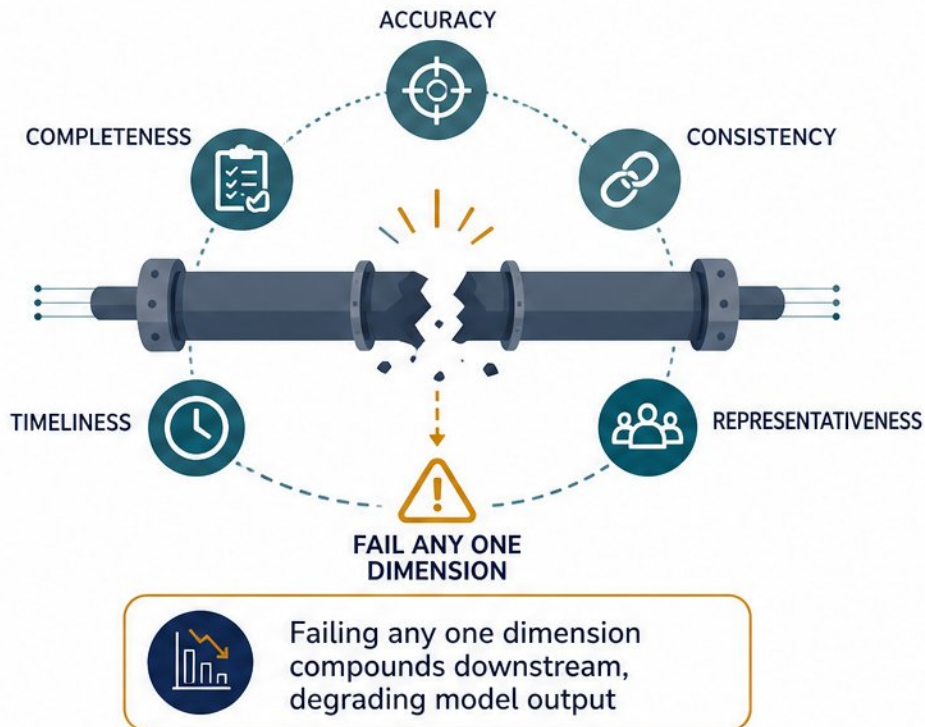


PRESCRIPTIVE

What is the best action?

Cross-Cutting Pattern: Data Quality Sets the Ceiling

FIVE DATA QUALY DIMENSIONS



DISTRIBUTION CASE TIMELINE



SIGNAL-TO-DECISION PIPELINE



- Five failure dimensions: accuracy, completeness, consistency, timeliness, representativeness



- Failing any one dimension compounds downstream, degrading model output



- SPAR's SAP rollout: 32 months of paralysis, R1.6B lost revenue, R170M lawsuit



- Post-go-live data fixes cost five to ten times more than upstream repair

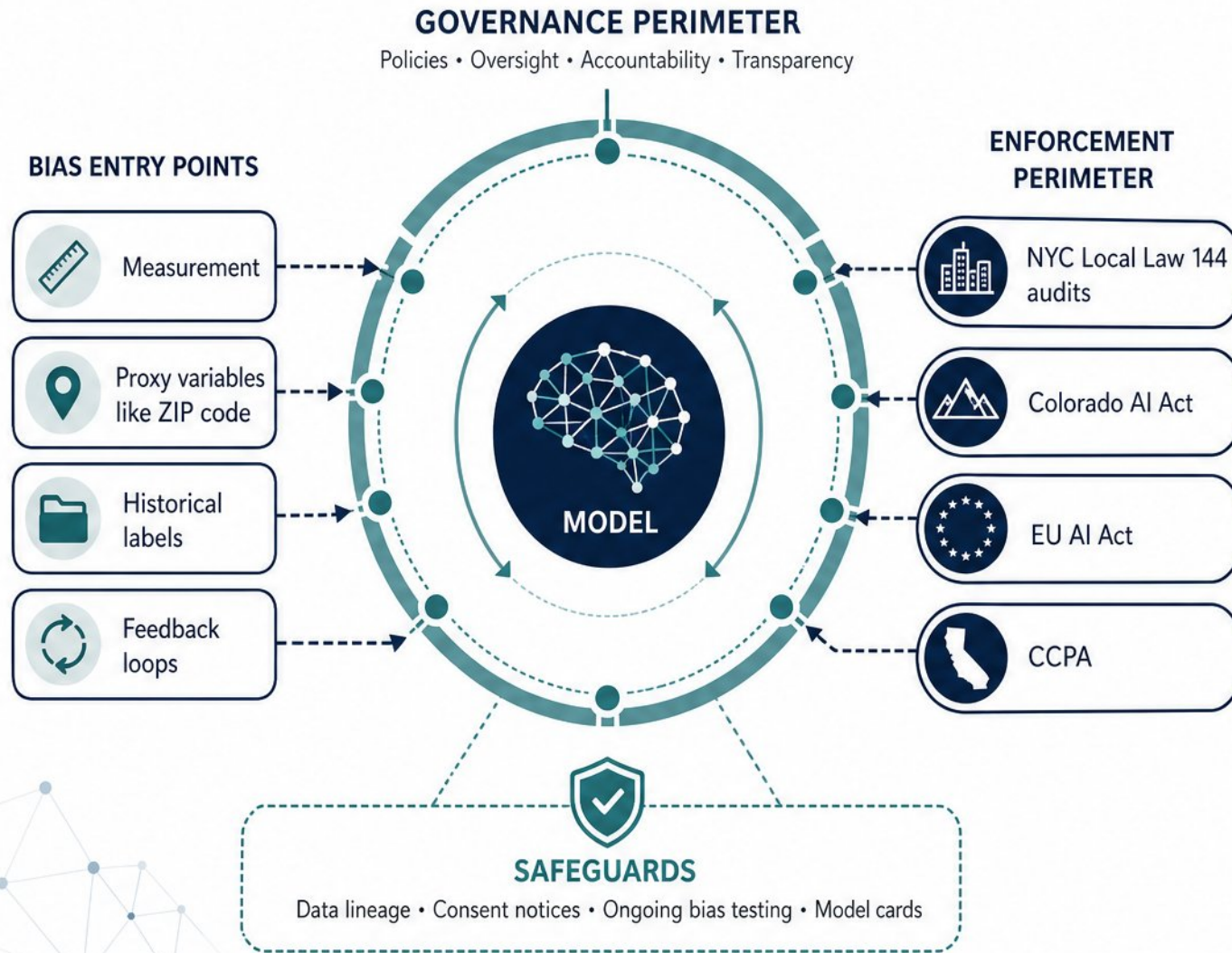


- Pilot-to-production trap: a \$400K pilot becomes a \$1.2M remediation, nine-month delay



- Communicate limits by naming the limitation, decision, and bounded workaround

Cross-Cutting Pitfall: Bias, Privacy, and Governance



- Bias sources: measurement, proxies like ZIP code, historical labels, feedback loops



- NIST SP 1270 groups bias as computational, systemic, and human



- Fairness tests: four-fifths rule, statistical parity, equal opportunity, calibration



- FTC August 2026 policy: undisclosed personalized pricing may violate Section 5



- Enforcement now: NYC LL 144 audits, Colorado AI Act, EU AI Act, CCPA



- Safeguards: data lineage, consent notices, ongoing bias testing, model cards

From Example to Action: Assessing Your Own Analytics Case



FIVE-PART CASE CARD FRAME



1 DECISION CONTEXT

What decision are we trying to improve?



2 ANALYTICS APPROACH

What data, method, and assumptions will we use?



3 EXPECTED INSIGHT

What will the analysis reveal or predict?



4 DECISION IMPACT

How will this change the decision and create value?



5 ADOPTION PLAN

Who needs to act, and how will we drive adoption?

PRE-IMPLEMENTATION CHECKLIST



- Apply the five-part template and two lenses to one initiative you sponsor



- Pre-build checklist: real decision, quantified impact, adoption, simpler rule



- Benefit claims need a baseline, counterfactual, and independent validation



- Tailor the message: executives value and risk, technical teams method and assumptions



- Answer objections (“not accurate enough,” “too messy”) with evidence, not opinion

EVIDENCE STANDARDS



Baseline

Define the current state clearly.



Counterfactual

Estimate what would happen without the analytics.



Independent Validation

Use objective, third-party, or held-out evidence to validate.



Transparent Assumptions

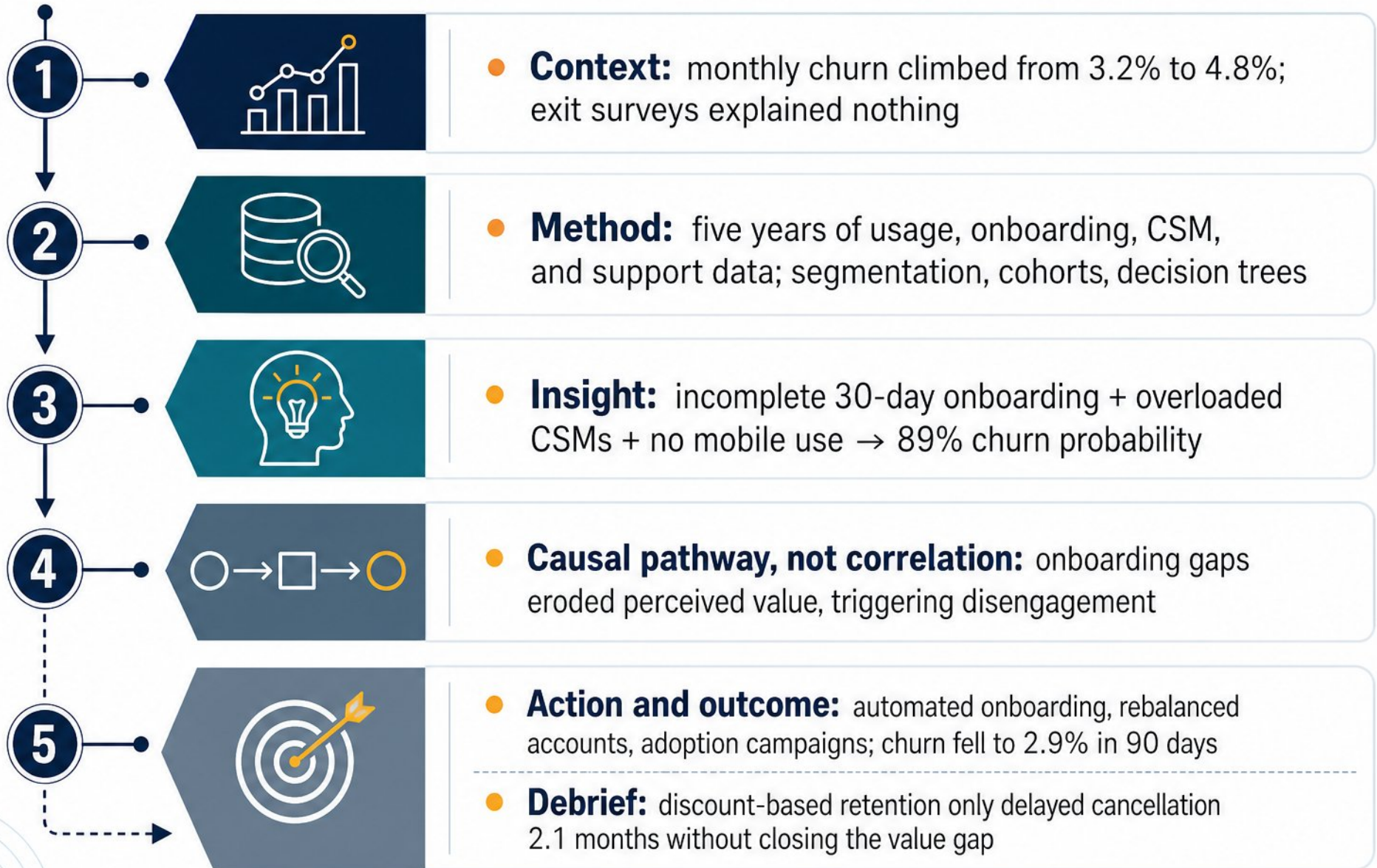
State key assumptions and limitations plainly.



Reproducible Logic

Ensure the method can be reviewed and replicated.

Case Study Deep Dive: One Churn Program, Start to Finish



Case Study Deep Dive: A Credit Engine That Had to Be Explainable



Starting point: 21% of credit capital exposed; reviews capped at 1,100 per month



Design choice: four customer segments, separate models, governed lakehouse, versioned recommendations



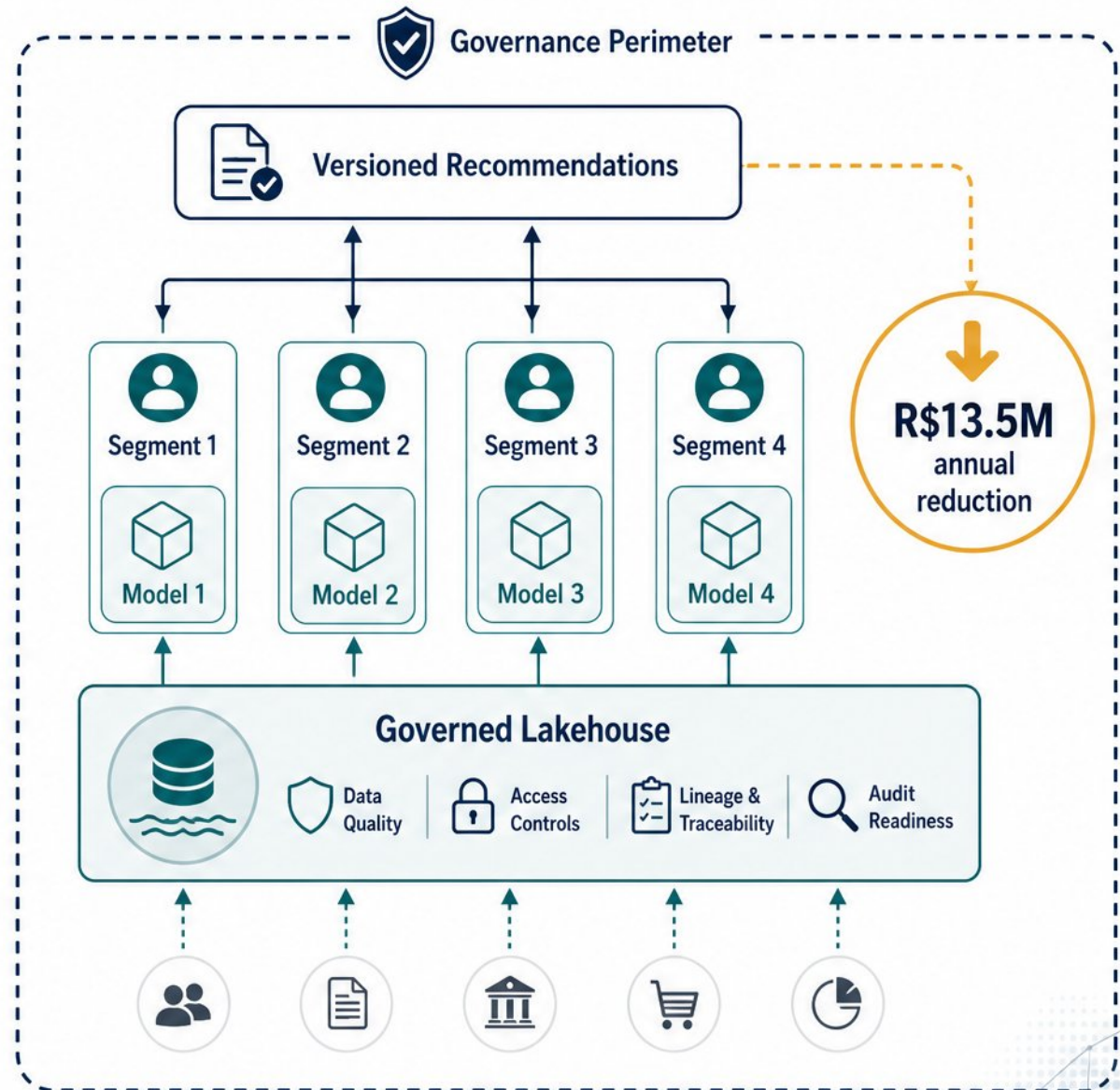
Result: exposure down to 19%, R\$13.5M annual reduction, 100% monthly re-evaluation



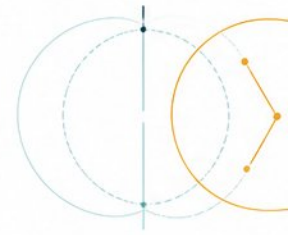
Governance dividend: explainable outputs justified every approval and rejection



Parallel lender lesson: 25x faster processing only mattered with classification quality and auditability



Workshop: Compare, Critique, and Decide



- Teams pick one case: name the pattern, strength, and pitfall



- Score it against the rubric; flag missing evidence, don't assume failure



- Three rounds of 25 minutes, then a two-minute compare-and-decide



- Defend each score with case evidence during peer critique and debrief



- 30-day plan: re-score one case, run one data quality check, raise one governance question

THREE ROUNDS OF WORK



ROUND 1
Explore and analyze



ROUND 2
Challenge and critique



ROUND 3
Refine and defend

COMPARE-AND-DECIDE



Two-minute
compare-and-decide

RUBRIC SCORING AREA



STRENGTH



SPLIT LENS: STRENGTH VS. PITFALL

PITFALL



30-DAY PLAN: PERSONAL ACTIONS



Re-score
one case



Run one
data quality
check



Raise one
governance
question

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