Digital Transformations in Marketing

A Model Framework for Improving the Effectiveness of a YouTube Channel's Content Strategy

Oleksandr Nikitenko, Lidiya Guryanova, Marianna Oliskevych,
Larysa Tiesheva, Roman Nesterenko

V. N. Karazin Kharkiv National University
Simon Kuznets Kharkiv National University of Economics
Ivan Franko National University of Lviv

Research problem and objective

The management problem

Views measure reach. They do not establish qualified demand or commercial value.

Each video also adds to a library that can generate views in later periods.

The research objective

Select a monthly mix of long videos and Shorts that balances model lead generation and downside risk.

Compare fixed portfolios under the same budget and shared uncertain conditions.

Source: article, Sections 1–3

Empirical data and bootstrap calibration

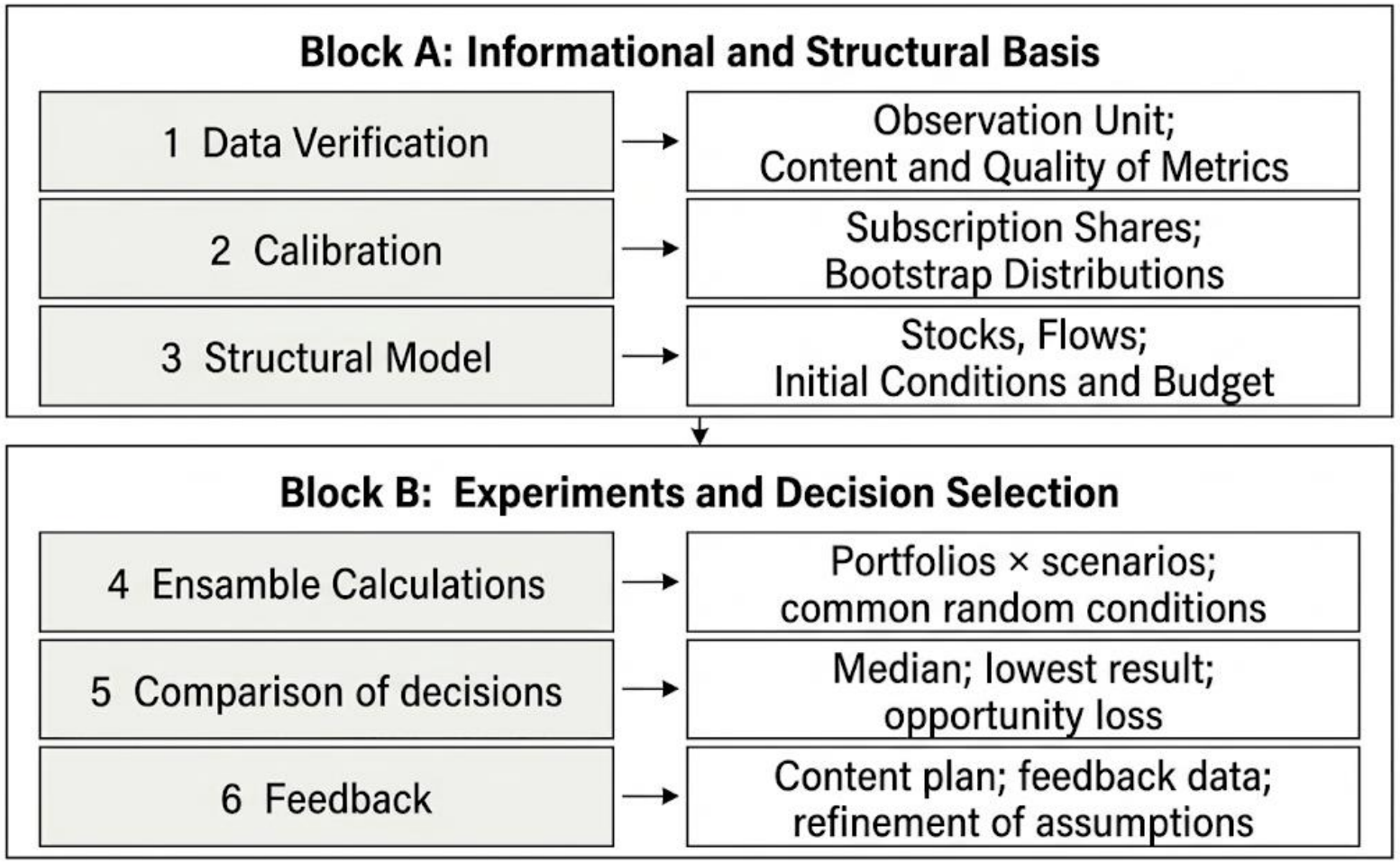
Metric	Long videos	Shorts
Video observations	27	41
Total views	9,381,555	87,504,503
Total subscriptions	37,134	166,470
Subscriptions / views	0.3958%	0.1902%
95% bootstrap interval	0.3642–0.4418%	0.1257–0.2638%
Median relative retention	35.90%	75.27%
Revenue / 1,000 views	USD 2.098	USD 0.042
Top 3 videos' share of views	52.70%	34.66%

20,000 resamples at the video level, separately by format.

Consumer channel data describe platform behavior. Industrial lead conversion remains an assumption.

Source: article, Section 3.1 and Table 1

The model framework



Two connected blocks

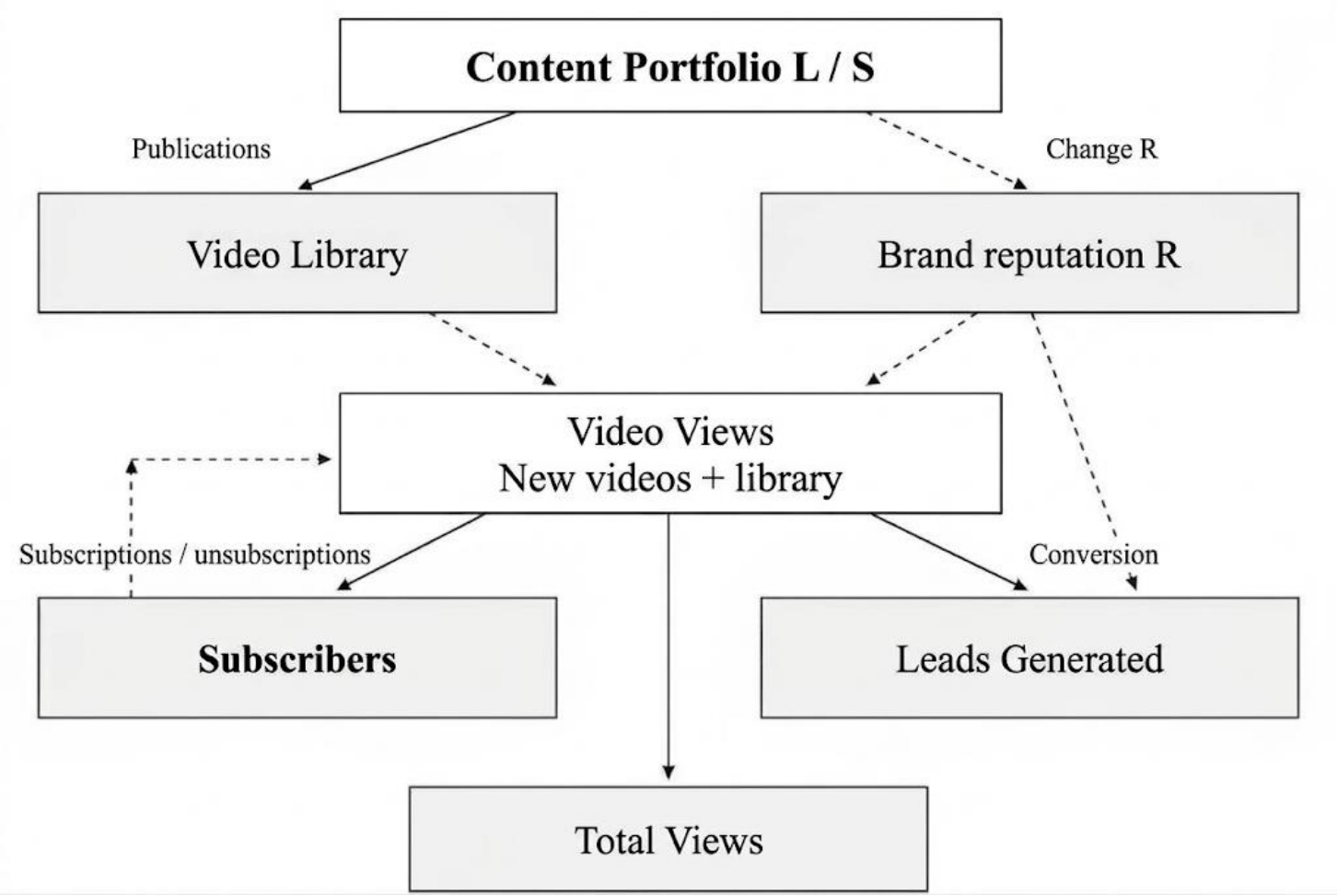
Data and structure establish parameters, uncertainty, and model assumptions.

Simulation and comparison identify candidate portfolios for a content plan.

New observations support recalibration.

Source: article, Section 3.2, Figure 1

System dynamics and cumulative effects



Six state variables

Two content libraries, subscribers, reputation, total views, and total leads.

Assumed lead coefficients

Long videos: 0.001
Shorts: 0.00001
Reputation modifies conversion.

Vensim structure, Python/NumPy simulation
Euler step: 0.125 months
Reputation constrained to [0, 1]

Source: article, Section 3.3, Figure 3

Six portfolios under one resource constraint

Monthly notional budget: 50 units Long video: 10 units Short: 2 units

Portfolio L / S	0 / 25	1 / 20	2 / 15	3 / 10	4 / 5	5 / 0
Monthly cost	50	50	50	50	50	50

24

months per trajectory

10,000

trajectories per portfolio and scenario

300,000

trajectories across 6 portfolios and 5 scenarios

Paired experiments apply identical random conditions to all portfolios.

Source: article, Section 3.4

Baseline and four stress scenarios

Scenario	Experimental change	Duration
Baseline	No additional stress	24 months
Reach stress	Reach falls to 70%	Months 7–12
Conversion stress	Long-video lead conversion falls to 70%	24 months
Reputation stress	Half the growth rate, double the decline rate	24 months
Combined stress	All three disturbances together	As specified above

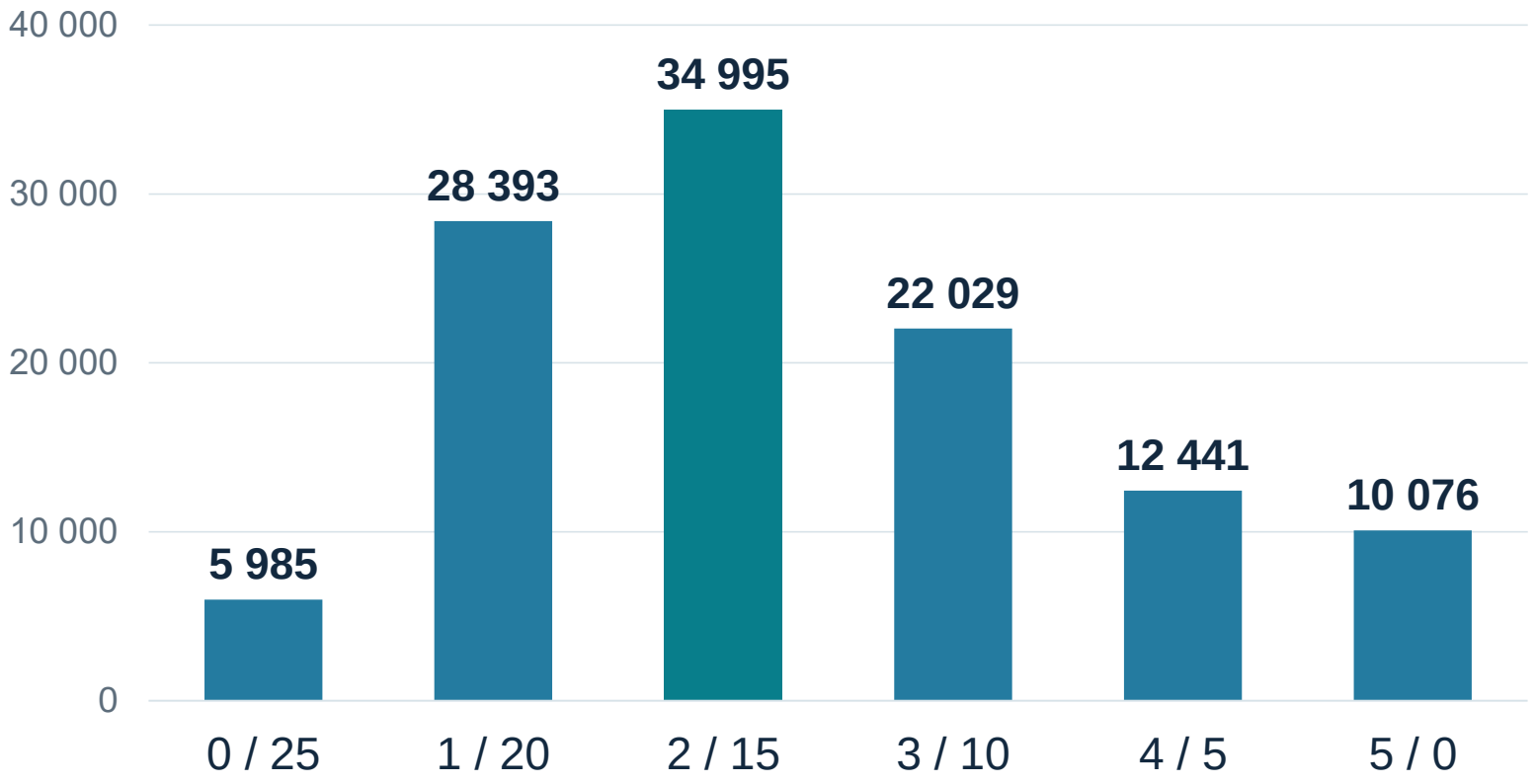
Scenario probabilities are unspecified.

The analysis compares vulnerability across scenarios without constructing a probability-weighted forecast.

Source: article, Section 3.4

2 / 15 maximizes baseline median leads

Median model leads over 24 months



L / S = long videos / Shorts per month

34,995

Highest baseline median
2 long + 15 Shorts per month

9,926–65,311

10th–90th percentile interval for the same portfolio

3 / 10 has the best baseline bottom-10% average: 7,996.

Source: article, Section 4.2, Table 2

Portfolio medians across stress scenarios

Median cumulative model leads over 24 months

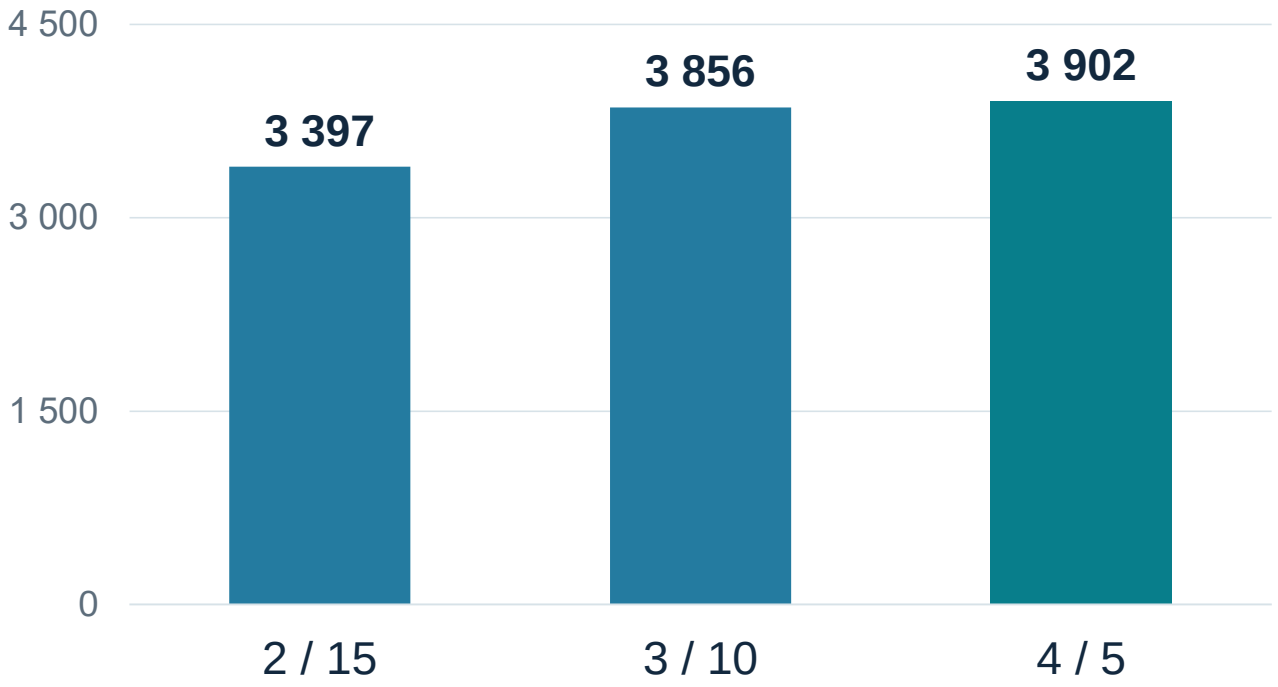
L / S	Baseline	Reach	Conversion	Reputation	Combined
0 / 25	5,985	5,020	5,985	5,088	4,226
1 / 20	28,393	21,951	21,132	23,630	13,374
2 / 15	**34,995**	**24,483**	**25,192**	**27,576**	**13,424**
3 / 10	22,029	13,500	15,652	15,184	7,195
4 / 5	12,441	10,329	8,767	10,091	5,956
5 / 0	10,076	8,810	7,053	8,423	5,175

2 / 15 retains the highest median in all five scenarios.

Source: article, Section 4.3, Table 3

The risk criterion changes the preferred portfolio

Worst-scenario average of the bottom 10%
Selected candidate comparison, model leads



Protecting the absolute downside

4 / 5 maximizes the smallest bottom-10% average across scenarios.

Its advantage over 3 / 10 is only 1.2%.

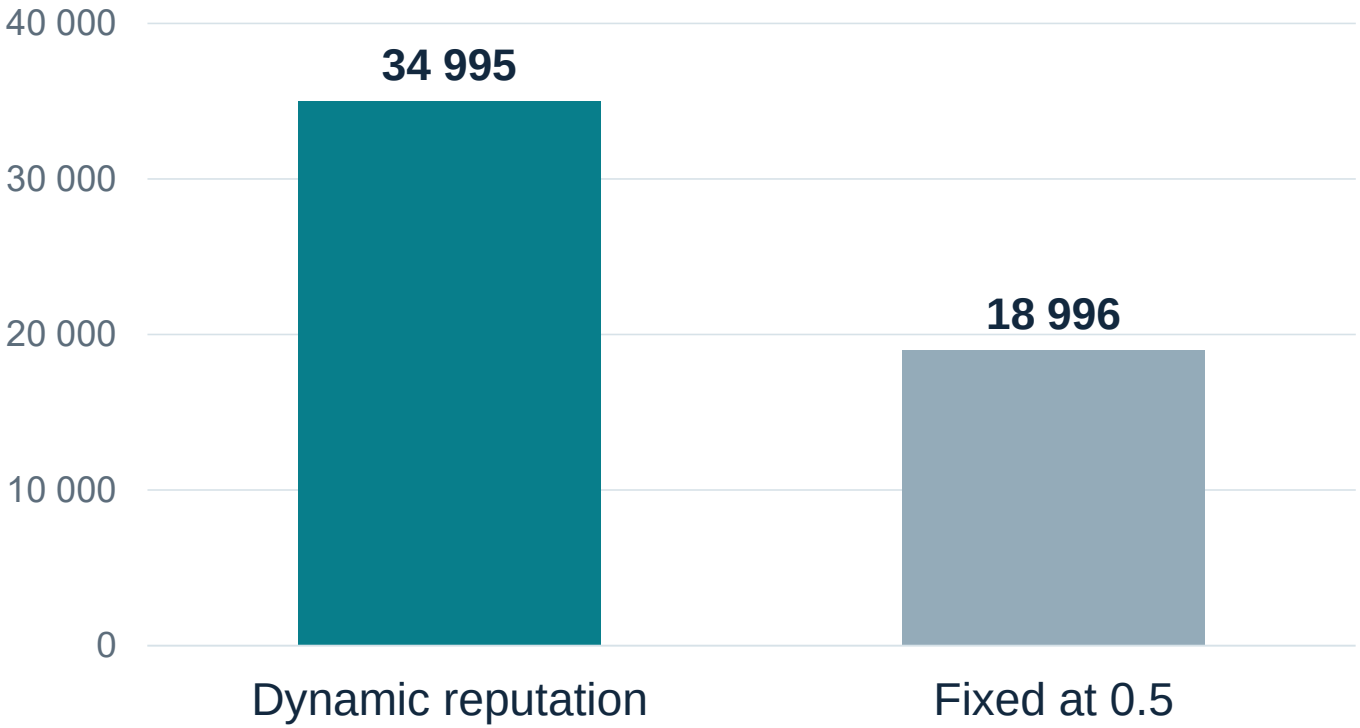
Staying close to the best outcome

2 / 15 minimizes worst-scenario mean relative regret: 0.104.

Source: article, Sections 3.4 and 4.3

Results depend strongly on the reputation mechanism

Baseline median model leads for 2 / 15



45.7%

lower median when reputation stays fixed at 0.5

Numerical checks

Half-step, deterministic 4 / 5: +0.61%
New seed, baseline 2 / 15: +0.53%

Numerical consistency does not establish empirical validity.

Source: article, Section 4.4

Qualification rates can change the business decision

Let q(u) be the share of model inquiries that meet the enterprise’s qualification requirements.

Decision criterion	2 / 15 is preferred to 4 / 5 when
Baseline median	q(2 / 15) / q(4 / 5) > 0.356
Robust lower-tail outcome	q(2 / 15) / q(4 / 5) > 1.149

The thresholds are analytical results of the simulation.

The study does not estimate actual qualification rates. The calculation assumes a constant positive rate for each portfolio.

Source: article, Section 4.5

Limits of the evidence

Transfer to industrial marketing

Subscription rates come from a consumer channel. The study does not observe industrial inquiries or sales.

Model assumptions

Notional costs, lead coefficients, and reputation dynamics require enterprise-specific validation.

Long-term accumulation

Library aging and nonlinear reach may alter the projected cumulative effect.

Restricted strategy space

Six fixed portfolios and five scenarios leave adaptive schedules and other shock intensities unexplored.

Source: article, Section 5

Application to an industrial enterprise

Define the outcome

Choose qualified leads, sales workload, or order volume as the management objective.

Use actual production costs

Measure filming, editing, and expert time, then rebuild the feasible portfolio grid.

Link content with CRM records

Record campaign ID, inquiry date, customer need, qualification status, and sales outcome.

Validate and recalibrate

Test reputation and library aging against new observations before scaling the content plan.

Source: article, Sections 4.5–6

Conclusions

2 long + 15 Shorts

Highest baseline median model leads: 34,995
Also preferred under the relative-regret criterion.

4 long + 5 Shorts

Best worst-scenario bottom-10% average: 3,902
3 long + 10 Shorts is a close alternative: 3,856.

Risk preferences determine the candidate portfolio.
Enterprise data must validate the commercial meaning of model leads.