THE AI-AHP DECISION AGENT: GUIDING WHERE B2B INNOVATION SHOULD GO NEXT

SCALING SMARTER MARKET ENTRY AND INVESTMENT DECISIONS ACROSS INDUSTRIES

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THE CHALLENGE FOR B2B COMPANIES

choosing the right market matters.

75%

product launches fail to meet their revenue targets

40%

revenue comes from new products or markets

0%

Without innovation, that number becomes

WHO WE SERVE

01 WHO THEY ARE

Technology-driven B2B companies, from startups to mid-sized firms, actively exploring new markets and use-cases.

02 WHAT THEY WANT

Identifying which new markets offer the highest payoff with the lowest risk.

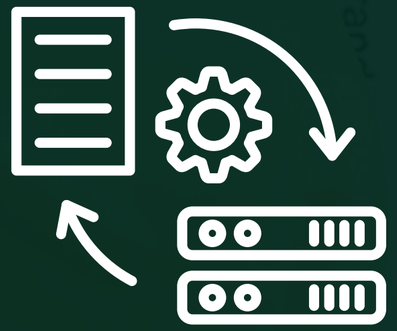
03 PAIN POINT

Months of market research often culminate in gut-feeling decisions or analysis paralysis when faced with multiple promising opportunities.

AN AI AGENT THAT DECIDES WHICH MARKET YOU SHOULD ENTER

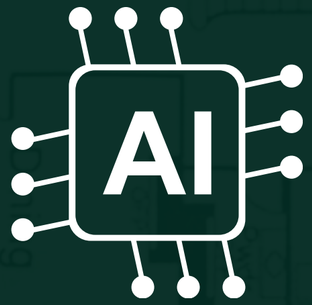
Objectively, Instantly, and Explainably

HOW IT WORKS



COMPANY INPUT

Key company information and expected direction



AI DATA SCANNING

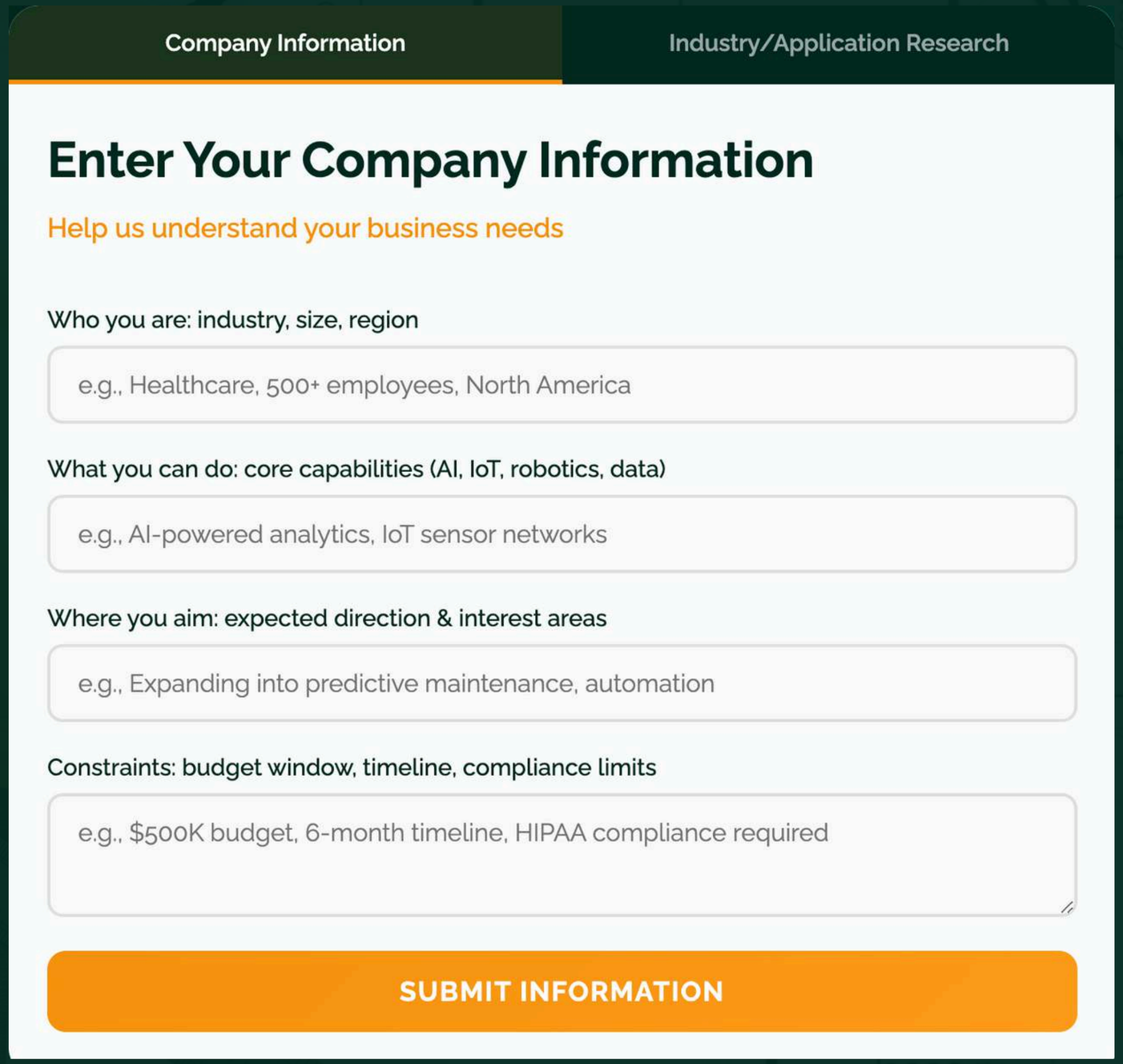
Collects news and market information from the past 1 year

AHP DECISION MODEL

Evaluates alternatives based on criteria and scores each option

AI SCALING REPORT & DECISION OUTPUT

Generates visual dashboard + market entry recommendation



STEP 1: COMPANY INPUT

These inputs let the system tailor its market research and recommend only the most relevant opportunities.

Link to the prototype

PROMPT

“Given the following company profile:
Industry: {industry}
Size / Region: {size_region}
Core Capabilities: {capabilities}
Strategic Interests: {direction_interests}
Constraints: {constraints}
Search across data from the past 12 months (news, funding, patents, research, and case studies) to identify the Top 5–7 B2B industries or applications most relevant and achievable for this company.
For each candidate, evaluate and summarize the following criteria:
Market Demand (adoption trend, growth rate, pain point severity)
ROI Potential (productivity gain %, cost savings %, payback period)
Implementation Cost (investment range, complexity, HR needs)
Technical Feasibility (data availability, model maturity, infra readiness)
Scalability & Adoption (cross-industry fit, partnership ecosystem)
Output a structured table with candidate names, quantitative or proxy scores (0–5 scale) for each criterion, and short evidence summaries or references.”

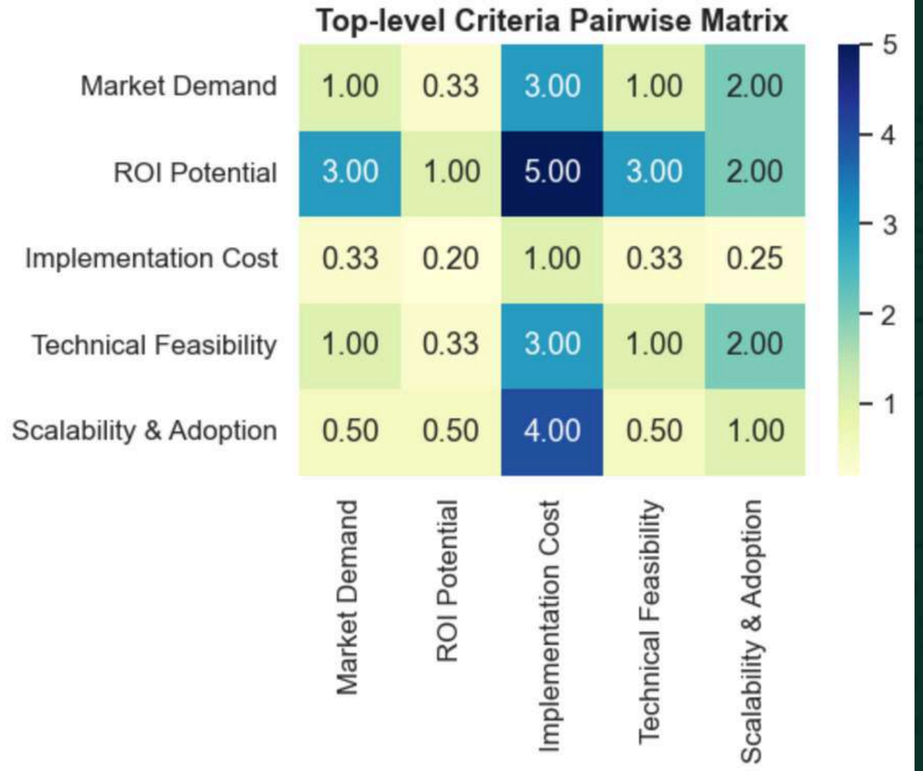
STEP2: DATA SCANNING

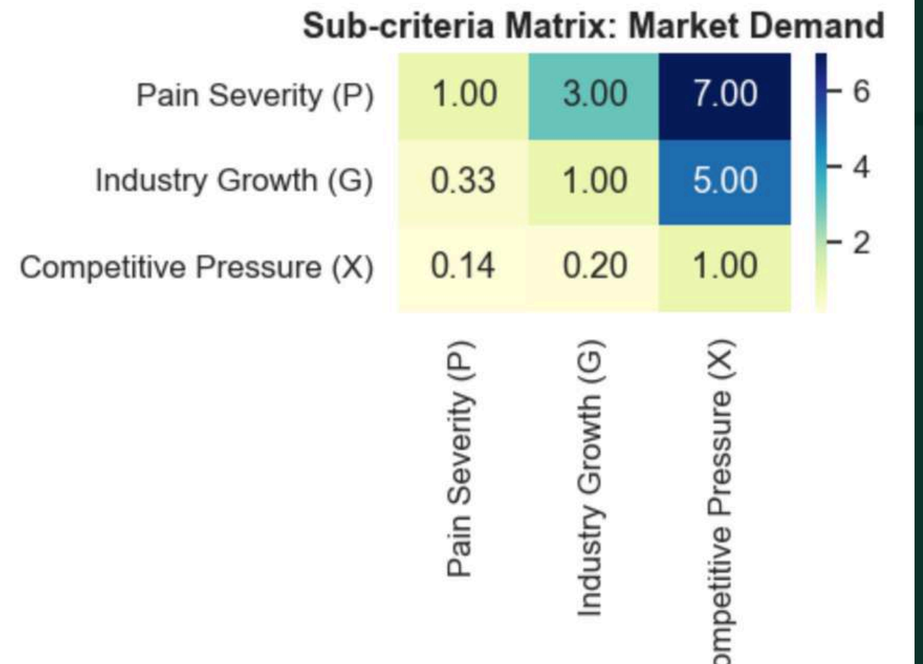
The AI Agent tailors its market search to each company’s profile — scanning **one year** of USA data to find the most promising and feasible opportunities based on that company’s unique strengths and constraints.

STEP 3: AHP SETUP (DECISION HIERARCHY)

Goal	Select the Best Market or Application to Enter				
Criteria	Market Demand	ROI Potential	Implementation Cost	Technical Feasibility	Scalability & Adoption
Sub-Criteria	Adoption trend (past 3–5 years)	Typical productivity gain	Investment range (USD)	Data availability	Cross-industry replicability
	Growth rate or proxy signals	Defect/downtime reduction (%)	Integration complexity (ERP/MES)	Model reliability	Organizational readiness
	Severity of customer pain points	Payback period (months)	HR/training demand	Infrastructure readiness	Partnership ecosystem
Alternatives	AI Quality Inspection（QI）	Predictive Maintenance	Energy Optimization（EO）	Adaptive Machining（AM）	Supply Chain Forecasting（SCF）

For the AI Agent case: The 5–7 industris or application identified by the Agent





STEP 3: AHP (PAIRWISE COMPARISON)

Top-level Criteria Weights

- ROI Potential = 0.41
- Technical Feasibility = 0.19
- Market Demand = 0.19
- Scalability & Adoption = 0.15
- Implementation Cost = 0.06
- Consistency Ratio = 0.048 (acceptable ≤ 0.10)

MODEL RESULTS (AHP GLOBAL RESULTS)

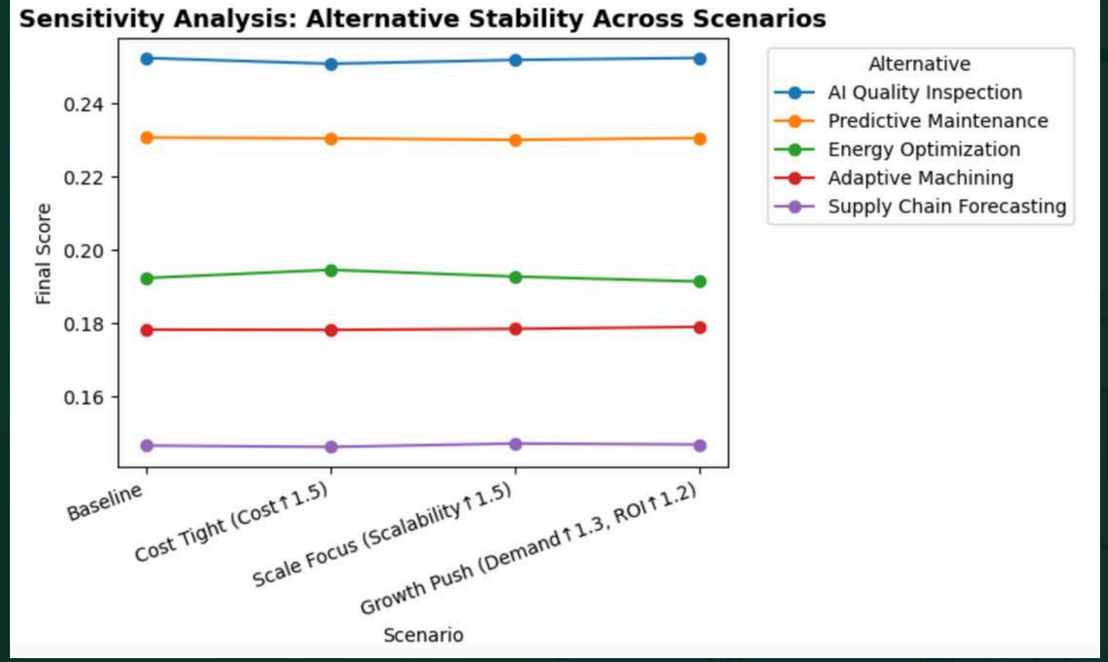
Supply Chain Forecasting
0.1466

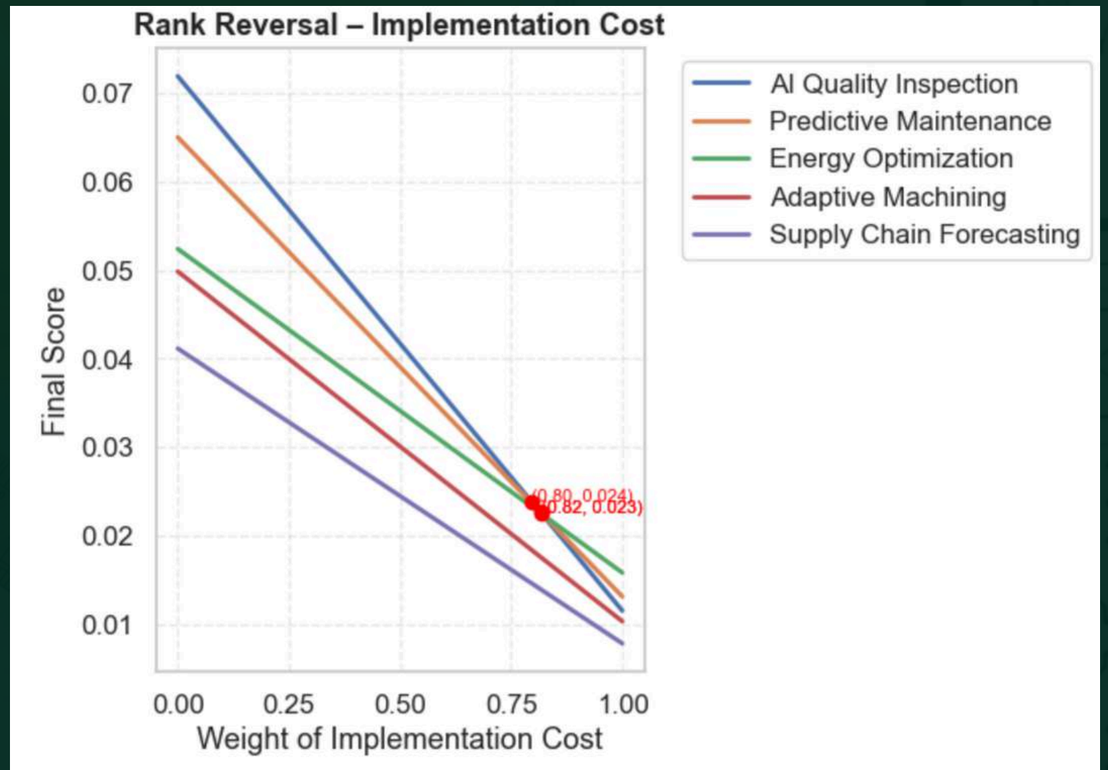
Adaptive Machining
0.1782

Energy Optimization
0.1923

Predictive Maintenance
0.2306

AI Quality Inspection
0.2523





STEP 3: AHP (SENSITIVITY VALIDATION)

Scenario-based Sensitivity

- Tested three what-if scenarios:
  - Cost Tight → Implementation Cost ×1.5
  - Scale Focus → Scalability ×1.5
  - Growth Push → Demand ×1.3, ROI ×1.2
- Across all scenarios, AI Quality Inspection remained #1
- Ranking stability = 100% consistent order
- Max Score Shift < 0.01 (≈ ±3%) → Results remain consistent under scenario changes

Monte Carlo (5000 simulations): AI Quality Inspection wins 4 592 times (> 95%)

AI-AHP Decision Engine Report

Market Entry Recommendation — Comprehensive Analysis

Generated on November 2, 2025

Top Recommendation: Computer Vision for Quality Inspection

AHP Global Score: 0.289 (Rank #1 of 5) | **Stability:** 87% winner retention

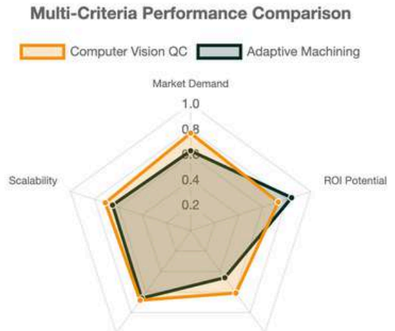
87%	10-13	28-35%	25%
CONFIDENCE LEVEL	MONTHS PAYBACK	EXPECTED IRR	PRODUCTIVITY LIFT

1) AI Data Scanning Results

Search Scope: 12-month analysis of news, funding, patents, partnerships, and enterprise case studies

Rank	Application	Adoption	ROI	Evidence	Score
1	Computer Vision QC	High Growth	High	58	0.289
2	Adaptive Machining	Moderate	Very High	27	0.256
3	Predictive Maintenance	Stable	Medium-High	42	0.224
4	Digital Twin	Moderate	Medium	33	0.137
5	Energy Optimization	Moderate	Low-Medium	22	0.094

3) Multi-Criteria Comparison



STEP4: AI SCALING REPORT & DECISION OUTPUT

Process:

After AHP ranking, the AI Agent uses APIs to collect latest market data and auto-builds reports for top alternatives.

Output:

- Top recommendation
- AHP scores with stability & rationale
- Financial snapshot & ROI model
- Pilot plan, readiness, and risk mitigation
- Geographic & next-step roadmap

STRATEGIC IMPACT

AI

-Collected real-time industry data
-Extracted key metrics
-Built automated research reports

AHP

-Structured decision logic into 5 weighted criteria
-Compared 5–7 AI use cases objectively
-Ensured model consistency (CR < 0.1)

SCALING

-Enables repeatable decision-making
-Adapts to any B2B or manufacturing context
-Achieves industry-scale decisions in one click

NEXT STEPS

1. Finalize Data Pipeline Integrate real-time feeds for each criterion
2. Pilot Test Run AHP engine with live inputs
3. Validation & Feedback Compare AI vs human judgments
4. Rollout Deploy as web tool for B2B strategy teams

THANK YOU

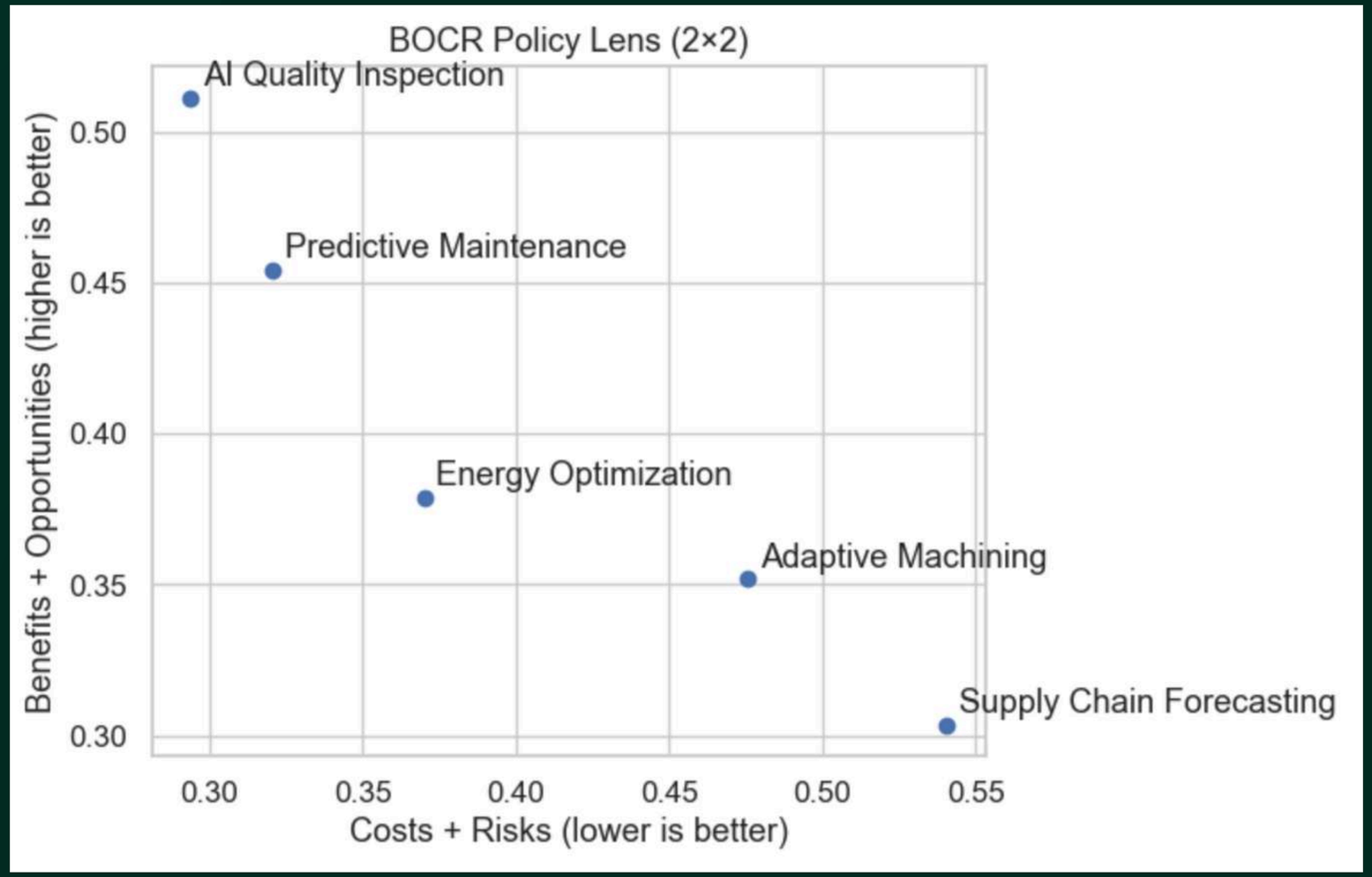
TEAM 11

APPENDIX

	Alternative	B	O	C	R
0	AI Quality Inspection	0.266064	0.245429	0.203482	0.089929
1	Predictive Maintenance	0.233214	0.221028	0.183089	0.137532
2	Energy Optimization	0.182298	0.196626	0.148259	0.221687
3	Adaptive Machining	0.173814	0.178035	0.217920	0.257513
4	Supply Chain Forecasting	0.144610	0.158882	0.247250	0.293339

BOCR Weighted Scores by Alternative

APPENDIX



BORC Policy Lens (2x2)

APPENDIX

	Market Demand	ROI Potential	Implementation Cost	Technical Feasibility	Scalability & Adoption	Total
AI Quality Inspection	0.0468	0.1058	0.0115	0.0516	0.0366	0.2523
Predictive Maintenance	0.0428	0.0958	0.0131	0.0458	0.0331	0.2306
Energy Optimization	0.0345	0.0768	0.0158	0.0355	0.0296	0.1923
Adaptive Machining	0.0370	0.0728	0.0103	0.0310	0.0271	0.1782
Supply Chain Forecasting	0.0291	0.0601	0.0078	0.0264	0.0231	0.1466

```
# Scenarios
cost_tight   = rerank_with_scalars({"Implementation Cost":1.5})
scale_push   = rerank_with_scalars({"Scalability & Adoption":1.5})
sales_push   = rerank_with_scalars({"Market Demand":1.3, "ROI Potential":1.2})

cost_tight, scale_push, sales_push
```

```
(                Alternative     Score
 0     AI Quality Inspection  0.250745
 1    Predictive Maintenance  0.230397
 2       Energy Optimization  0.194518
 3        Adaptive Machining  0.178128
 4  Supply Chain Forecasting  0.146212,
                  Alternative     Score
 0     AI Quality Inspection  0.251787
 1    Predictive Maintenance  0.229967
 2       Energy Optimization  0.192679
 3        Adaptive Machining  0.178426
 4  Supply Chain Forecasting  0.147141,
                  Alternative     Score
 0     AI Quality Inspection  0.252343
 1    Predictive Maintenance  0.230500
 2       Energy Optimization  0.191334
 3        Adaptive Machining  0.178950
 4  Supply Chain Forecasting  0.146874)
```

Global Scores of Alternative (Under different scenario)

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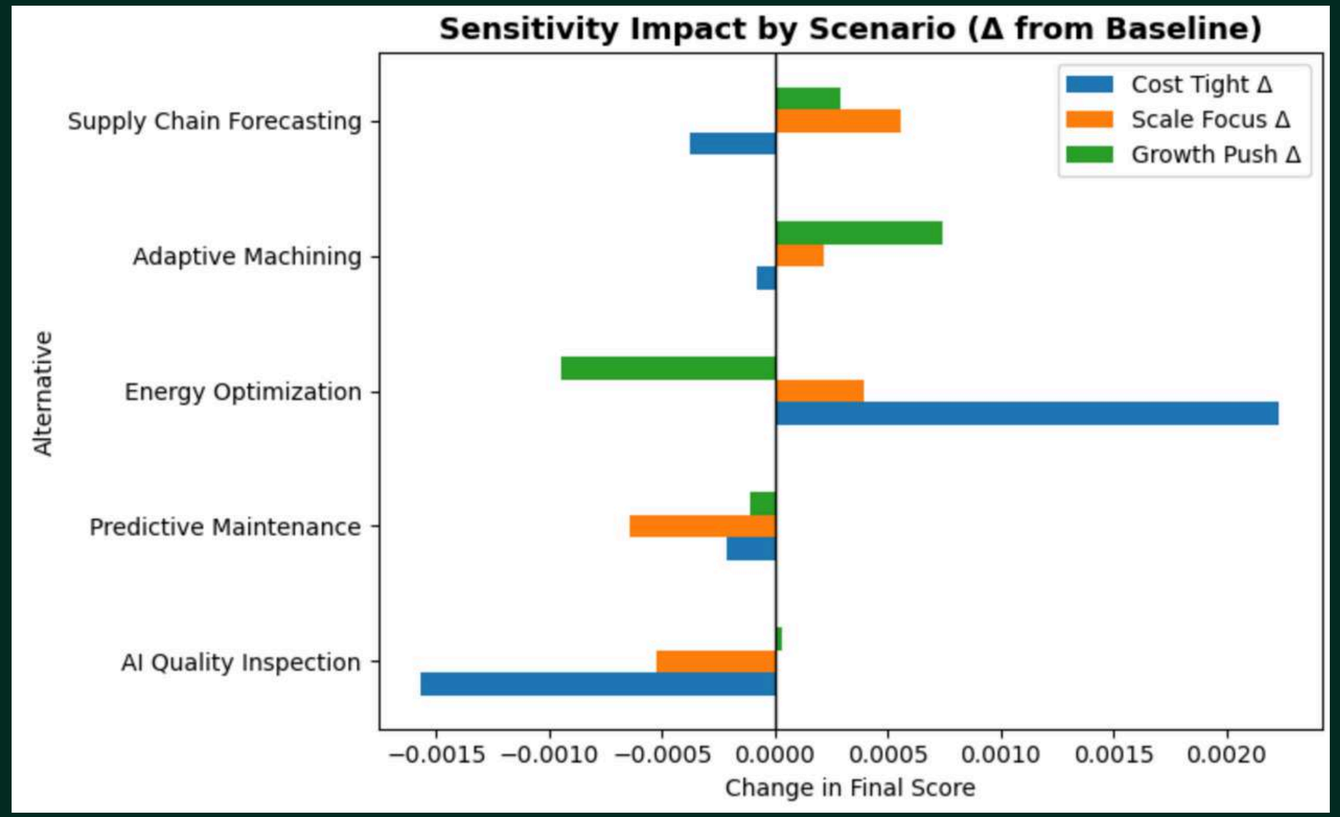

Sensitivity Impact by Scenario

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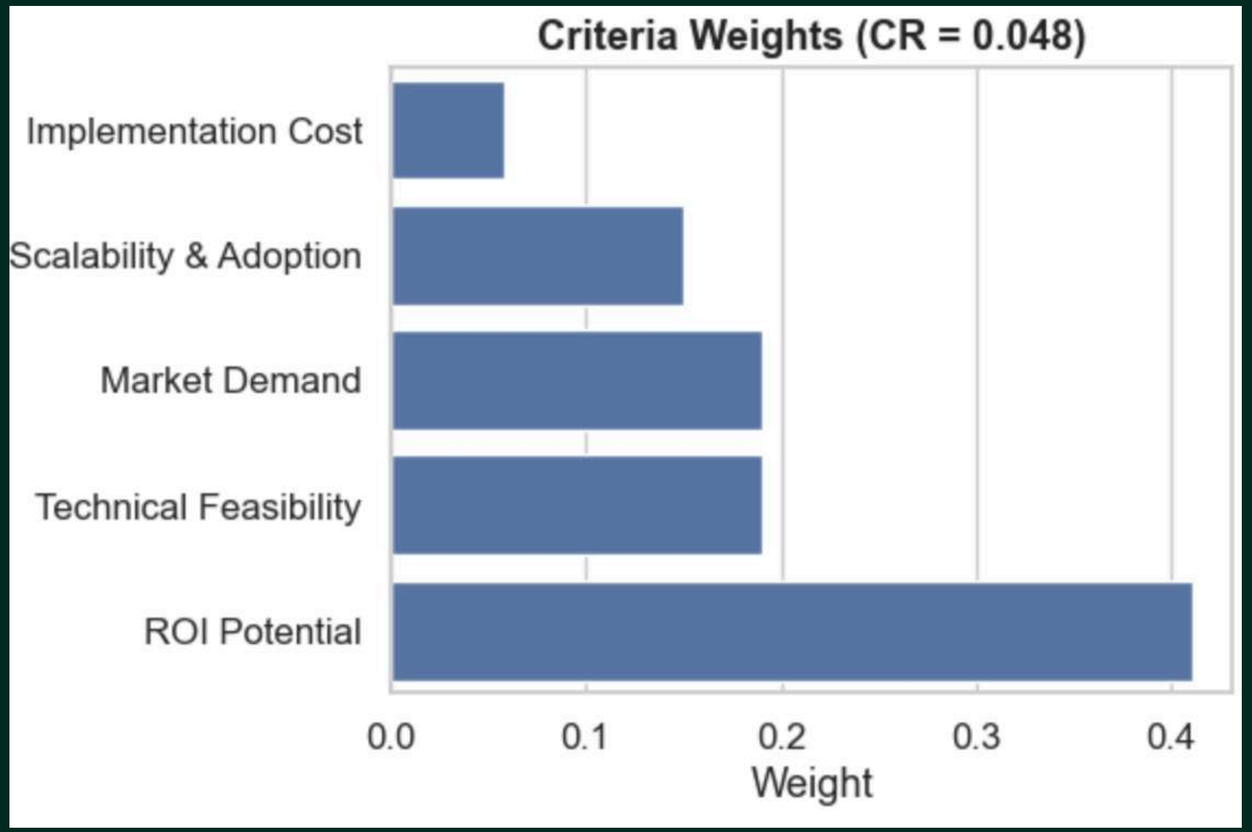

Criteria Weights (Bar Charts)

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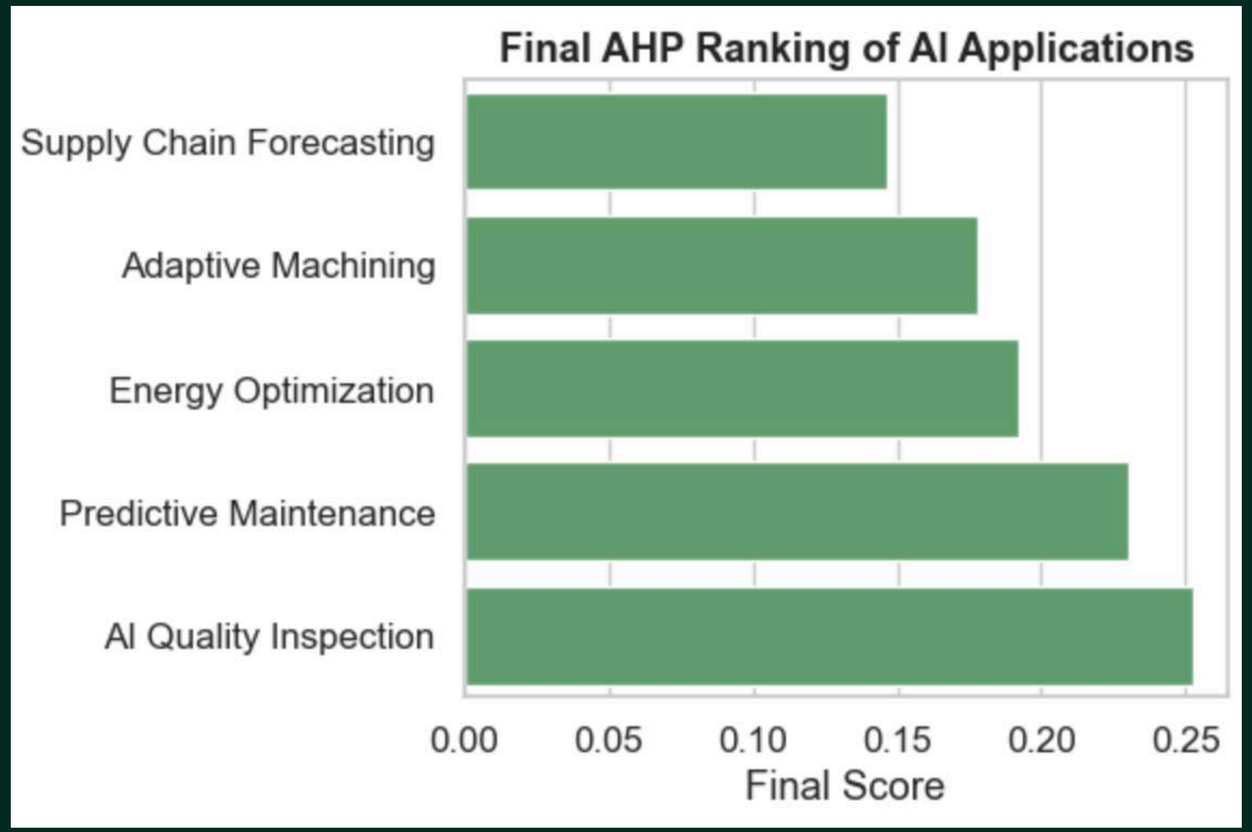

Final AHP Ranking of AI Applications

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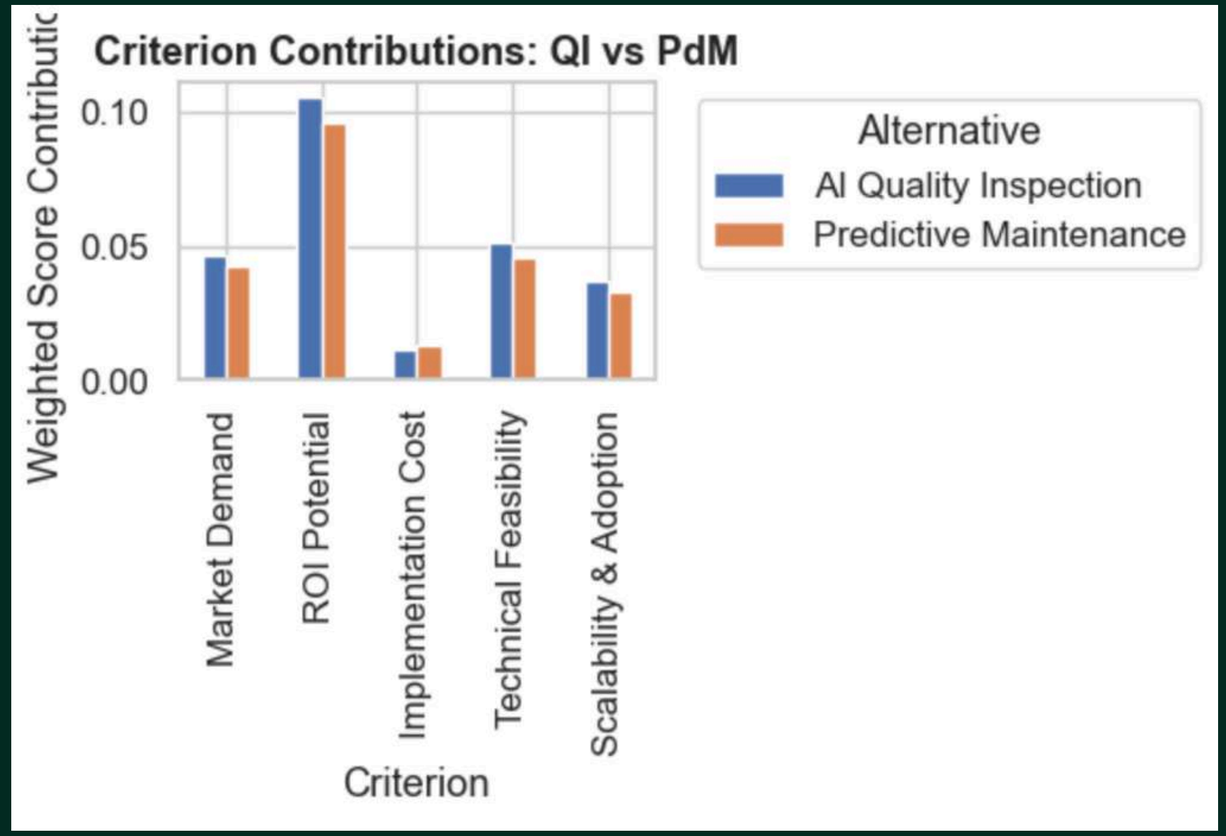

Criterion Contributions: QI vs PdM

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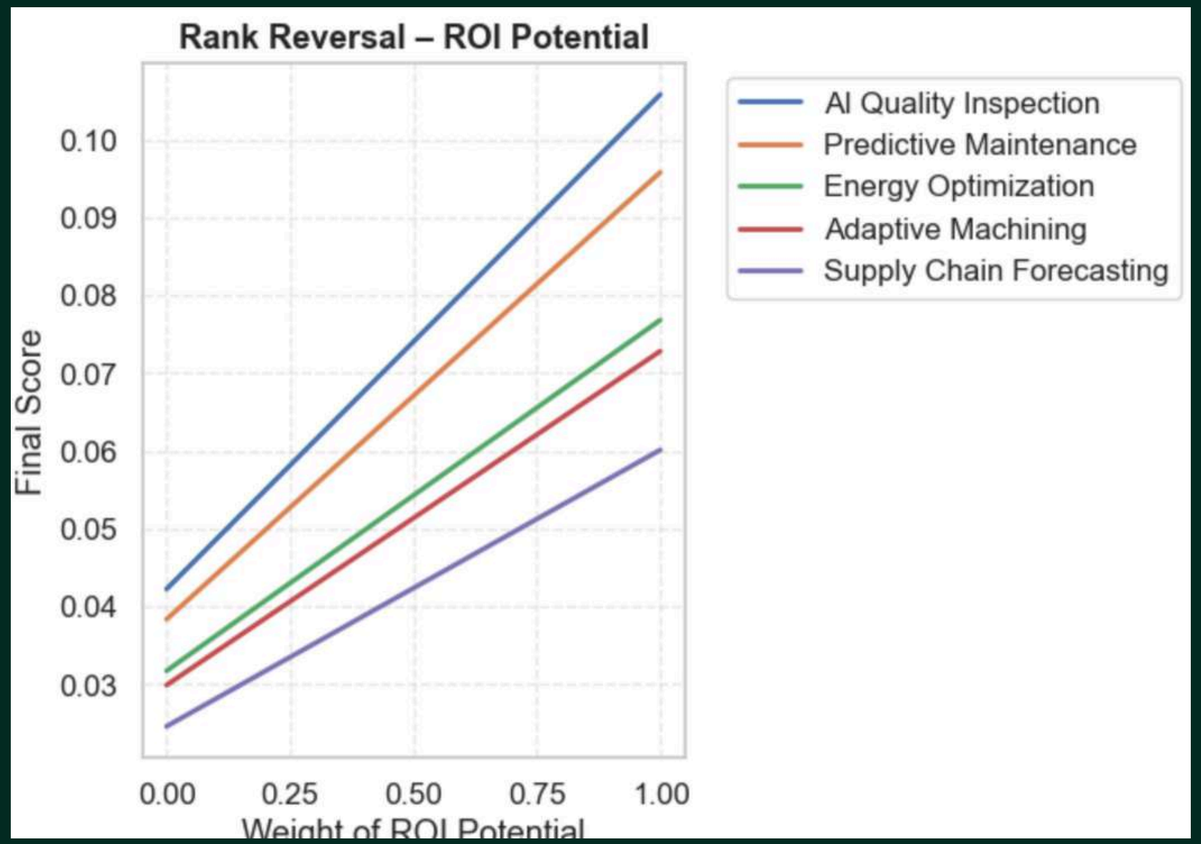

Rank Reversal - ROI Potential (Line Chart)

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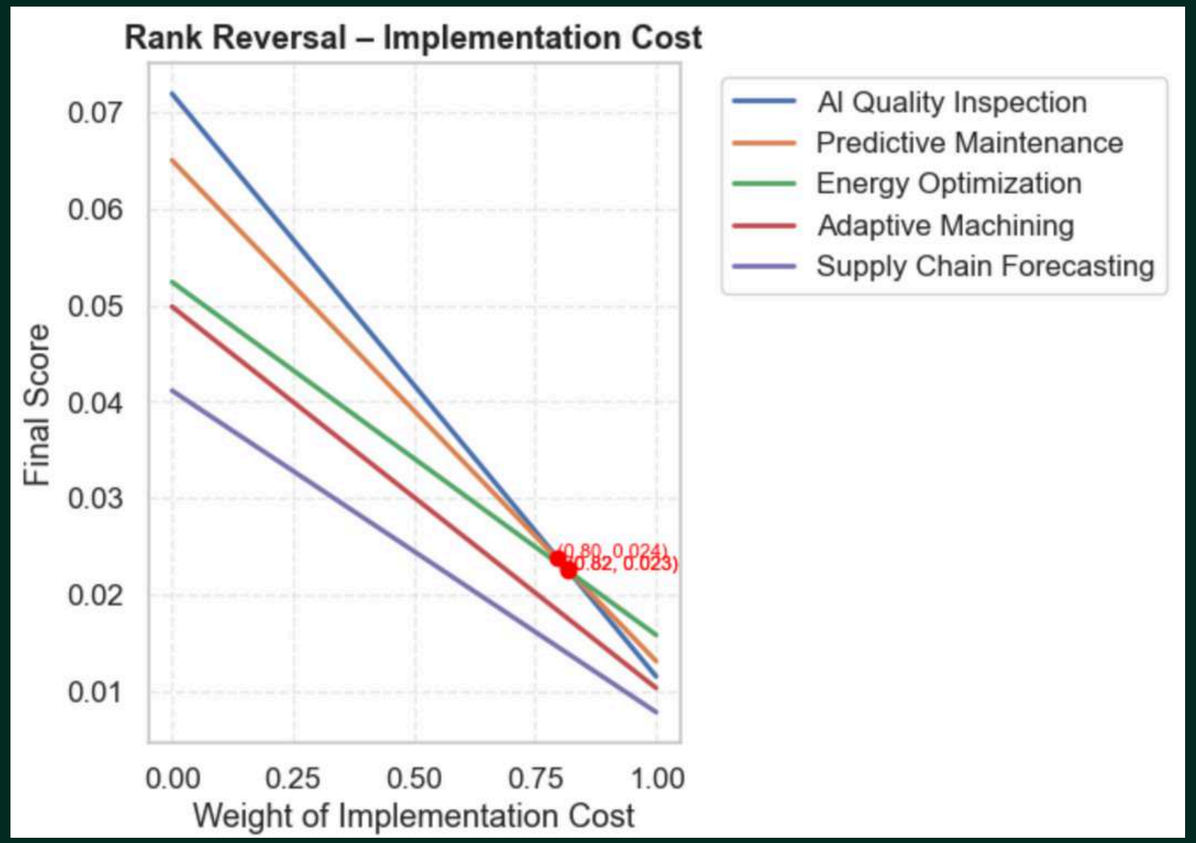

Rank Rversal - Implementation Cost (Line Chart)

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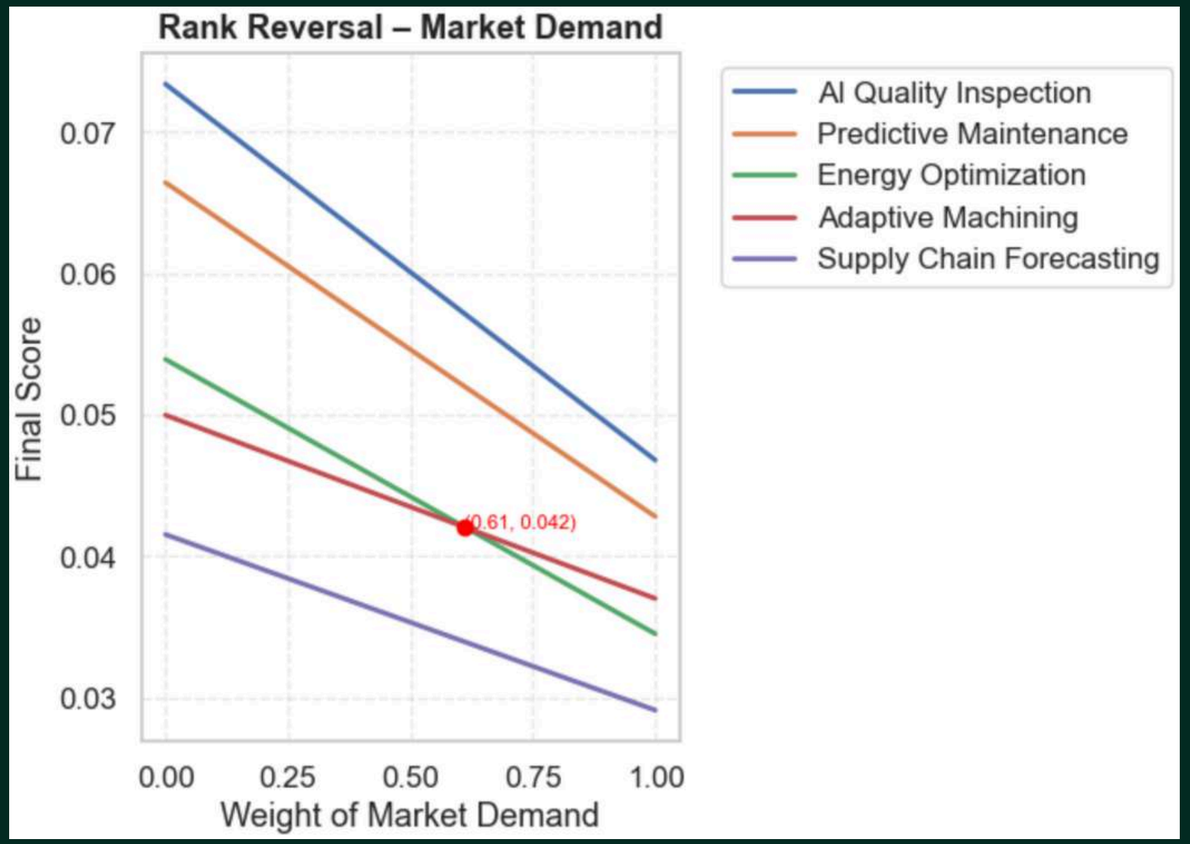

Rank Reversal - Market Demand (Line Chart)

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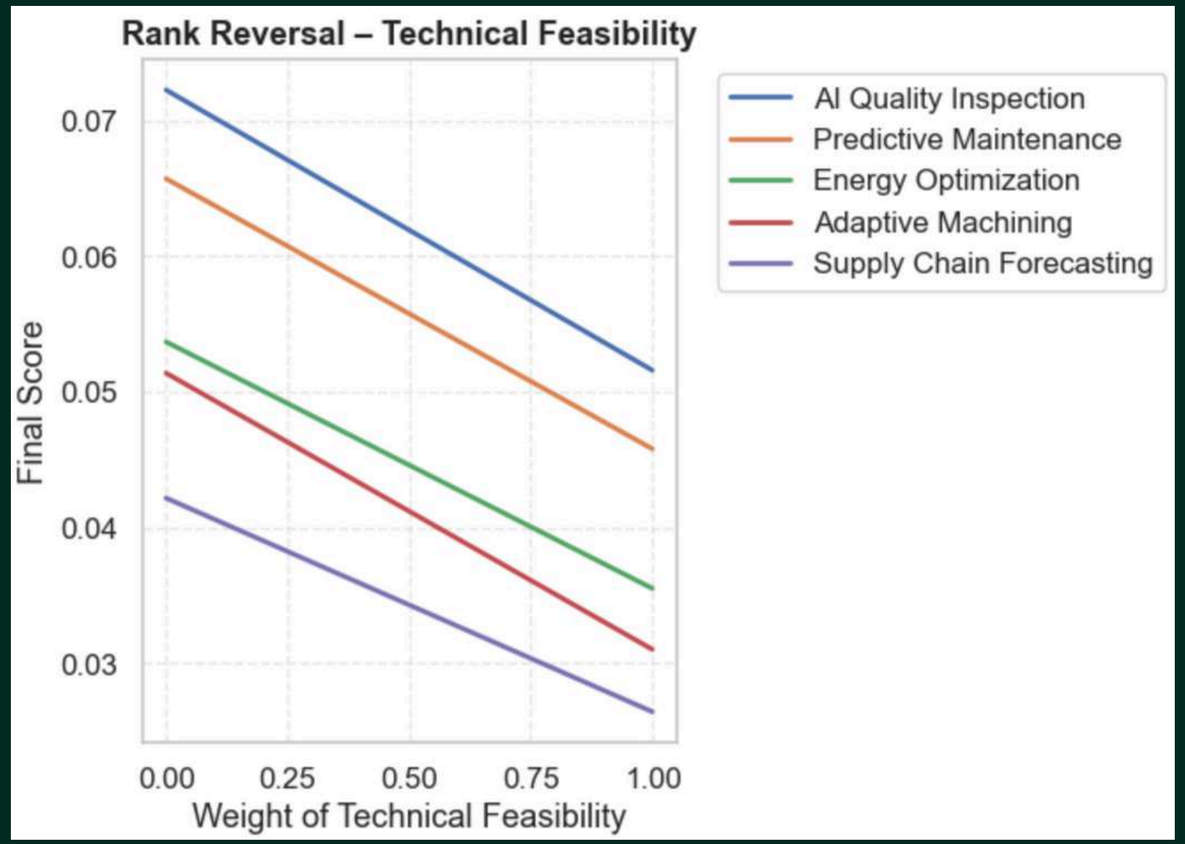

Rank Reversal - Technical Feasibility (Line Chart)

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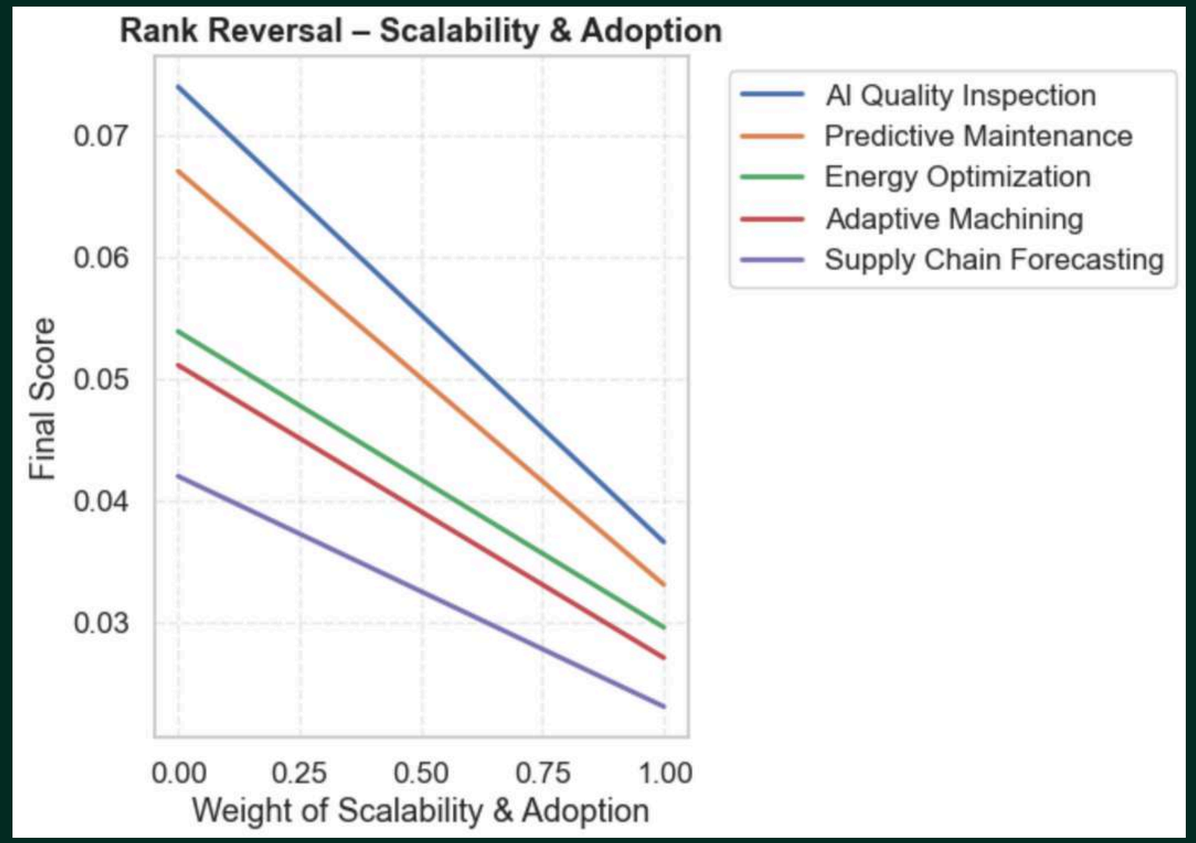

Rank Reversal - Scalability & Adoption (Line Chart)

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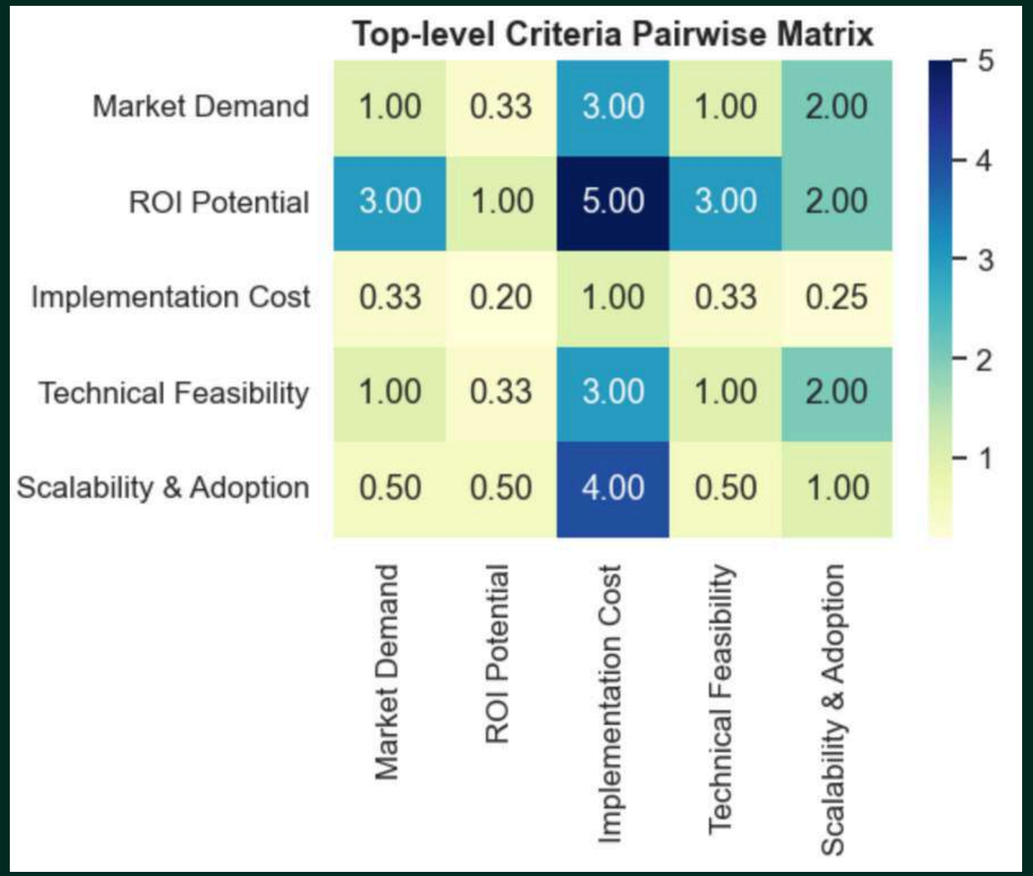

Top-Level Criteria Pairwise Matrix

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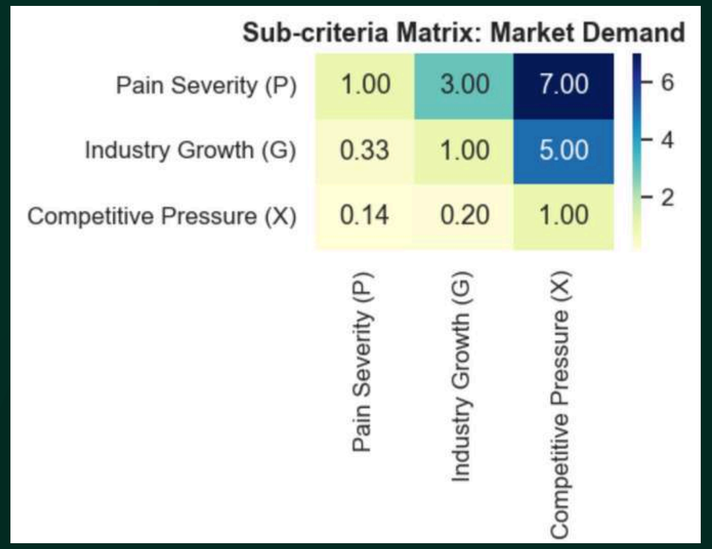

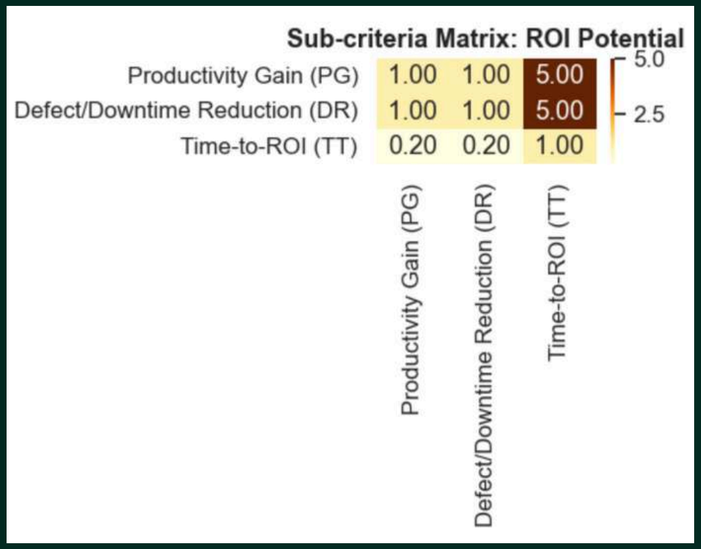

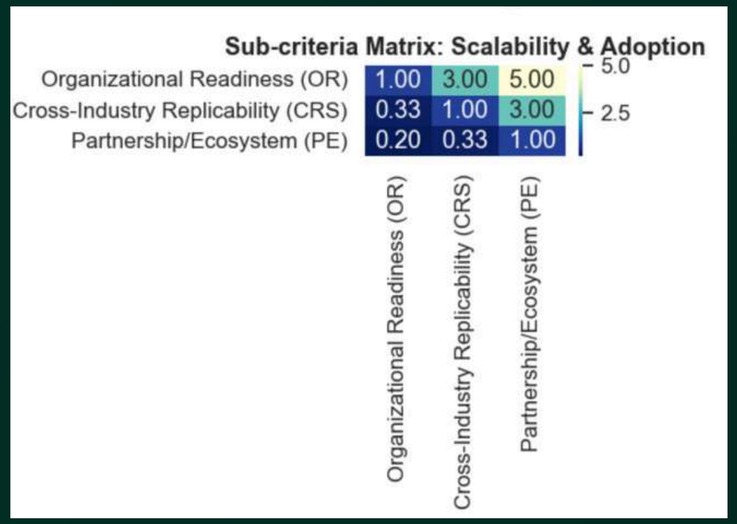

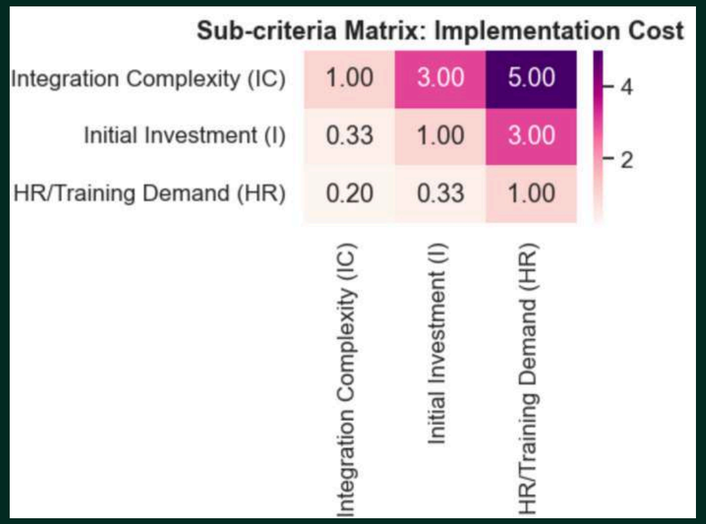

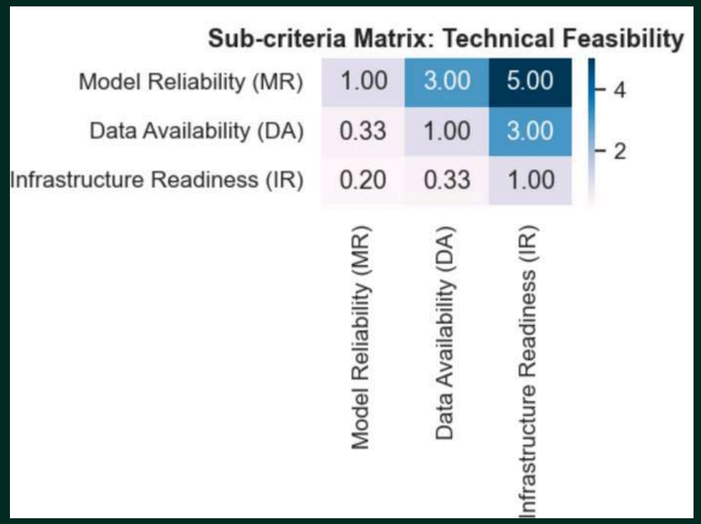

Sub-Criteria Matrix

APPENDIX

OTHER USE OF AI AGENT