



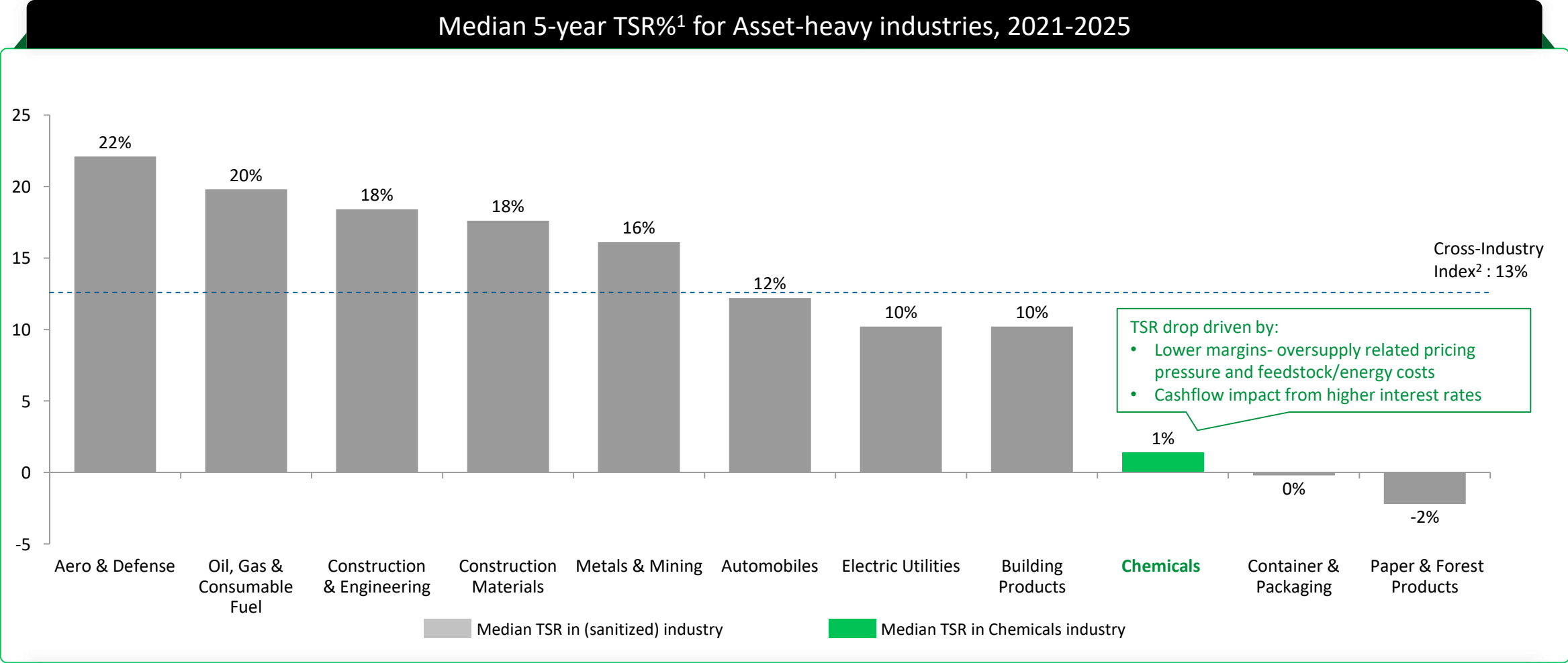
Executive
Perspectives

AI as the new performance divide

Chemicals, Petrochemicals

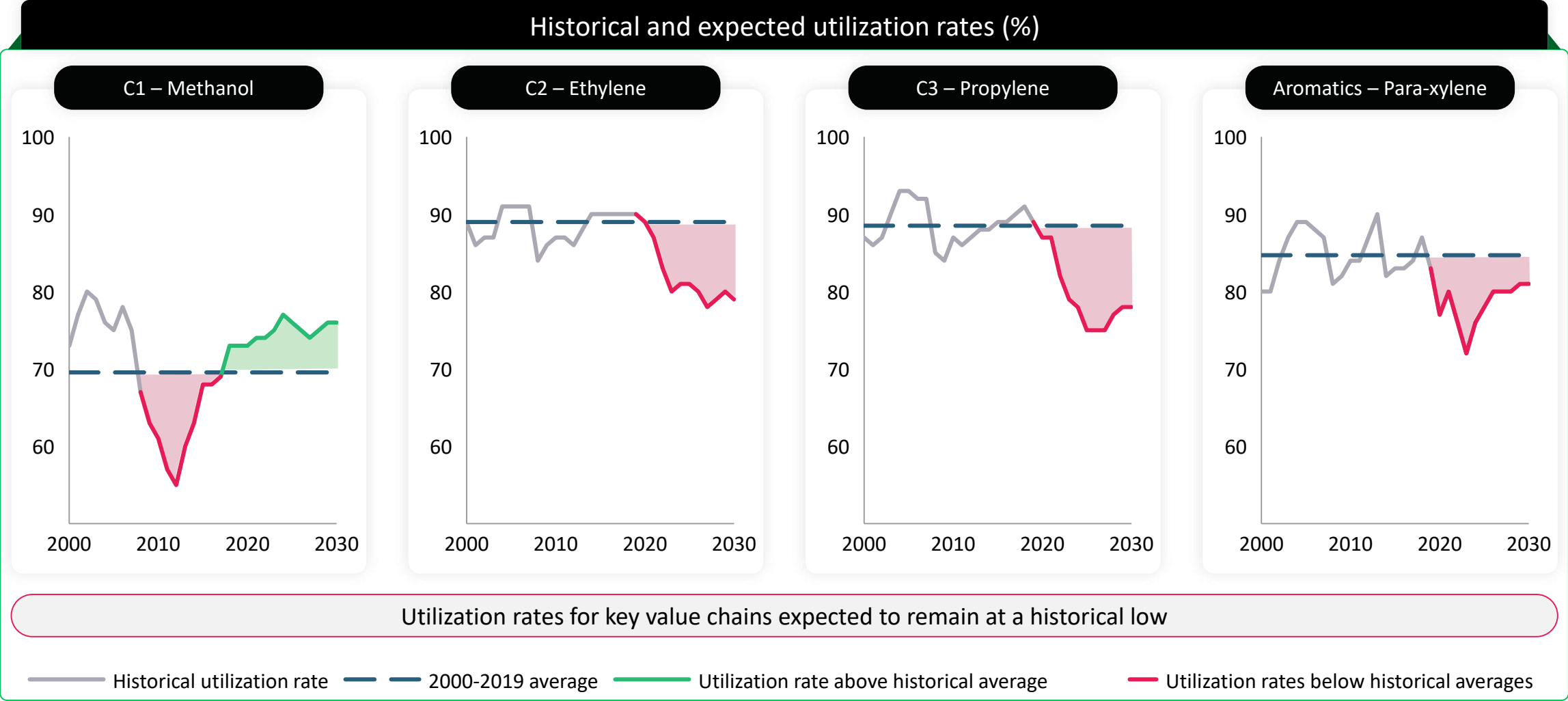
TNChE Asia, June 2026

Value creation in Chemicals lags peers, with shareholder returns falling to bottom quartile across asset-heavy industries



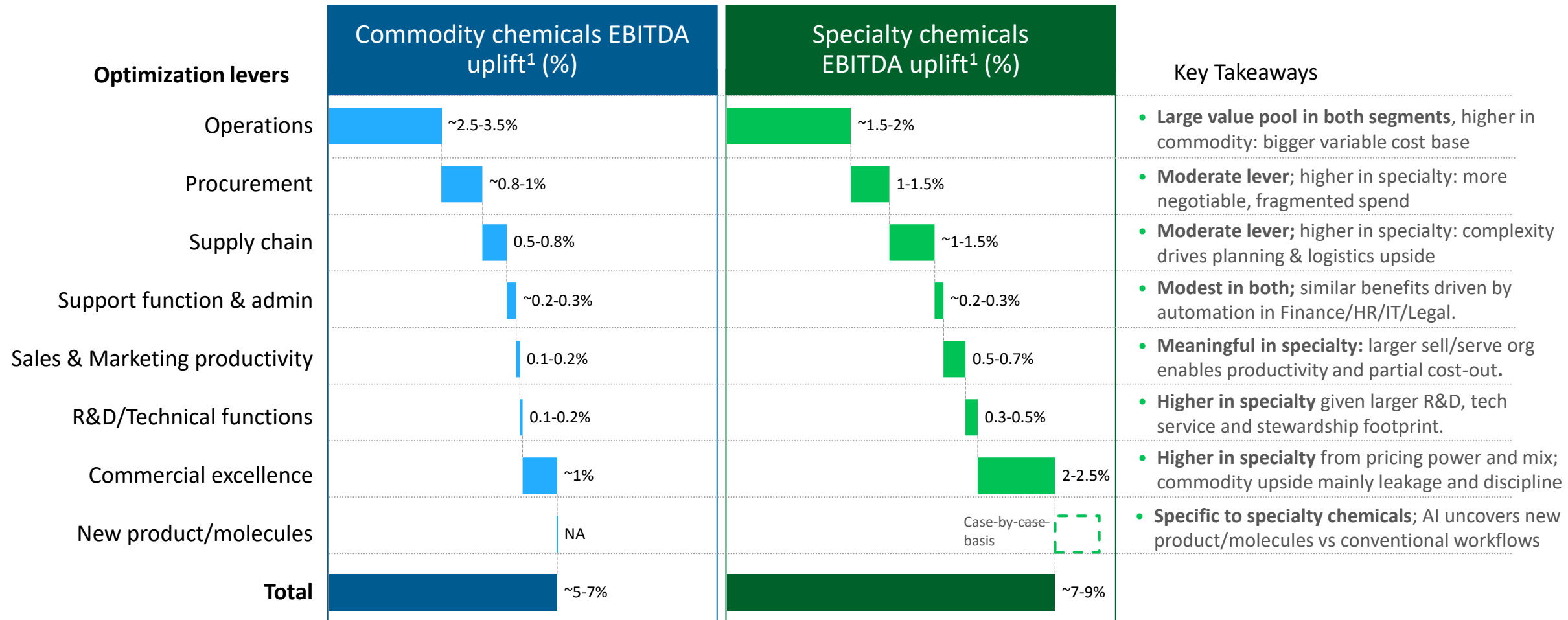
1. Total Shareholder Return; 2. MSCI Index: Tracks large and mid-cap stocks across 23 developed markets (DM) countries; Source: BCG analysis, S&P Cap IQ

Profitability outlook continues to look challenging, with key value chains expected to operate below historical rates



AI has potential to unlock +5 – 9% EBITDA uplift for chemical players

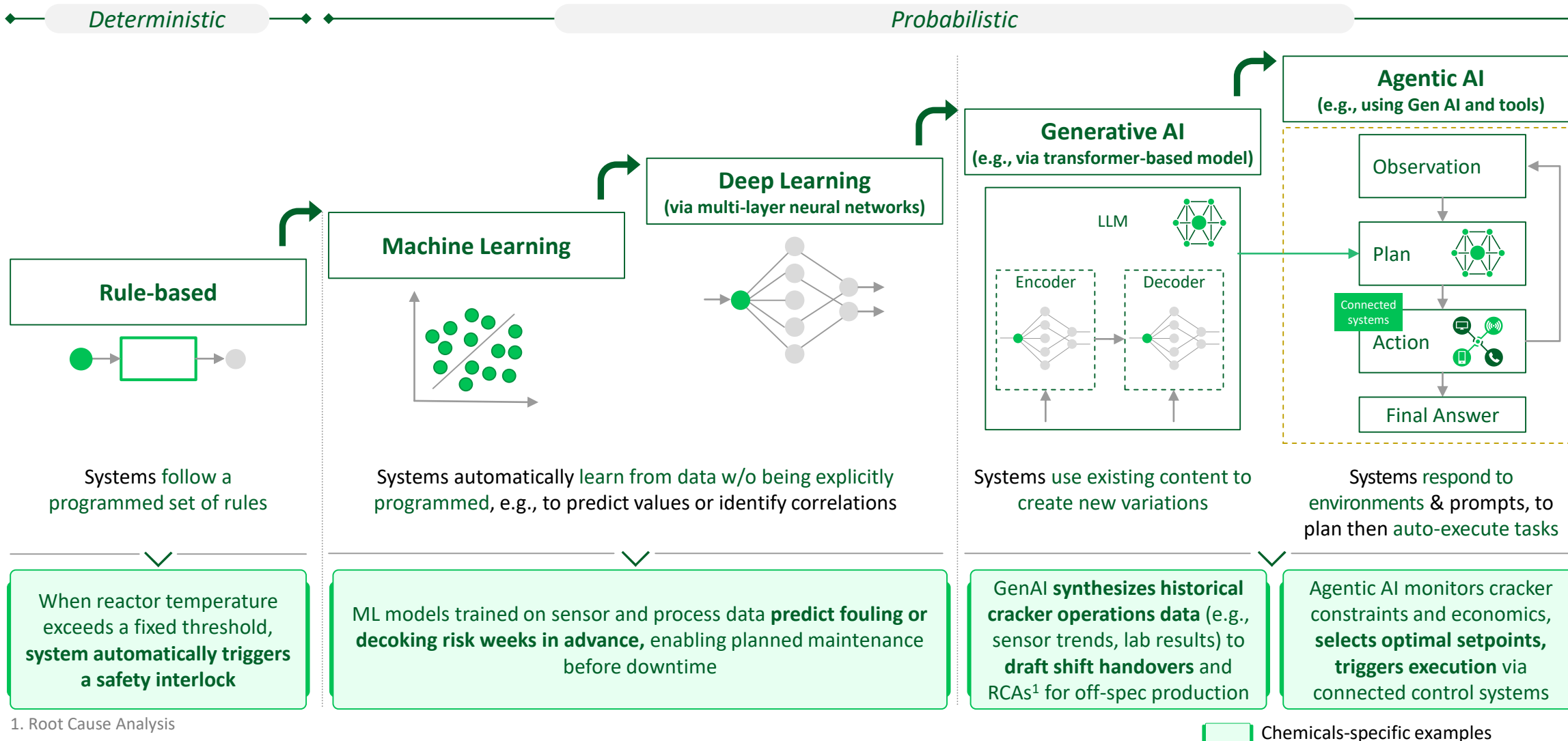
Expected EBITDA margin uplift (pp of revenue) from full potential AI transformation



1. BCG analysis; built assuming typical P&L split of a commodity and specialty chemicals company and associated AI driven improvement from BGC experience

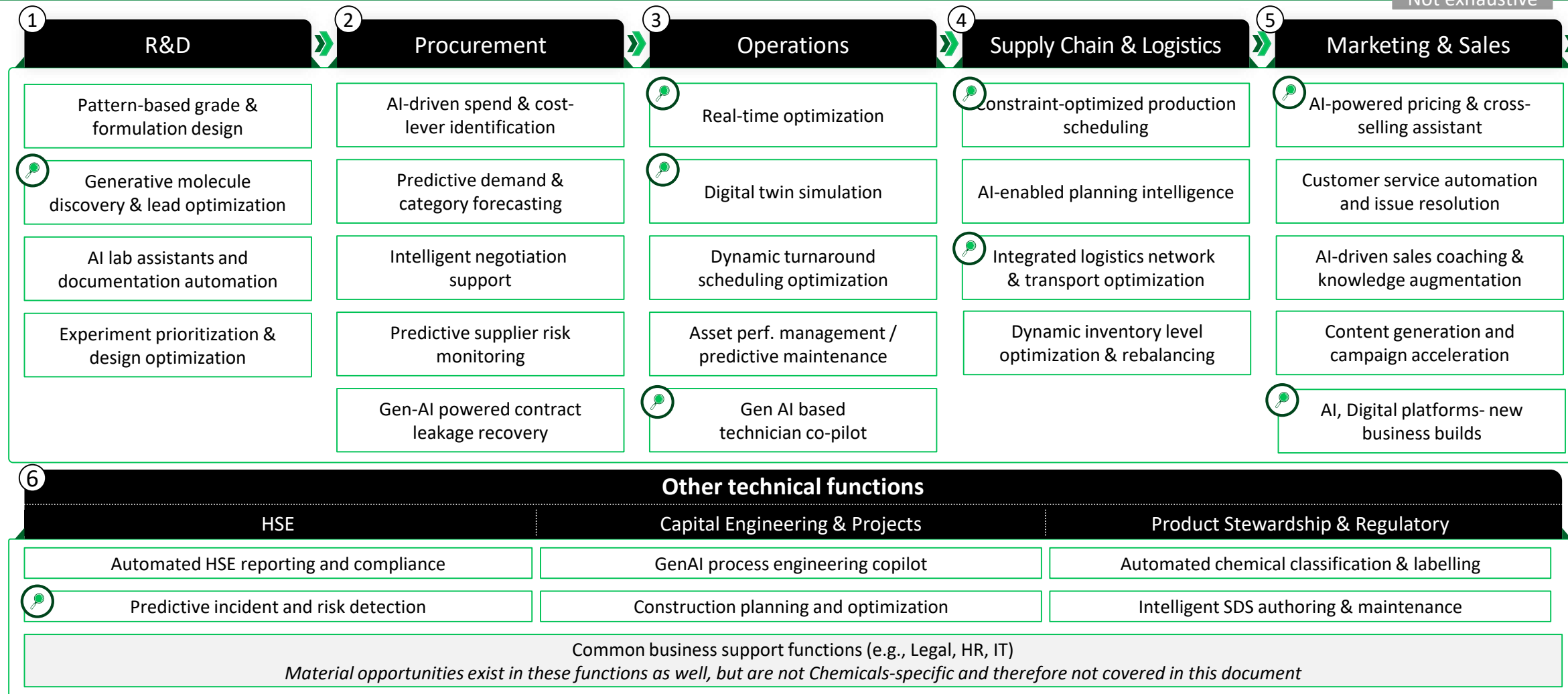
Rapid advances in AI and high-performance computing have the potential to fundamentally transform the Chemicals industry

Not exhaustive



AI is unlocking several high-impact applications across the full value chain¹

Not exhaustive



1. Highest-ROI mix of use cases will differ by business model
Source: BCG analysis

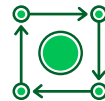
Leading companies emphasize Reshape and Invent rather than Deploy when implementing AI transformations



DEPLOY

Strategies that adopt AI tools to streamline day-to-day work, foster productivity, and free up capacity for high-value work

Automation of routine but critical tasks (e.g., Auto-write paperwork: AI turns lab/plant notes into first drafts of reports like incident write-ups, test summaries, and handover notes.)



RESHAPE

AI-enabled transformations that redesign end-to-end workflows and processes to reimagine how functions operate

Transformation of work beyond productivity (e.g., Auto-diagnose off-spec batches: When a batch fails spec, AI pulls the key data, suggests likely causes, and recommends the next checks. The team decides faster and scraps fewer batches.)



INVENT

AI-native offerings that elevate customer value proposition and create new processes or business models

Breakthrough innovation and new revenue through GenAI (e.g., Performance guarantee service: AI monitors basic system readings and tells the operator exactly when and how much treatment chemical to add.. the company charges a fee linked to targets and customer see fewer upsets and downtime

Less mature companies focus mainly on **Deploy** solutions, while more mature companies emphasize **Reshape and Invent**

AI unlocked a breakthrough in R&D by discovering ~100x more high-potential molecular candidates that outperformed existing compounds

The challenge

- Carbon capture required solvents (i.e., ionic liquids) with a **highly specific, hard-to-optimize set of properties**
- Manual chemical discovery was slow and resource-intensive**, with millions of combinations beyond human exploration capacity or tacit institutional knowledge

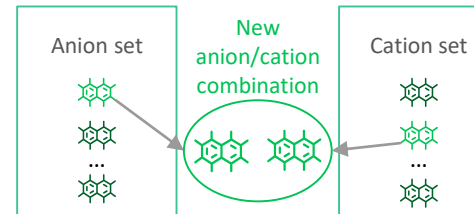


How AI played a role



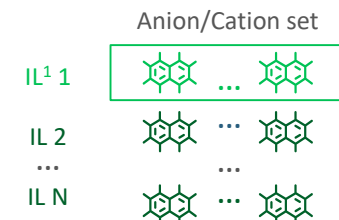
Generated and evaluated a vast number of theoretical molecules, expanding the search space beyond human feasibility

Material combinations exploration



Predicted and ranked candidates against target properties, rapidly narrowing down to **most promising options**

Ranking based on target property



Autonomously generated the optimized IL¹ structure and assessed its scientific feasibility

Optimized IL¹ structure



Outcomes and benefits

Candidates predicted vs conventional options

5-10%
OPEX savings potential

10%
Capex reductions

Higher CO₂ removal potential

AI continuously optimized cracker operations to improve yield and efficiency; agentic AI could be further leveraged for closed loop operations

The challenge

Operational performance of a chemical cracker was challenged due to:

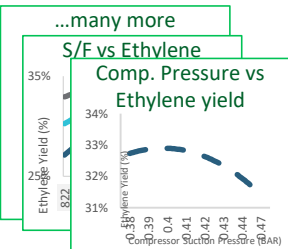
- **Limited ability to manage hundreds of interdependent** process variables and KPIs manually
- **Suboptimal operating points** driven by heuristics
- **Lack of clear link** between KPIs and economic value

How AI played a role



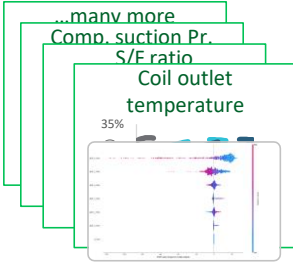
AI-ML model **determined operating parameters to maximize cracker margin**

Parameter relationships feeding into model...



Incorporates 1,000+ variables & multi-process dependencies

...driving the optimization of critical parameters



Model selected based on historical data and initial results of data analysis



Generated a dashboard to provide a strong visualization of plant conditions & optimized KPIs



User interface of dashboard showing KPIs and their economic impact



Agent executed approved parameter changes directly through the APC/DCS system, with operator override

Outcomes and benefits



- Impact derived from:
- ✓ Improved performance on **KPIs** that deliver highest economic impact
 - ✓ Improved cracker **yield**
 - Similar outcome expected in other chemical manufacturing processes

AI has enabled a step change in chemical manufacturing safety by shifting from reactive management to real-time intervention

The challenge

On-site safety and risk management for a chemical manufacturing firm faced gaps due to:

- **Reactive incident detection**, where issues were identified only *after* escalation
- **Limitations to manual monitoring**, wherein scale and complexity of operations exceeded what safety personnel could effectively monitor in real time
- **Passive CCTV systems**, limited to recording without real-time risk detection or analytics



How AI played a role

Deployment of **AI computer vision platform on company's existing camera infrastructure**:

- Ran 20+ **specialized real-time safety scenarios**, with customizable detection parameters to **detect violations early**
- Provided **continuous incident logging and safety trend analytics** for deeper insights
- **Sent prompt alerts** via mobile notifications and audio alarms for immediate response



Demo video showcasing capture of safety violations at chemical plant



Intuitive dashboard showing multiple active safety scenarios

Outcomes and benefits

30-50%



in near-miss incidents

Up to 90%

increased incident reporting rate

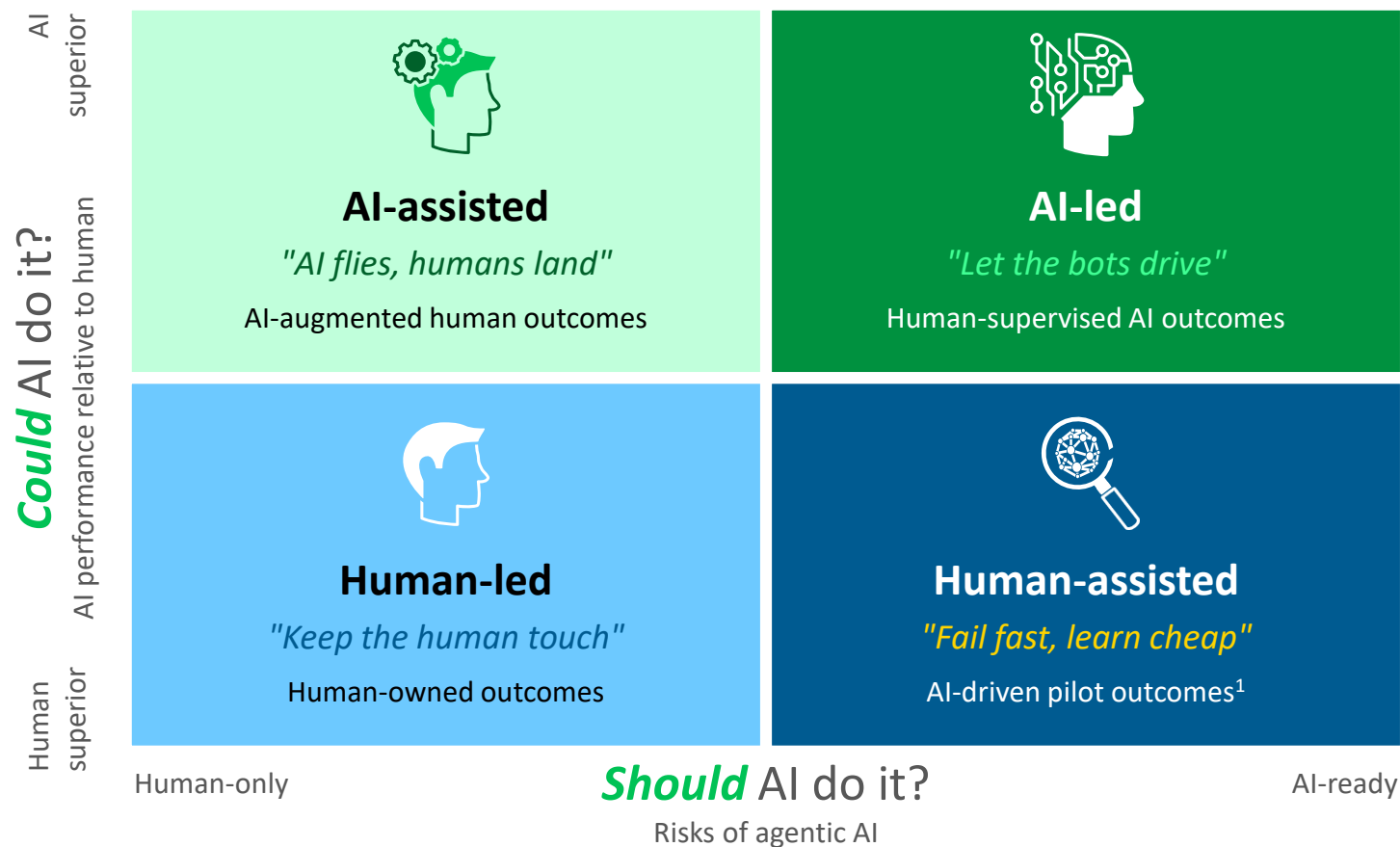
>50%

faster response time in intervention

Two questions define which activities need to be transformed: *Could* AI do it and *Should* AI do it?



AI-First Matrix



Questions for categorization

Could AI do it?

AI performance relative to human

Depends on

- technical feasibility¹
- accuracy & robustness
- speed & scale

Should AI do it?

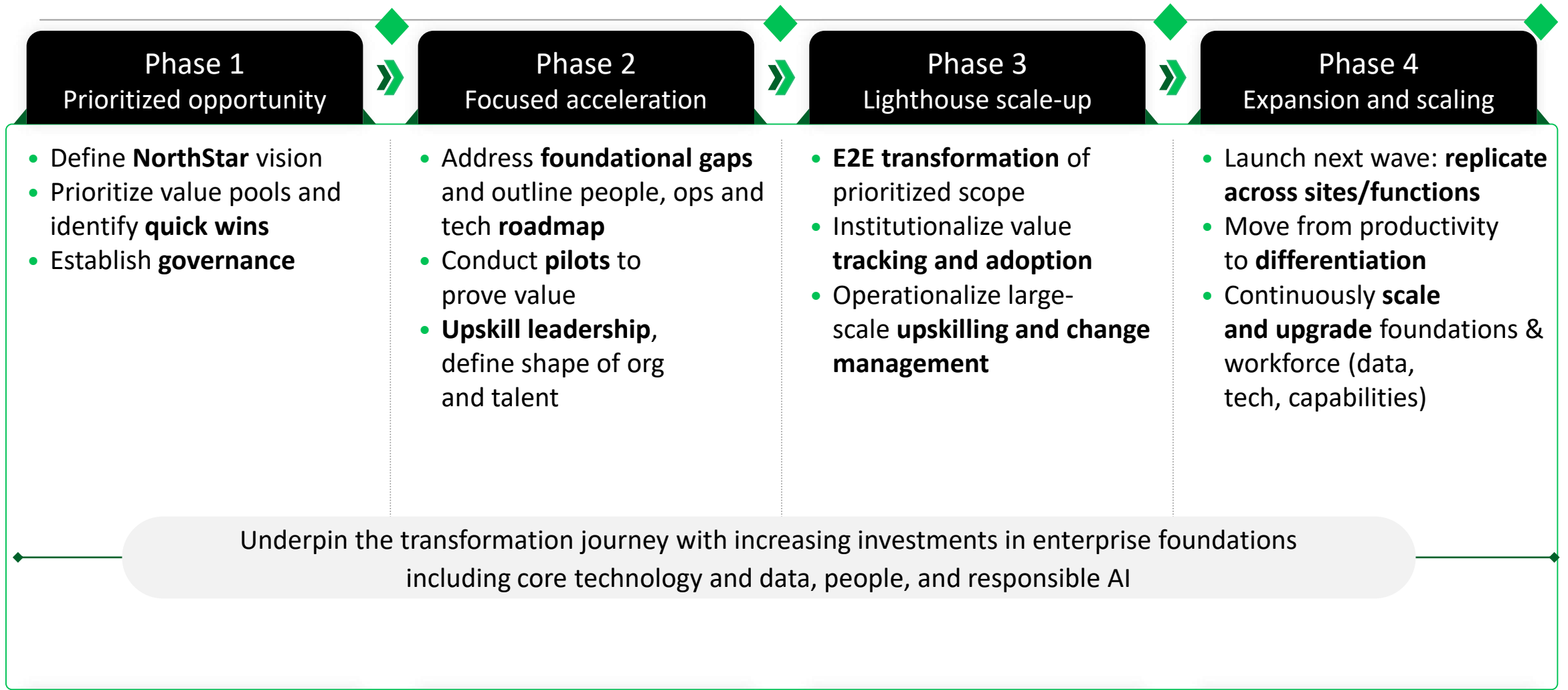
Risks of agentic AI

Depends on

- regulatory risk
- ethics & safety
- financial merit
- cultural preference

1. If there is no technical feasibility, accuracy & robustness and speed & scale do not need to be assessed

Transformation to an AI-first chemicals company requires a focus on prioritized opportunities early before expansion and scale-up



What AI Future-Built Leaders do |

Value creation comes from end-to-end functional redesign where AI transformation is led by people, not just technology

10%

AI Models

Deterministic, generative, agentic, contextual graphs and system architecture

20%

Technology/IT

Model infra, MLOps, data foundation, QA, AI architecture design, cloud migration, etc.

70%

Business & People Transformation

End to end zero based workflow definitions, including RACI, escalations, access rights, policies
Org design, talent & role-based upskilling
Culture, management & communications

Six steps for executives to kickstart the transformation

1



Own the change: Anchor the AI ambition at C-suite level, with clear top-level ownership & accountability

4



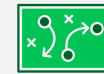
Set up a focused AI delivery office: Anchor the AI program in a central delivery team with defined ownership and measurable targets

2



Focus on game changers: Prioritize AI in processes that matter most and drive highest P&L impact

5



Execute operating model shifts: Implement org changes, process improvements and reskilling to align with broad adoption of AI tools

3



Standardize and upgrade: Upgrade enterprise data and IT system foundations to enable rapid deployment AI solutions

6



Drive cultural change: Shape new behaviors and mindsets through leadership posture and org-wide upskilling



BOG