

From Commodity to Capability

A future-back view for chemicals executives

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Key messages

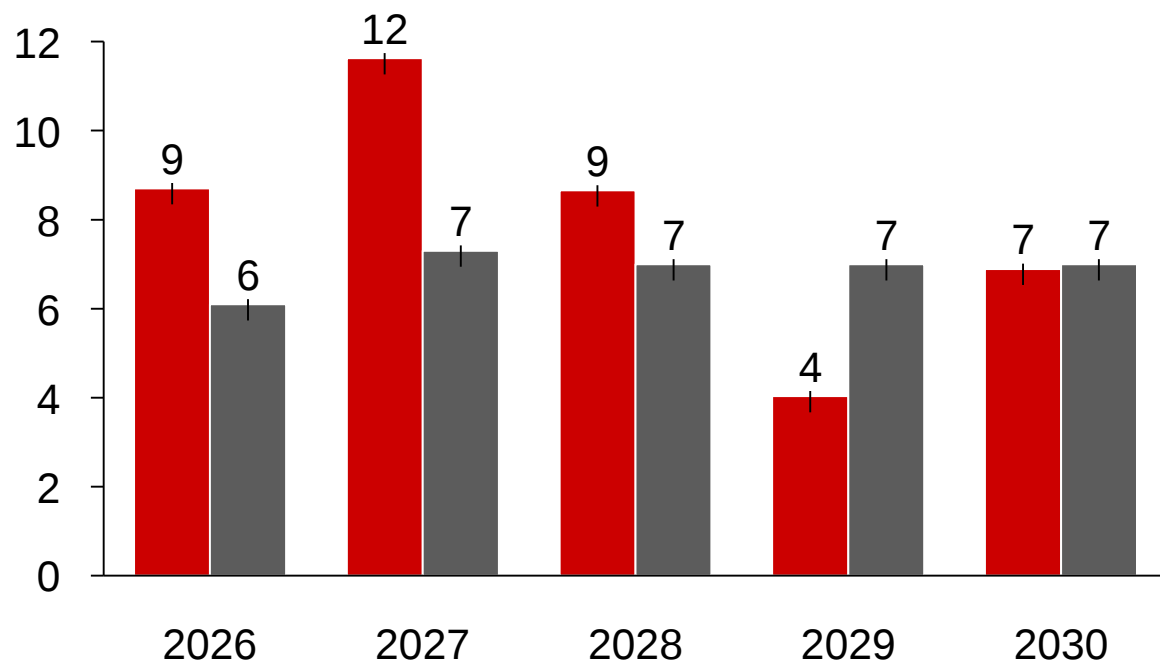
- The petrochemicals cycle is structurally disrupted through at least 2030: capacity far exceeds demand, and utilization sits at 10-year lows
- The Iran conflict creates a temporary price spike, but the underlying supply glut persists
- Spreads will not recover on their own: winning requires a deliberate innovation portfolio, not more capacity
- The chemicals sector has consistently underperformed on innovation returns, but a proven playbook exists
- Act now: define an innovation signature, establish a Resource Allocation Committee, shift 20%+ of resources, and execute swiftly

Supply will outpace demand through 2030 and beyond

Ethylene capacity additions vs. demand growth

Mt

■ Capacity Growth ■ Demand Growth



+7 Mt

Ethylene supply overhang increase 2026-30

<81%

Forecast global ethylene utilization through 2028 — well below the ~90% needed for healthy spreads. Recovery to mid-80s only by 2030

60%

Of new capacity through 2028 still in China and now exporting into SE Asia. Iran spike fades within 12-18 months

Overcapacity is not easing and the cycle does not turn before 2030

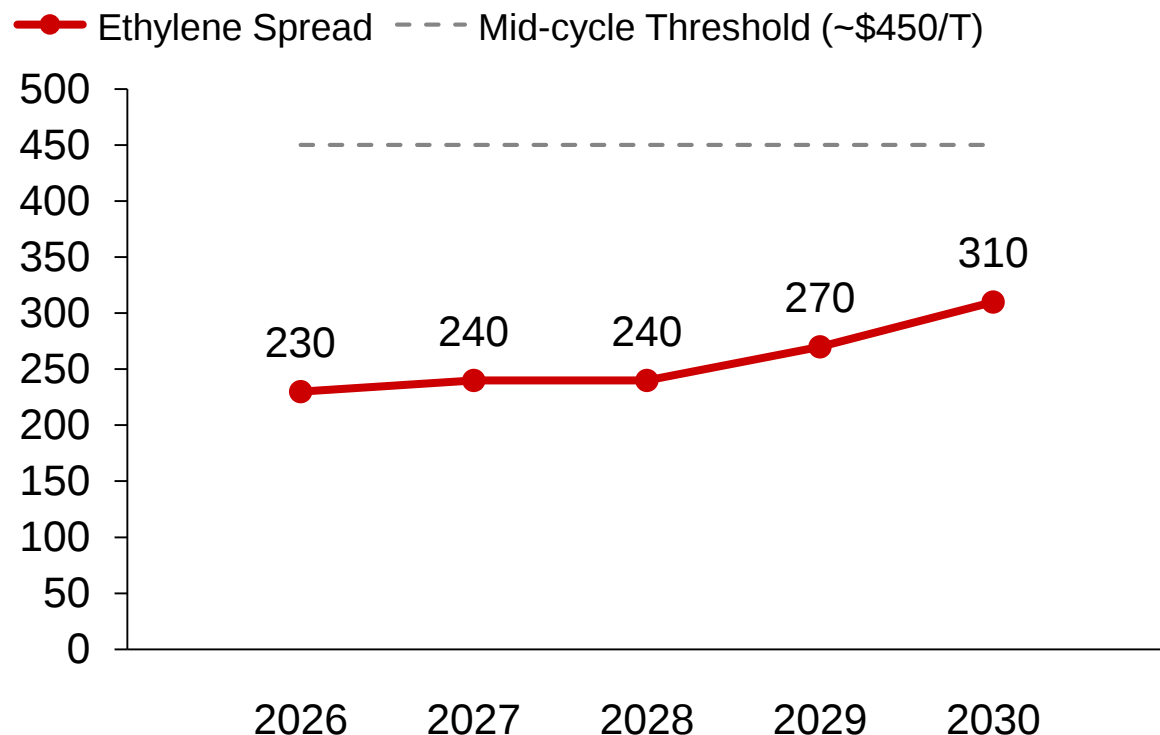
Source: Wood Mackenzie Petrochemicals Outlook (Sept 2025); S&P Global / C&EN World Petrochemical Conference (Mar 2026); Bain analysis

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Structurally low spreads mean commodity volume alone cannot cover cost of capital

SEA ethylene – naphtha spread

USD/t



~\$200/t

SE Asia ethylene-naphtha spread gap to mid-cycle through 2028, translating to billions in lost contribution margin

<5%

Forecast chemicals net profit margins through 2027, vs ~6% historical average. Below most players' cost of capital

15+ Mt

Of EU and NE Asia capacity expected to close by 2028, but rationalization lags new China builds and glut persists



You cannot cost-cut your way to your cost of capital

The current chemicals innovation playbook has struggled to earn attractive returns

/EXAMPLES

DuPont Sorona

THE BET

30+ years of R&D on **bio-PDO and PTT** to create a renewable polyester alternative from corn sugar

THE OUTCOME

Niche premium positioning in apparel, carpet, performance materials; did not become the large-scale polyester platform originally envisioned.

BASF White Biotech

THE BET

Multi-year R&D push into industrial biotech, **including fermentation** routes for vitamins, enzymes, **bio-based** intermediates and specialty ingredients

THE OUTCOME

Early ambitions were narrowed, restructured, or absorbed into existing businesses. White Biotech did not become the disruptive growth platform once implied.

Dow Versify (POE)

THE BET

Internal development of propylene-ethylene elastomers using **INSITE catalyst technology**; positioned as a differentiated specialty plastics platform

THE OUTCOME

Built a specialty elastomer position, but value capture was pressured as competing metallocene POE and POP capacity expanded and premium applications became more contested

LyondellBasell Hyperzone

THE BET

\$2.4B greenfield HDPE plant in La Porte, TX using proprietary **Hyperzone PE technology** to leapfrog competitors in advanced bimodal grades

THE OUTCOME

Commissioned into a weak PE cycle and 2020 to 2024 downturn. Technology differentiation was insufficient to offset oversupply, margin compression, and slower-than-expected premium grade monetization.

Other industries cracked the innovation code; chemicals can borrow their playbook

INDUSTRY

WHAT THEY DID

THE LESSON FOR CHEMICALS

Pharma

AlphaFold + AI drug discovery: slashed lead-discovery cycles from years to weeks; 80%+ R&D time reduction at early adopters

Chemicals R&D is sitting on the same untapped value pool. Stop running R&D like a 1990s wet lab

Auto

Tesla rebuilt the value chain: vertical integration in batteries + software-defined vehicle. Incumbents played catch-up for a decade

Reinvent the molecule + the customer interface. Specialty + service beats spot-price commodity

Semiconductors

TSMC's pure-play foundry model split design from manufacturing. Captured the entire value of the smartphone era

Asset-heavy commodity producers can win by becoming the world's most reliable, lowest-cost manufacturer of others's molecules

Steel

Nucor's mini-mill bet broke incumbent integrated mills. Lower capex, regional, agile, winning market share for 30 years

Smaller, smarter, modular assets close to feedstock or demand will beat mega-cracker bets in the 2030s

Source: Bain analysis; industry case studies

Four fixable root causes explain why innovation keeps failing

1

Capex addiction

Capital allocators reward MT-of-capacity, not first-of-kind. Innovation gets crowded out by the next world-scale cracker — even when the cracker has no path to its cost of capital.

2

Fast-follower DNA

The industry has rewarded process replication over breakthrough chemistry for 40 years. The muscle for early-stage venture, partnership and absorption is atrophied.

3

JV graveyard governance

50/50 JVs designed for asset construction. Slow, consensus-driven, single-asset-focused. Innovation needs the opposite — fast, opinionated, portfolio-funded.

4

No patient capital

Public-market quarterly cycle vs. 7-15 year tech maturation curves (bio, electrified cracking, CO₂-to-chem). Every CFO kills the program in year 3 of an 8-year curve.

Building blocks turn innovation from a project list into a deliberate portfolio

1 Anchor in the Growth System

Innovation as a deliberate growth lever — not a side bet

2 Start from the customer need

Prioritize by full potential, not by what R&D wants to build

3 Map projects to 4 archetypes

Renovate, Adjacent, Step-change, New frontier

4 Set the optimal archetype mix

Per business: match the imperative, not a one-size-fits-all signature

5 Tailor the management system

Each archetype needs different stage-gates, talent, KPIs

6 Govern with a Resource Allocation Committee

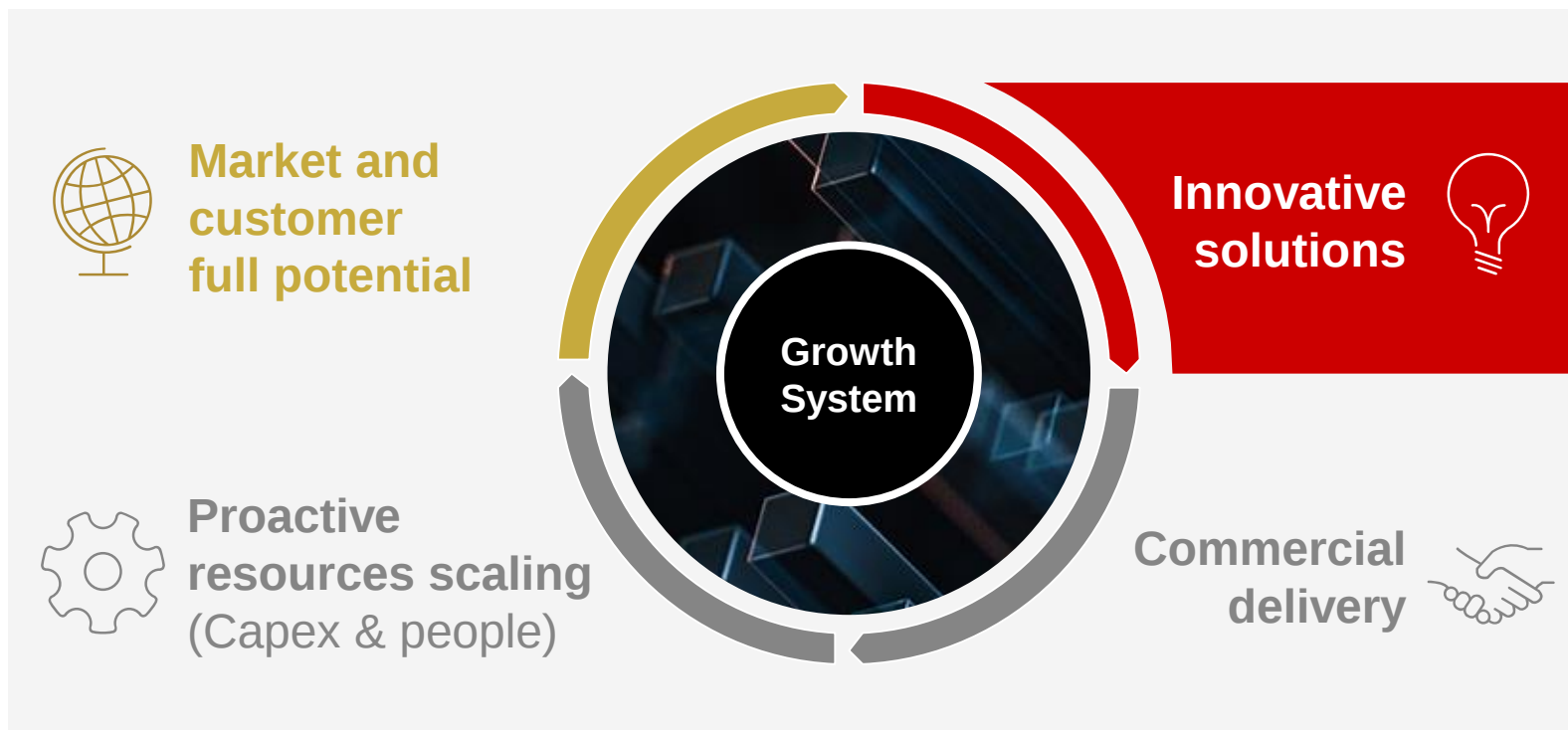
Arbitrate resources across the portfolio with clear cadence

① Innovation must anchor to the Growth System, not sit in an R&D silo

Key principles

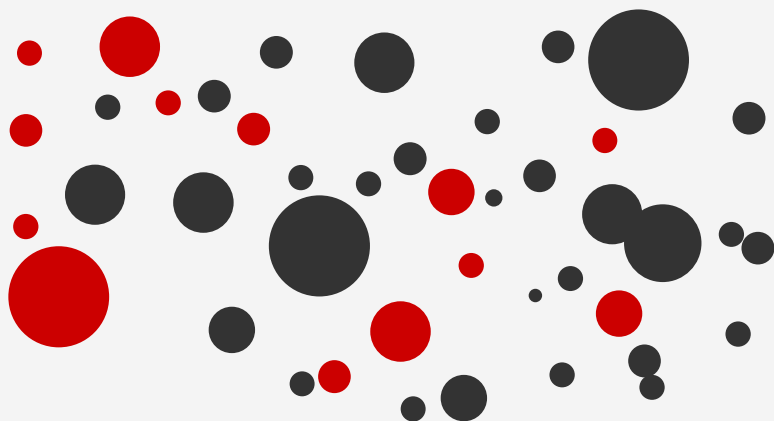
- Work and organize by **application**
- Systematically size **full potential** per market, per application and per account
- Steer **innovation** and **commercial delivery** towards **full potential**
- Align **capex** and **growth plans**

Growth System: repeatable model to drive full potential growth



② Start from customer need and full potential, not technology push

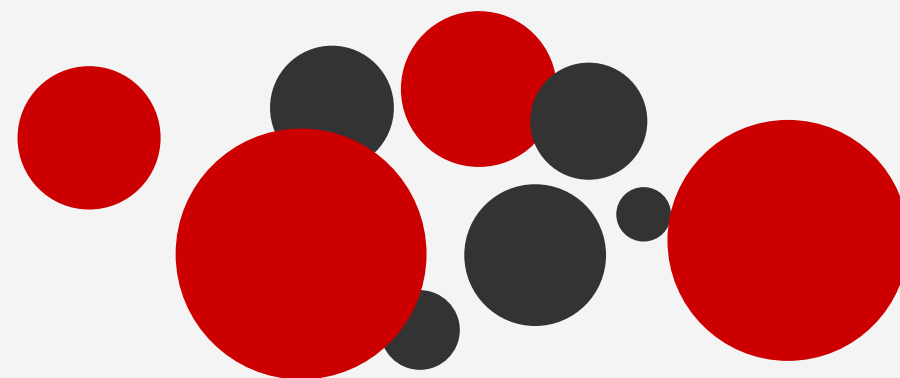
◀ Bubble size: full potential value ● Prioritized ● Deprioritized



FROM

Scattered technology projects

Fragmented and uncoordinated innovation projects, not linked to strategy and with **unclear customer need** and **full potential value**



TO

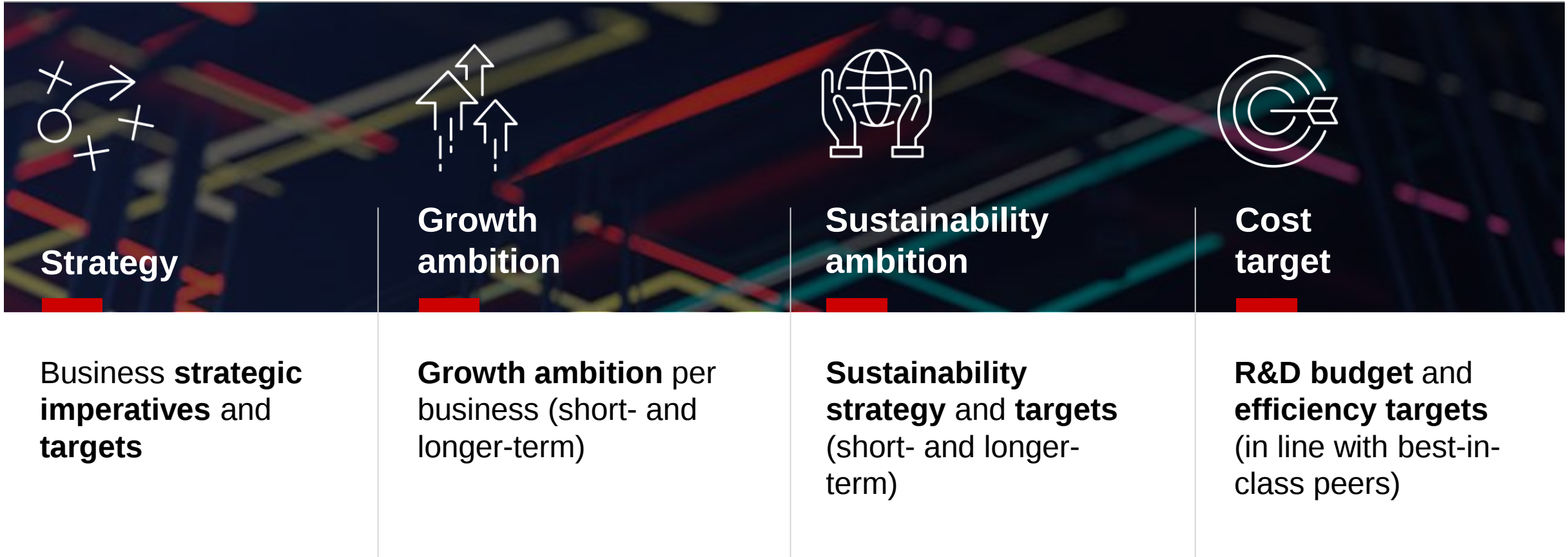
Customer themes with clear full potential

Select themes linked to strategic priorities and addressing **specific customer needs** of the true solution prescribers, **prioritized based on full potential value** per application

Four archetypes frame the innovation portfolio: Renovate, Adjacent, Step Change, **3** New Frontier

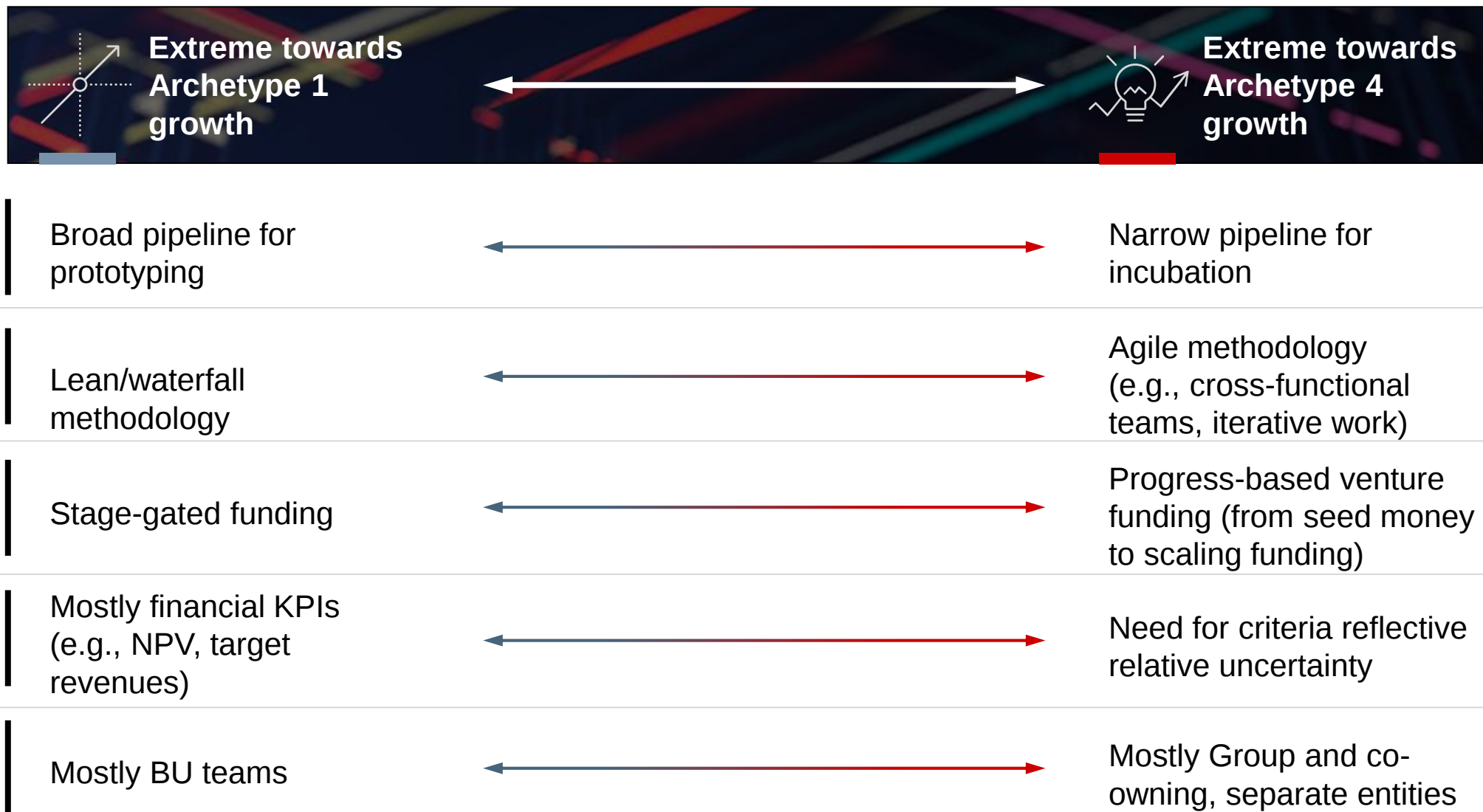
<i>Pure commercial</i>					
	BAU	Renovate	Adjacent	Step Change	New Frontier
Definition	Purely commercial opportunities	Adapt existing solutions to address new needs for existing applications	Adapt existing solutions to serve adjacent applications	Solution reinvention to adapt to regulatory change & market shifts	Breakthrough innovation to pioneer novel applications
Intent	• Combat baseline erosion • Grow through volume & price	• Combat baseline erosion • Grow the core near-term	• Grow close adjacencies near-term	• Future-proof portfolio in the long run	• Build next-gen growth engines

④ Each business needs a tailored archetype mix matched to its strategic imperative



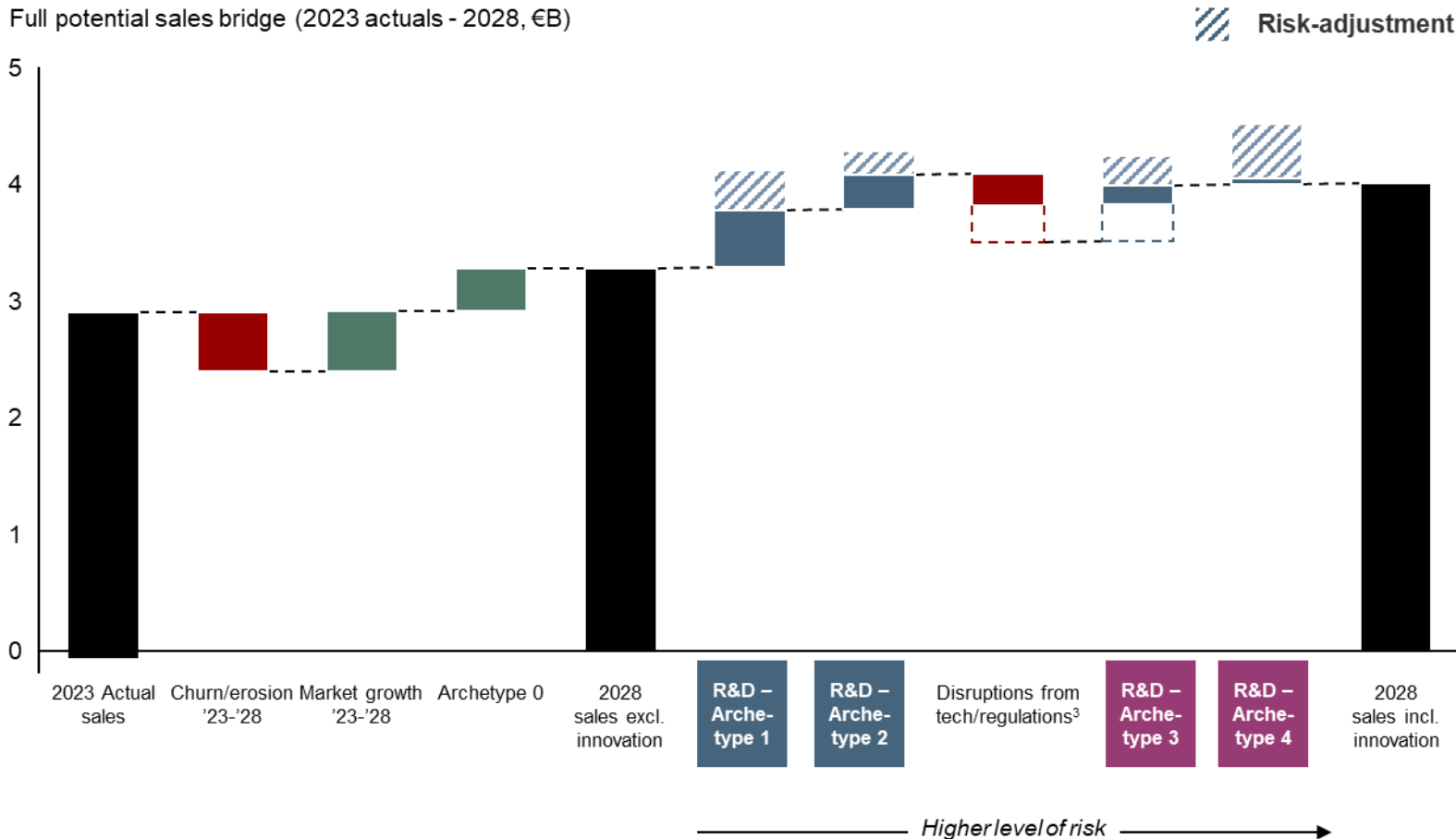
Define optimal archetype mix that accelerates growth from innovation and frees up resources

⑤ Each archetype requires different metrics, governance, and talent



⑥ A deliberate innovation signature makes risk and reward trade-offs explicit

Typical value bridge per archetype



Archetypes balance risk & reward

- **Each archetype plays a different role in the sales strategy**
 - **Archetypes 0, 1, and 2** compensate for baseline erosion and grow core/near adjacencies in near term
 - **Archetype 3** makes the portfolio future-proof, especially from a sustainability perspective
 - **Archetype 4** contains big bets to create the next growth engine
- **Sales are risk-adjusted to success rate to plan for achievable sales**
 - The success rate differs by archetype and by business and is calculated based on historical success rate of similar projects

Value creation domains map to specific innovation archetypes

Innovation domain	Renovate Improve existing	Adjacent Extend known	Step-change Reinvent core	New Frontier Build new business
AI	●	●	◐	
Green & low-carbon		◐	●	●
Bio-based feedstocks			◐	●
Process technologies			●	◐
Circularity		●	●	

● Primary fit ◐ Partial fit (blank) Not the primary path

Source: Bain analysis; archetype framework adapted from Bain Innovation Portfolio Strategy methodology

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AI compresses R&D cycle time by 40 to 50%, a table stakes play for Renovate and Adjacent

What's working

40-80%

R&D cycle time reduction
across early adopters

94%

of chemical execs say AI is
critical to future success

15%

Energy & operating cost reduction
from AI-driven plant optimization

Examples in market

Covestro



Circular traceability

AI-powered material traceability platform integrates carbon accounting end-to-end. Consumers scan products to view verified sustainability metrics, turning data into brand premium

BASF + Quantum Computing



Materials discovery

Quantum + ML used to design novel catalysts and battery materials, compressing discovery cycles from years to months on targeted molecules

Dow + Microsoft



Microsoft

Plant operations

Generative AI assistants on operator workstations reduce time to interpret plant data; predictive maintenance cuts unplanned downtime in pilot units

Thailand should execute a five-move playbook starting now

1	2	3	4	5
RATIONALIZE	FOCUS	BUILD	PARTNER	REINVEST
Cut commodity exposure now	Pick 2 innovation domains, not 5	Stand up a venture muscle	Buy capability, don't build alone	Free up capital
Identify bottom-quartile assets in commodity olefins/PE/PP. Close, divest, or convert ~15-20% of capacity over 24 months. Don't wait for the cycle	Bio (sugar feedstock advantage) + Circular (regional waste pools) are Thailand's natural plays. Stop spreading R&D thin across all 5 domains	\$200-300M venture fund + corporate accelerator. Target 8-12 investments in CO2 utilization, recycling tech, AI process platforms. Patient capital — 7-10 yr horizon	License Coolbrook-style process tech, JV with Dioxycle/Twelve, M&A a European recycling player. Time-to-market beats NIH every time	From asset rationalization + working capital release. Reallocate 50% to innovation, 30% to circular capacity, 20% to digital/AI infrastructure

Q&A

