

R&D Process Evolution at Milliken:

Striking the Balance Between Structure and Creativity

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Drew Child, Ph.D., P.M.P
Vice President, Research of Development
Milliken & Company

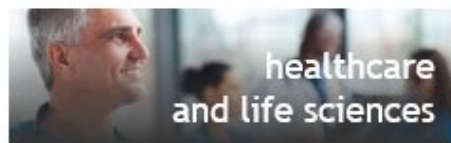


MILLIKEN AT A GLANCE



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we have **70+** locations and **8000+** associates across **15** countries creating **11,000+** products for use in...



How much revenue can we expect from the R&D pipeline?



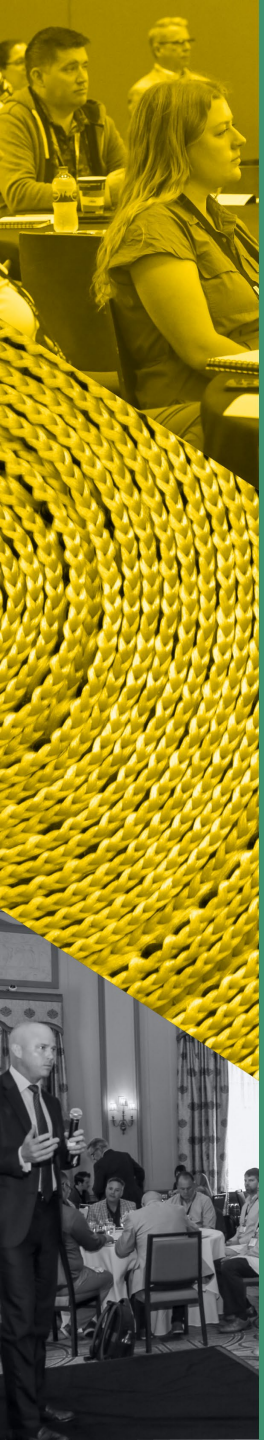
We have an awesome portfolio of projects!



That's good. So, when do you think they will launch?

Well, R&D is so hard to predict. You can't rush creativity.
But the projects are really great, trust me!





Oh, and we need more resources!



**The first step was to align on a harmonized process.
We had three main goals:**

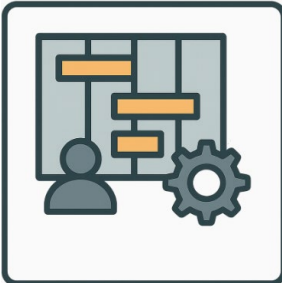


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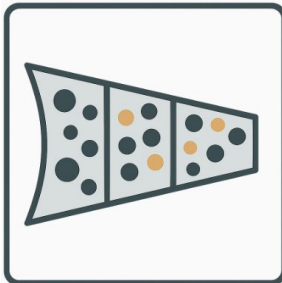
Project Selection

Working on the right projects



Project Management

Working on projects the right way



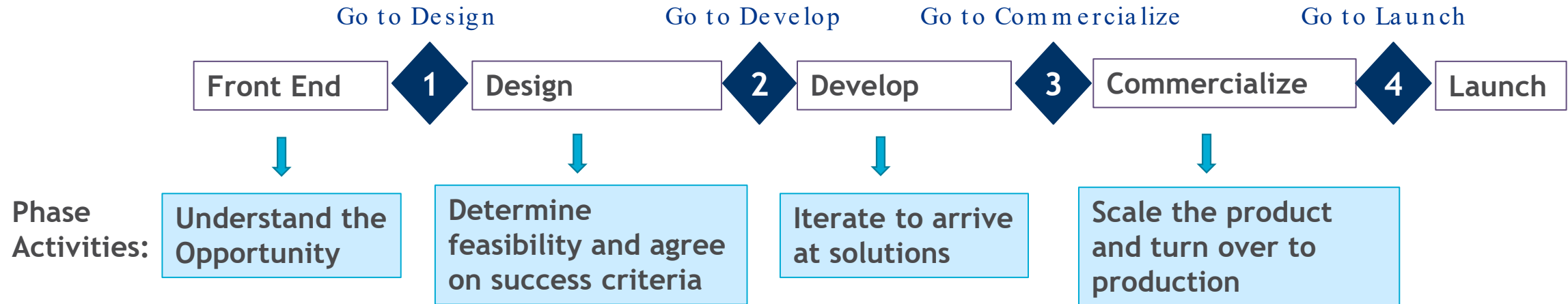
Portfolio Analysis

Making the right portfolio decisions

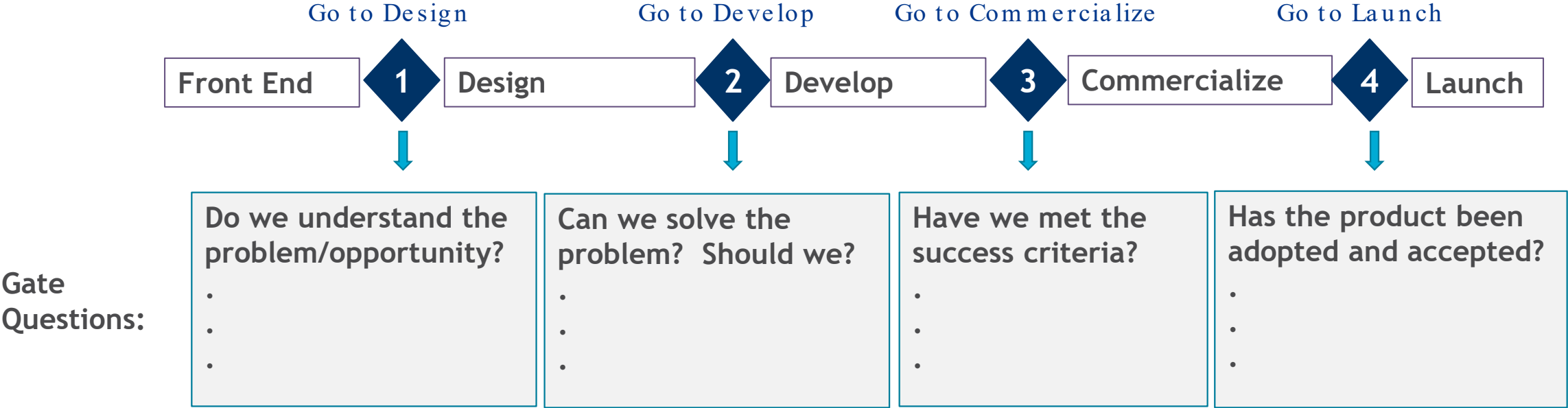
The basic phase activities are consistent for the enterprise.



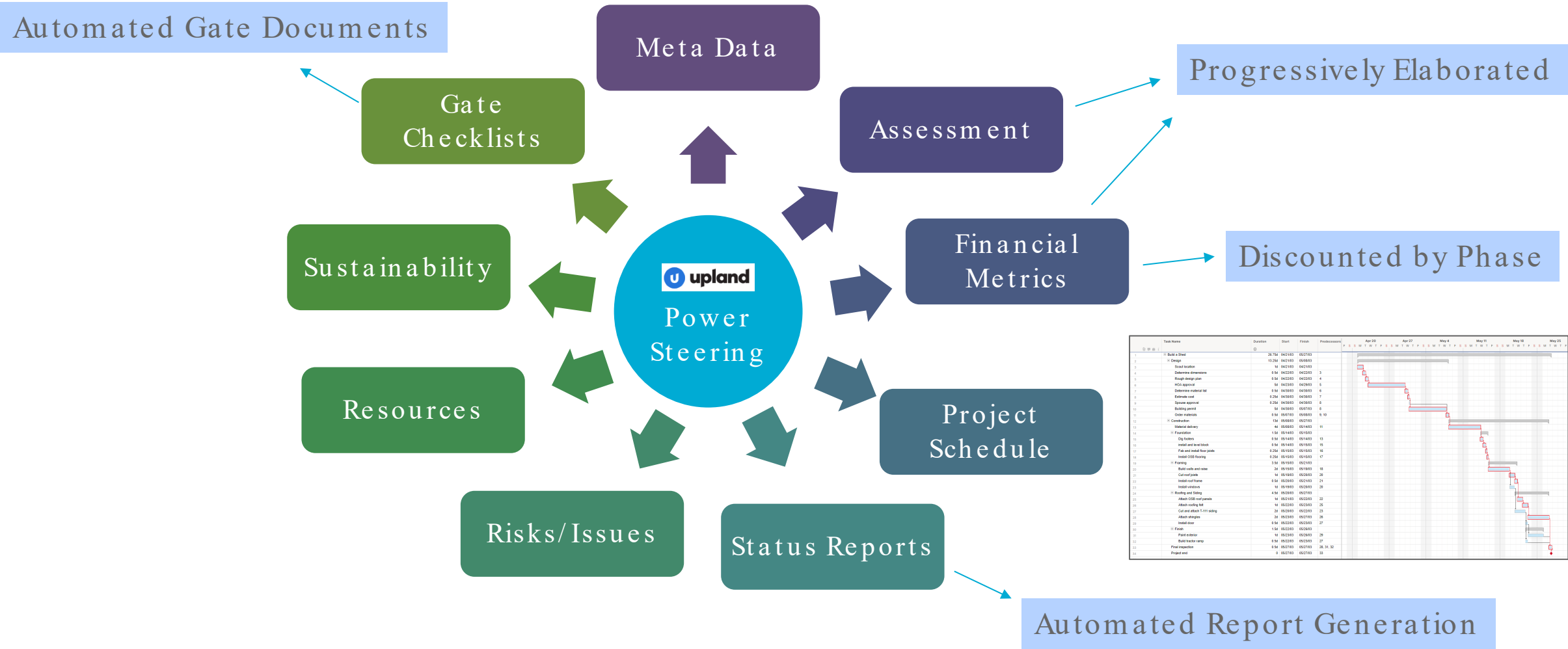
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The specific gate checklists and approval flows are customized to the project type.



The central database system drives the project management process and data collection.



The NPD process was improved, more visible, and harmonized, but issues persisted.



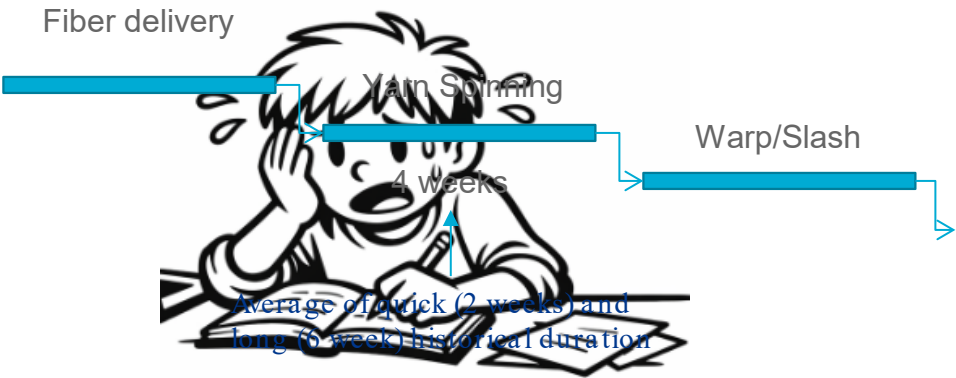
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- Nearly all projects were late (especially large projects)
- Inaccurate timelines complicated financial and operations planning
- Most R&D associates considered the process a “non-value-added burden”
- Portfolios were still much larger than the available resource pool



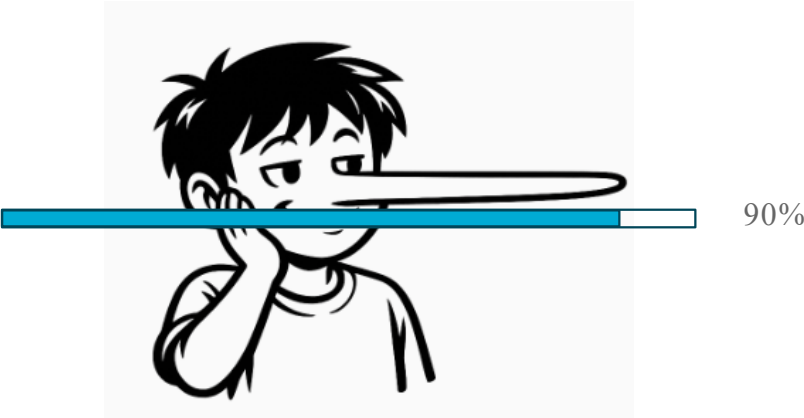
A combination of planning errors and behaviors led to large project delays.

The Student Syndrome



Tasks are started when there is just enough (or not quite enough) time

90% Syndrome (the liar's club)



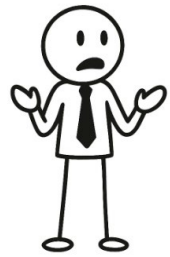
Tasks progress is reported to be 90% complete, then stalls completely

Systemic uncertainty contributed to large expectation gaps and unrealistic goals.

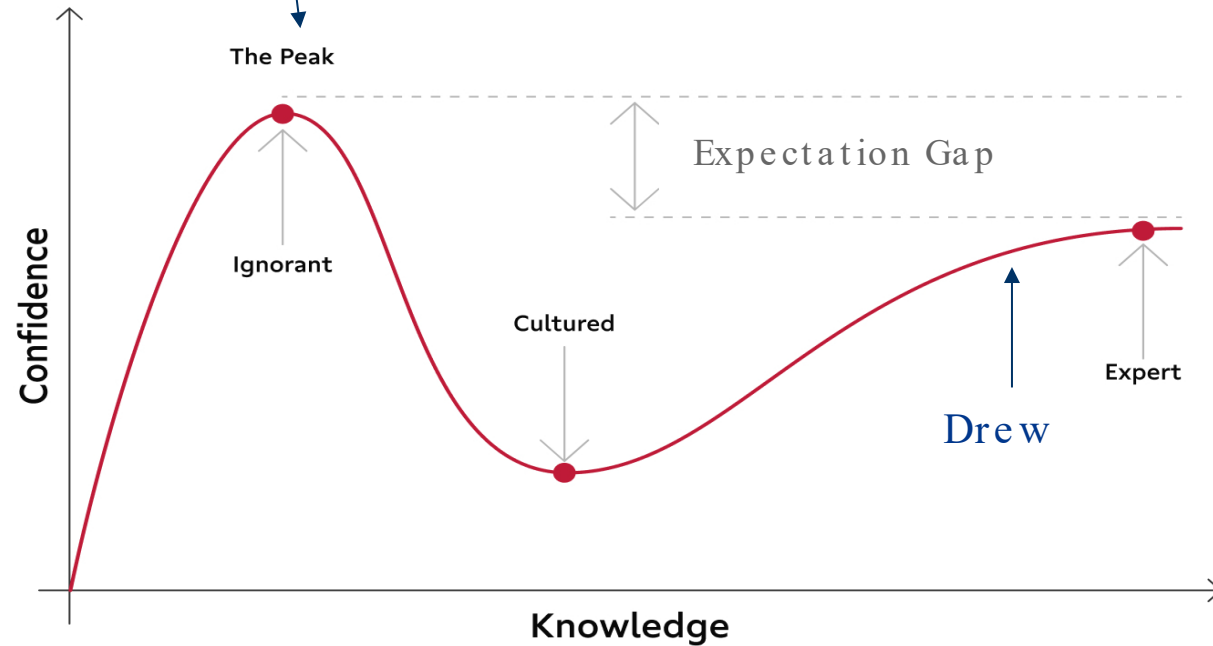


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Dunning-Kruger Effect



Business Leadership



Project Team Feedback

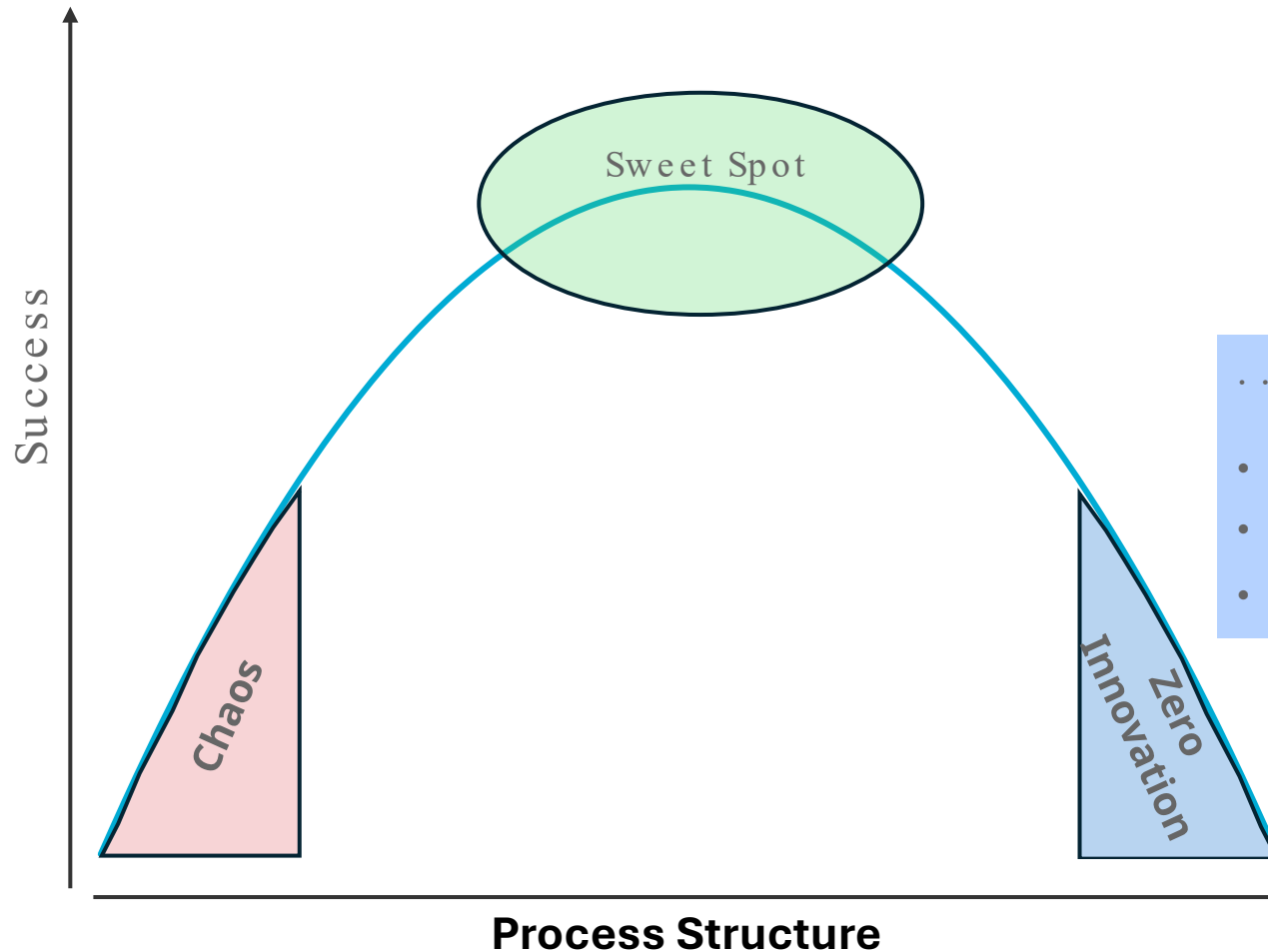
“Project plans are difficult to construct, time-consuming, and rarely reflect reality”

“Accountability of the plan is to people who have no knowledge of how long the project will/should take.”

**Empowering teams requires the correct amount of structure;
between chaos and stifling innovation.**



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Structure is required for:

- Clear project end dates
- Project velocity
- Data for decision making

..but need to consider:

- Unknown path in R&D
- Scope changes common
- Planning takes time

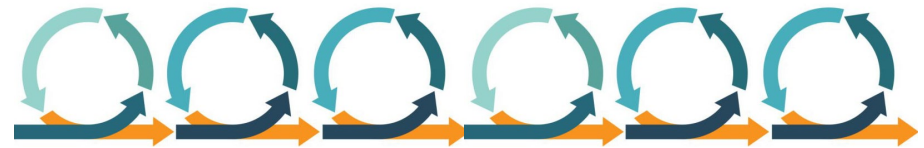
Agile has more fluid workflows but is not appropriate for projects with slow deliverable creation.



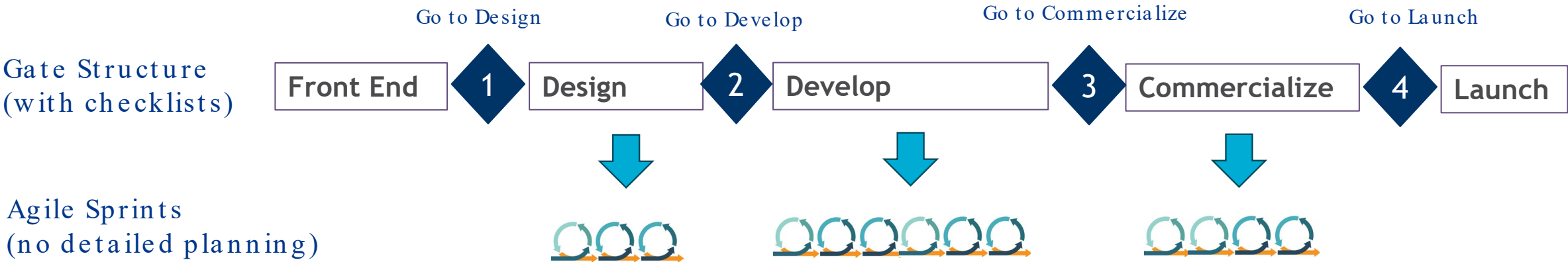
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Agile Principles:

- Work is divided into to small packets (sprints)
- Regular peer meetings to check on progress
- Tangible work is delivered at each sprint
- Decision making at the project level



Agile Stage-Gate is a hybrid approach that layers agile principles onto Stage-Gate structure.



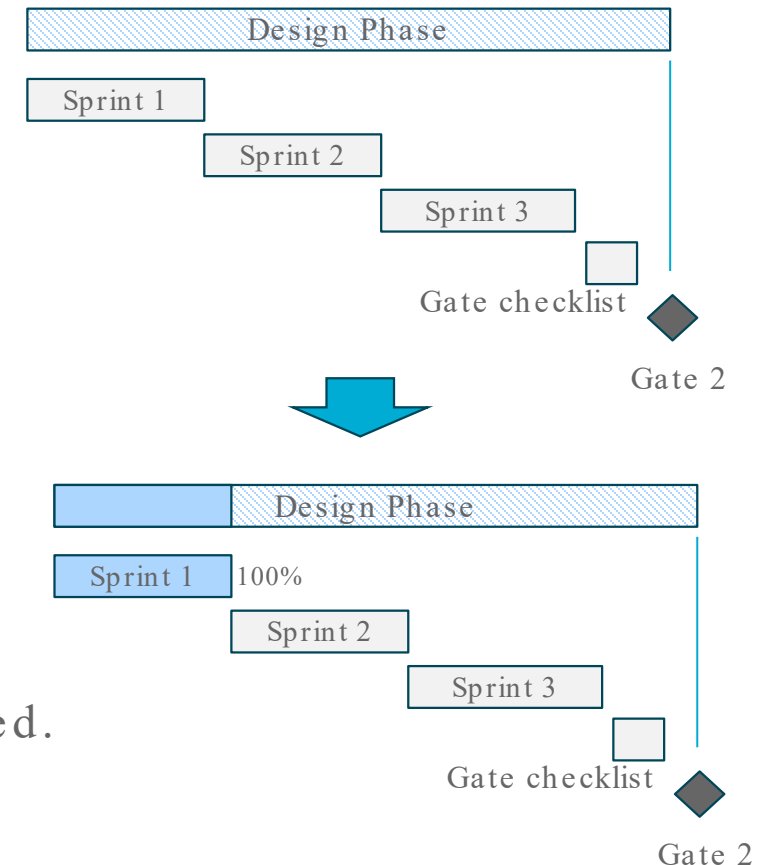
R.G.Cooper and AF.Sommer, “The Agile–Stage-Gate Hybrid Model: A Promising New Approach and a New Research Opportunity,” *Journal of Product Innovation Management* 33, no.5 (Sept 2016): 513–526.

Agile Stage-Gate pushes approvals down to the project level but still requires schedule updates.

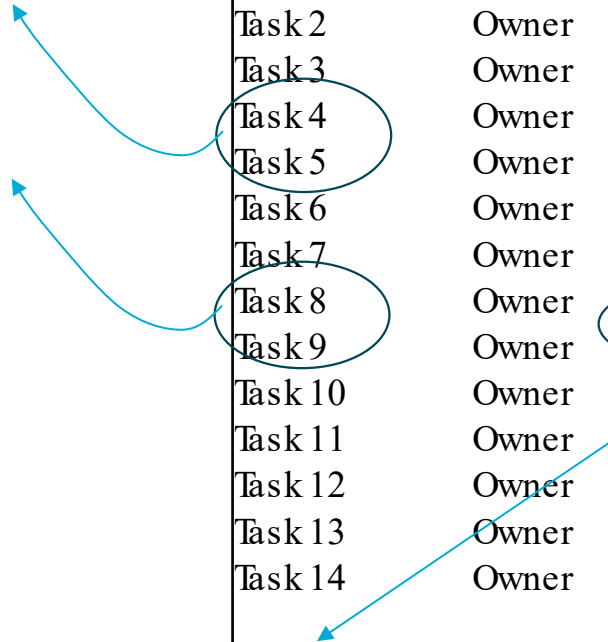


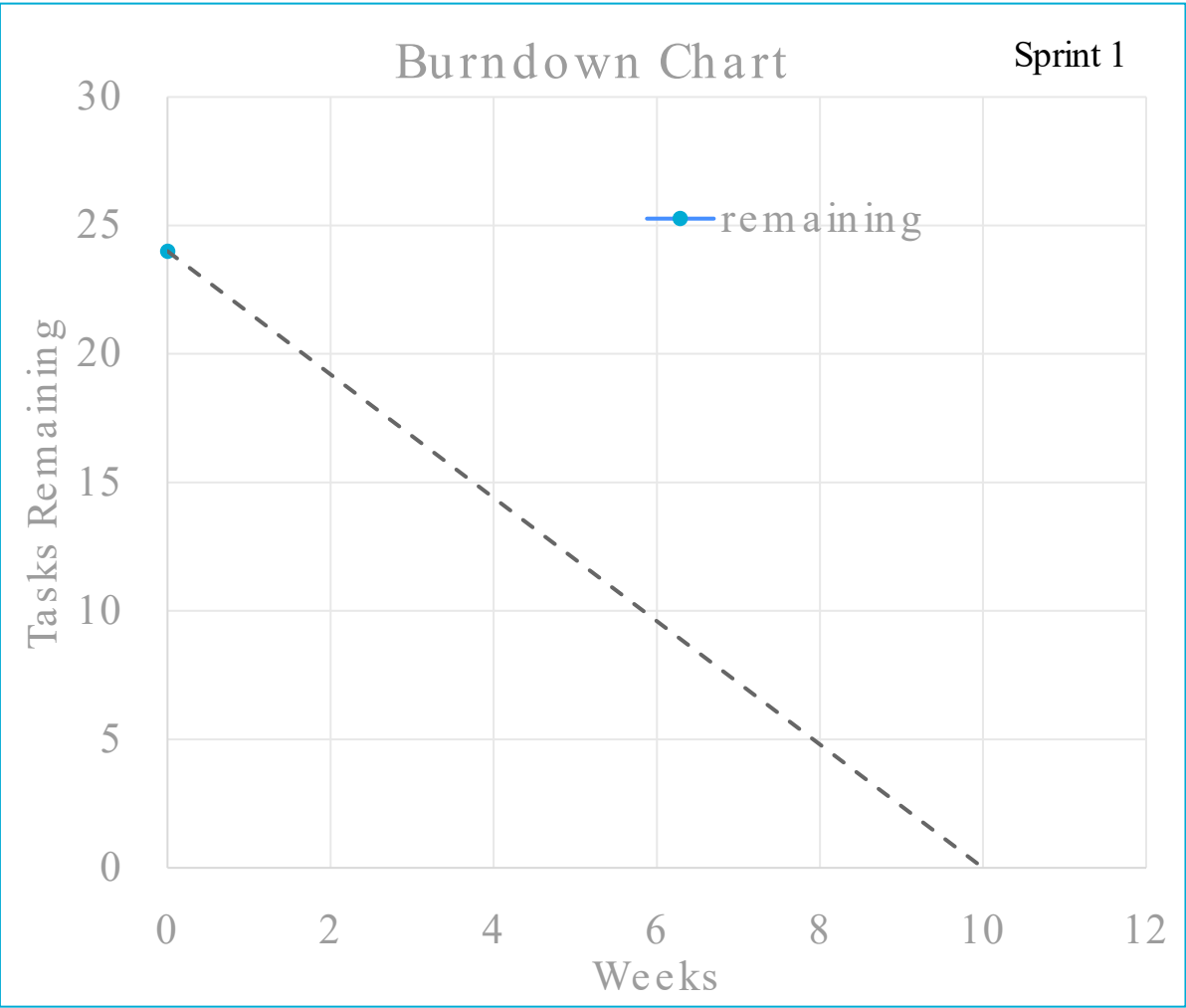
Agile Stage-Gate guidelines (at Milliken)

- A template is chosen with a generic plan and timeline
- Tasks are brainstormed to get to the next decision point
- The tasks are executed as soon as possible
- Team meetings weekly to update (complete, next, later)
- When the sprint is complete, the project plan is updated
- Gate meetings are held when the phase deliverables are achieved.



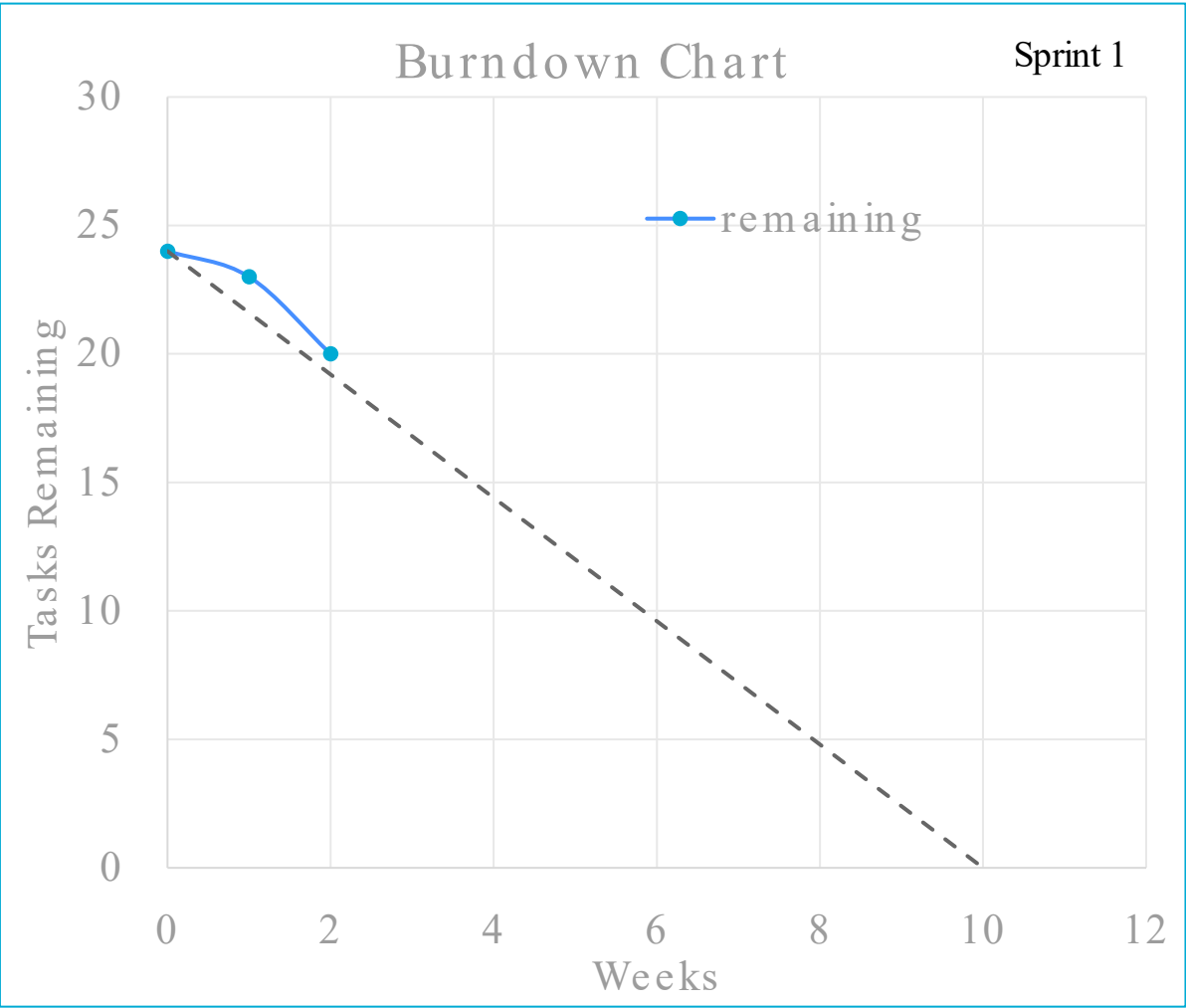
Sprints will have a specific goal or question. Tasks will be added to support that goal or answer.

Completed	In Process		Backlog	
	Task 1	Owner	Task 15	Owner
	Task 2	Owner	Task 16	Owner
	Task 3	Owner	Task 17	Owner
	Task 4	Owner	Task 18	Owner
	Task 5	Owner	Task 19	Owner
	Task 6	Owner	Task 20	Owner
	Task 7	Owner	Task 21	Owner
	Task 8	Owner	Task 22	Owner
	Task 9	Owner	Task 23	Owner
	Task 10	Owner	Task 24	Owner
	Task 11	Owner		
	Task 12	Owner		
	Task 13	Owner		
	Task 14	Owner		



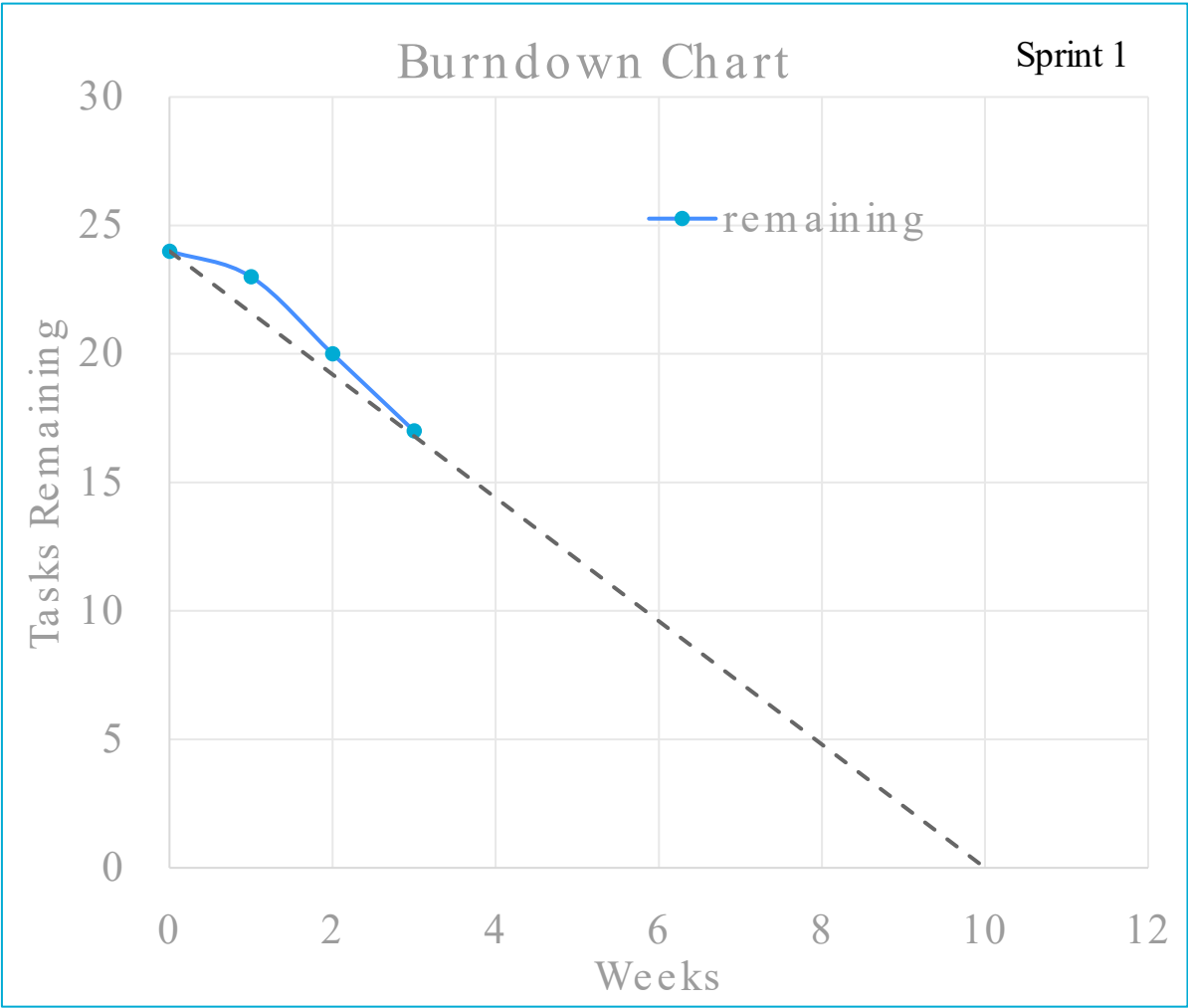
Weekly meetings are concise. The Burndown chart is the primary communication tool.

Completed	In Process		Backlog	
Task 4	Task 1	Owner	Task 15	Owner
Task 5	Task 2	Owner	Task 16	Owner
Task 8	Task 3	Owner	Task 17	Owner
Task 9	Task 6	Owner	Task 18	Owner
	Task 7	Owner	Task 19	Owner
	Task 10	Owner	Task 20	Owner
	Task 11	Owner	Task 21	Owner
	Task 12	Owner	Task 24	Owner
	Task 13	Owner		
	Task 14	Owner		
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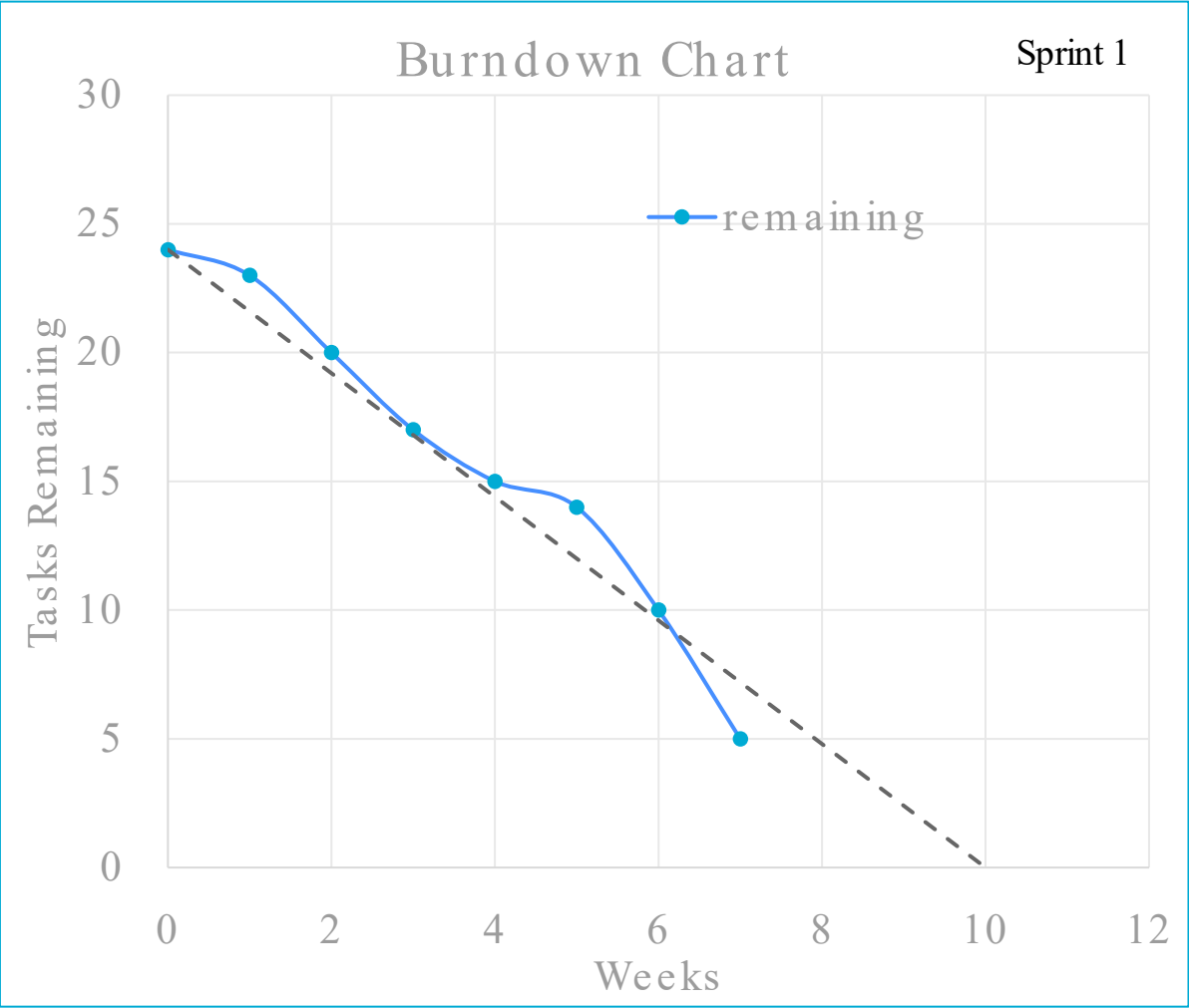
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	Task 23	Owner		
	Task 20	Owner		
	Task 21	Owner		
	Task 24	Owner		

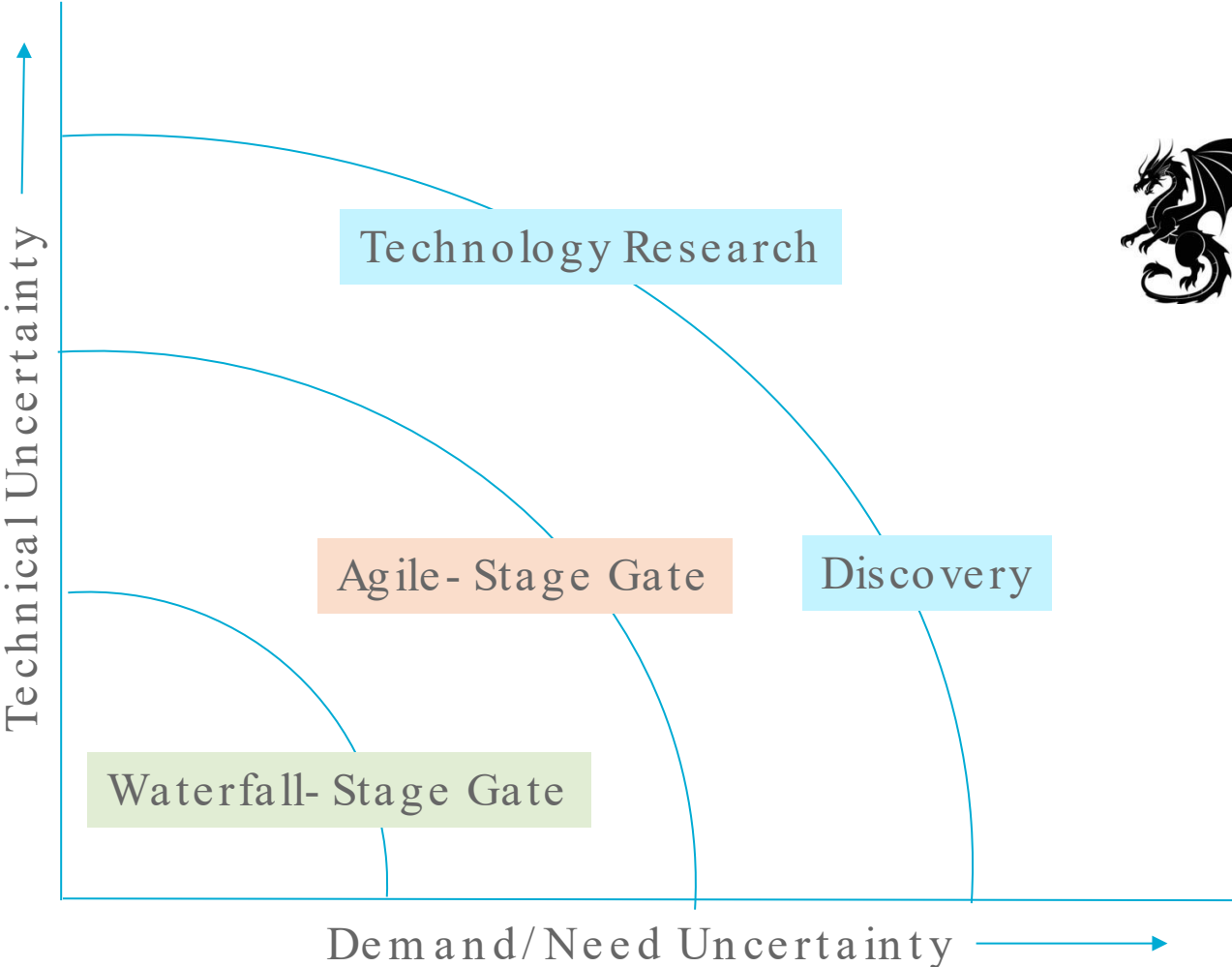


When the sprint is nearly complete, the goal for the next sprint is determined and tasks added to the new burndown chart.

Completed	In Process		Backlog
Task 4	Task 7	Owner	
Task 5	Task 10	Owner	
Task 8	Task 15	Owner	
Task 9	Task 18	Owner	
Task 6	Task 19	Owner	
Task 13			
Task 14			
Task 1			
Task 2			
Task 3			
Task 22			
Task 23			
Task 20			
Task 11			
Task 12			
Task 24			
Task 16			
Task 17			
Task 21			



The project management technique is driven by the project uncertainty.



Here be Dragons!

The new process eliminates the main causes of project schedule delays.

The Student Syndrome



90% Syndrome (the car's club)



Portfolio management starts with initial project selection and culling at gates.

Assessment Tool



Stage-Gate Process

Kill ugly projects at gates

Attractiveness

- Market size/ Growth rate
- Revenue/ Margin Potential
- Defensibility
- Ramp Rate

Capability

- Difficulty of Solution
- Cost/ Time to Develop
- Capability of Resources
- Capability of Assets

The project assessment is the primary tool used for justification.



Stage-Gate Process

Kill ugly projects at gates

Current Thinking

Gate 1

Gate 2

Gate 3

EDIT MODE

Copy From

Project Start - End : 08/07/2023 - 03/10/2027

(Project) Total

Name	Assessment Comments	
ATTRACTIVENESS		
Market Attractiveness	Target market size > \$100M	Management growth > GDP
Customer Engagement	Target market size > \$100M	Product with customer base
Product Uniqueness	Target market size > \$100M	Product used by the customer
Revenue Potential	Target market size > \$100M	Greater than \$20M
Margin Contribution	Target market size > \$100M	33%-40%
Ramp Rate (Time to Maturity)	Target market size > \$100M	and full potential in 4
Defensibility	Joint IP Position	high switching costs
Attractiveness Score		3.4
CAPABILITY		
Cost (net sample expense) to develop	Long development cycle due to FR and WRB requirements.	budget of \$100,000
Time to develop (FTE, time to launch)	2 years, Size of Prize will dictate resources needed.	High uncertainty, large FTE commitment (Multiple years of 1+ FTE)
Difficulty of Solution	Core FR platform but no immediate line of sight to solution. Will take multiple iterations.	Moderately low probability, no relevant data to predict probability of technical success
Design Criteria Understanding	Technical solutions are well scoped. Product scopes to be defined.	Moderately probability. Good understanding of customer needs/design criteria
Resource Fit	Multiple FR solutions but applications in this market are to be developed.	General idea of technology area, but significant gaps in expertise
Asset Availability	Width requirements don't align with current assets.	New assets will be required. Moderately high capital cost
Capability Score		2.1
Total Score		2.8

Proposed value proposition is not compelling compared to current alternatives.

Product will be perceived as equivalent to current alternatives.

Product will be perceived as advantaged, but unknown value to market.

Product will represent a marketable advantage in areas that will be valued by the customer.

Value proposition is far superior to current solutions in aspects that have importance to customers.

A dedicated, intentional portfolio management activity was needed to re-prioritized projects.



Stage-Gate Process

Kill ugly projects at gates



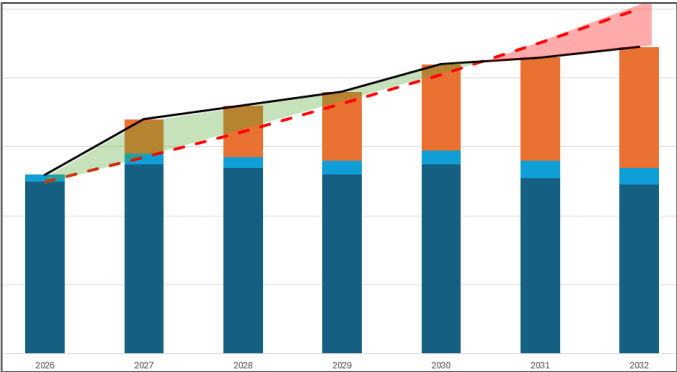
Portfolio Review

Re-prioritize projects based on “goodness”

Productivity Index

$$\begin{aligned} \text{PI} &= \frac{5 \text{ yr NPV}}{(\text{Remaining Days} \times \text{FTE}) + 100} \\ &= \frac{\text{Profit Impact}}{\text{Remaining Effort}} \end{aligned}$$

We have moved from portfolio review to a strategy-linked portfolio management process.



Stage-Gate Process

Kill ugly projects at gates



Portfolio Review

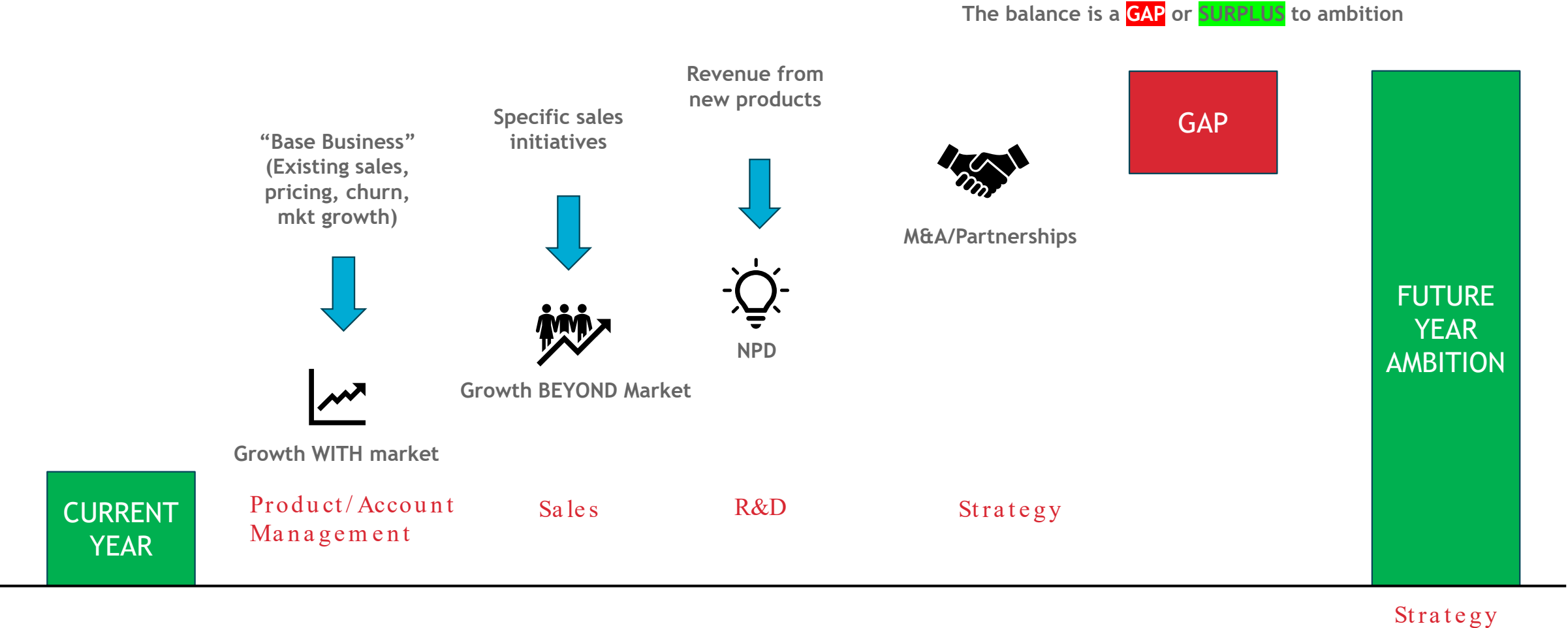
Re-prioritize projects based on “goodness”



Portfolio Management

Resource for short- and long-term sufficiency

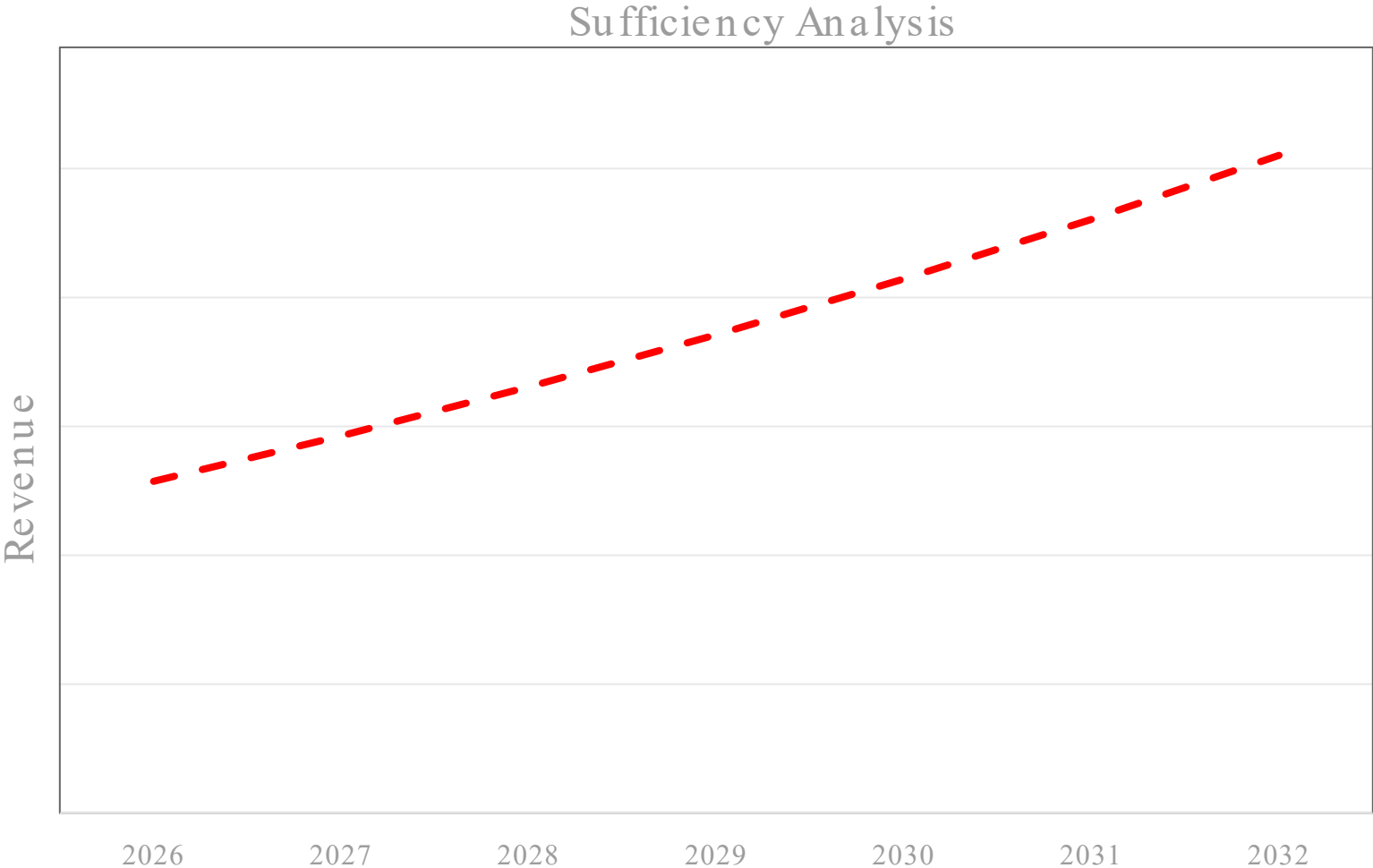
Sufficiency is a concept that ties together the levers of growth and compares against an ambition.



The strategic growth plan is the basis for sufficiency analysis.

Data sources:

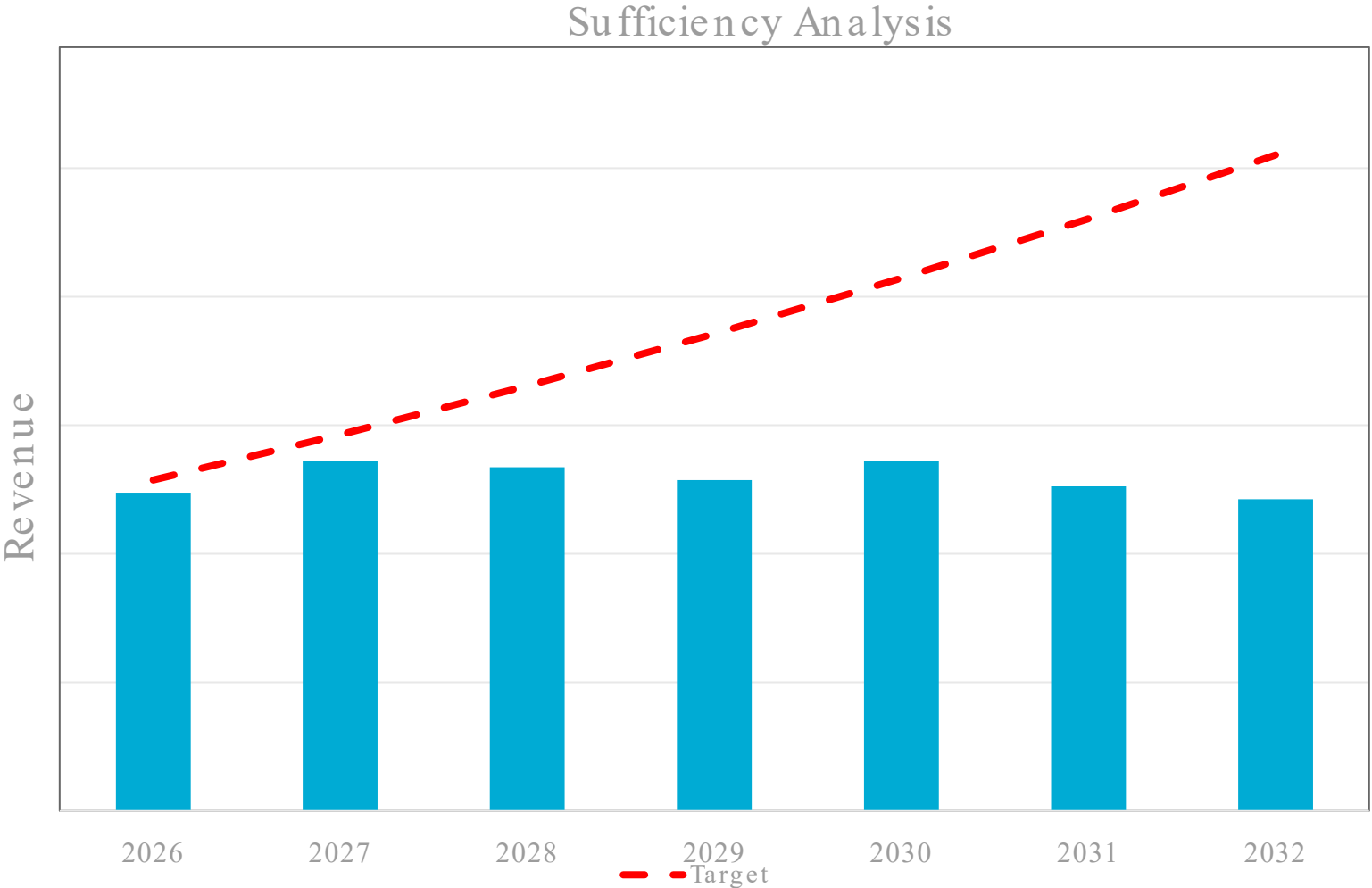
Strategic plan (Growth aspiration)



Agile Stage-Gate pushes approvals down to the project level
but still requires schedule updates.

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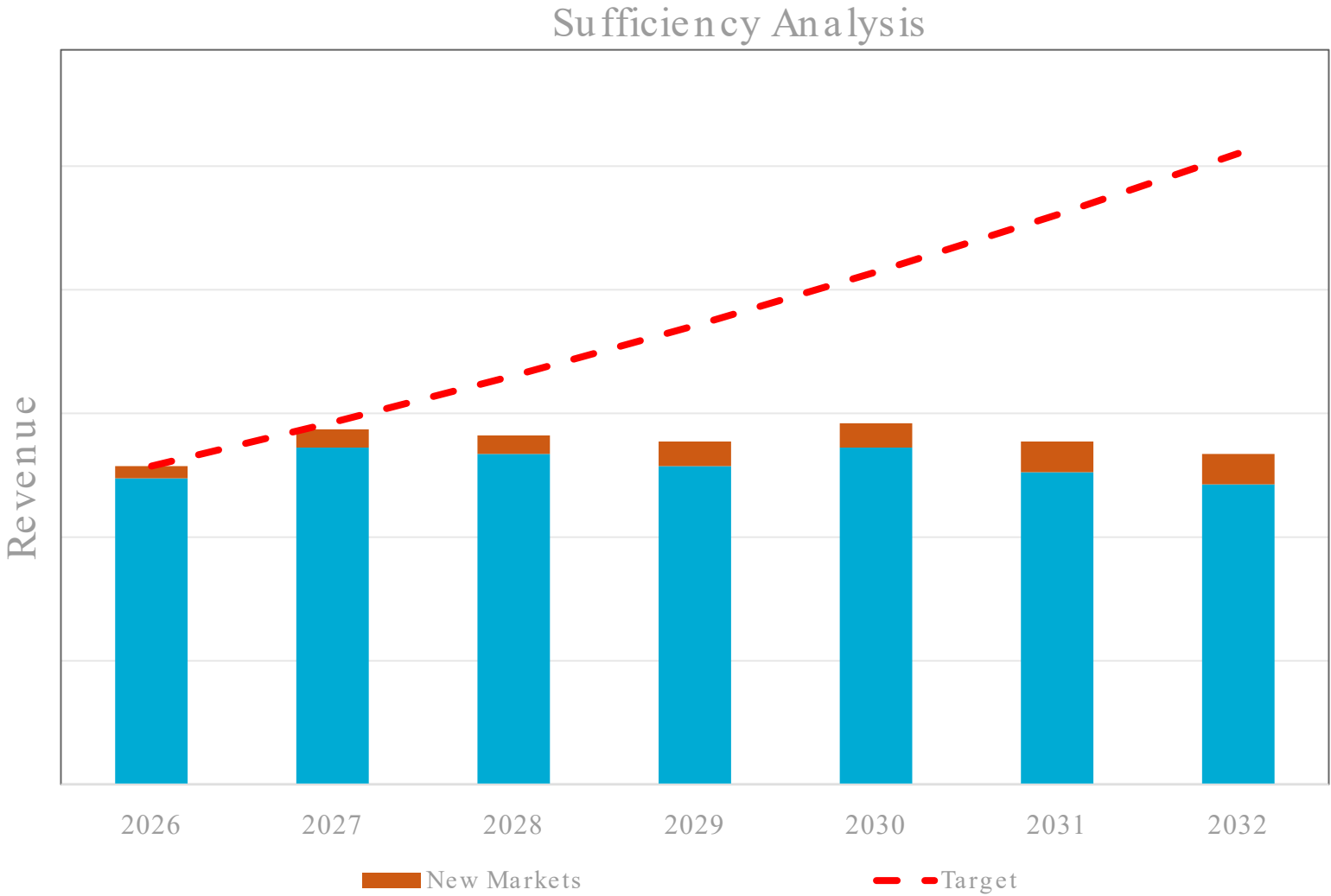
- Strategic plan (Growth aspiration)
- Sales Plan (existing products/existing markets)
 - Market growth
 - Share loss/churn/obsolescence
 - Recently launched product growth
 - Cannibalization



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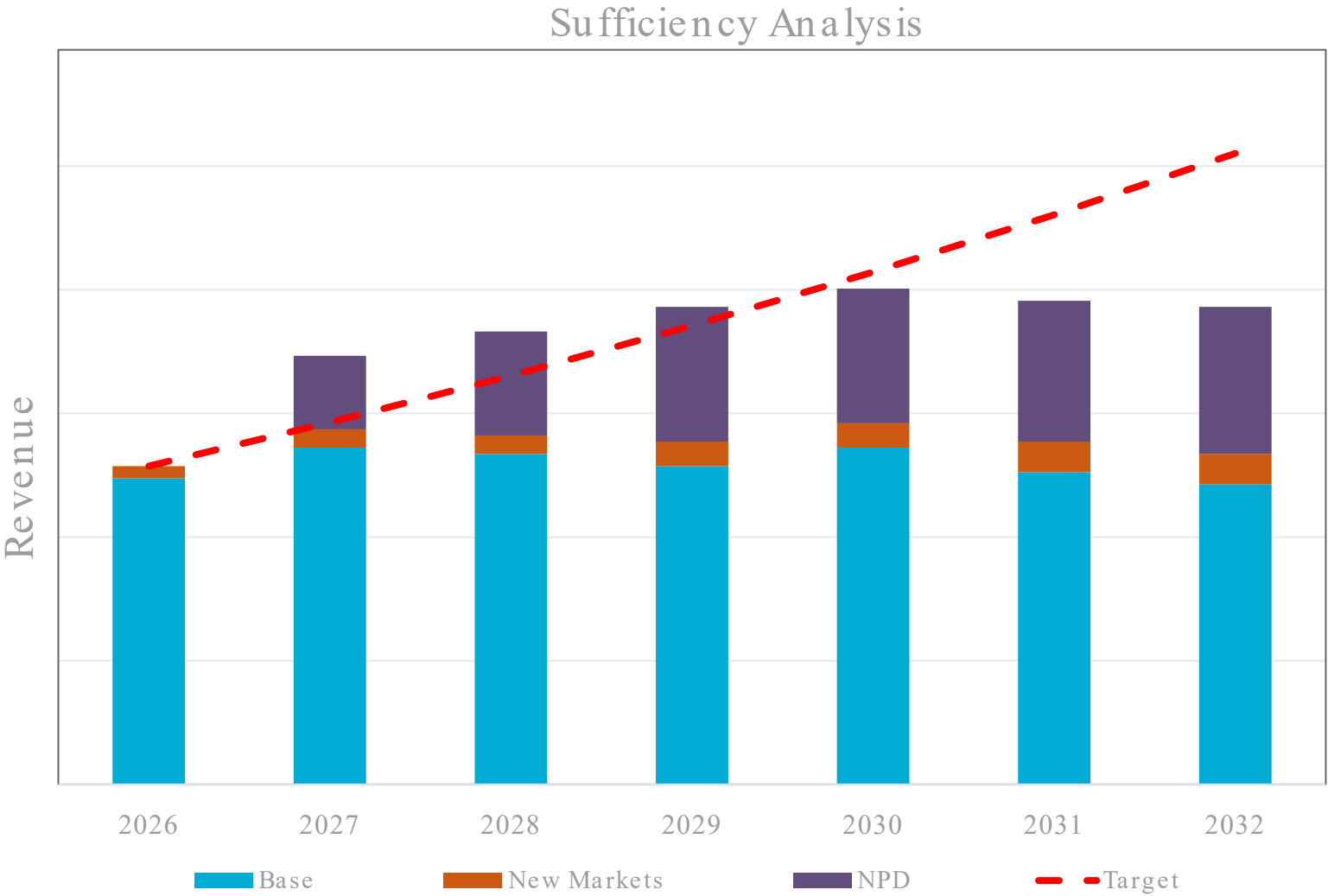
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- Sales Funnel (existing products/new markets)
 - Phase-weighted CRM data



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 - Phase-weighted CRM data
- Revenue from new products
 - Phase-weight NPD (Power Steering) data



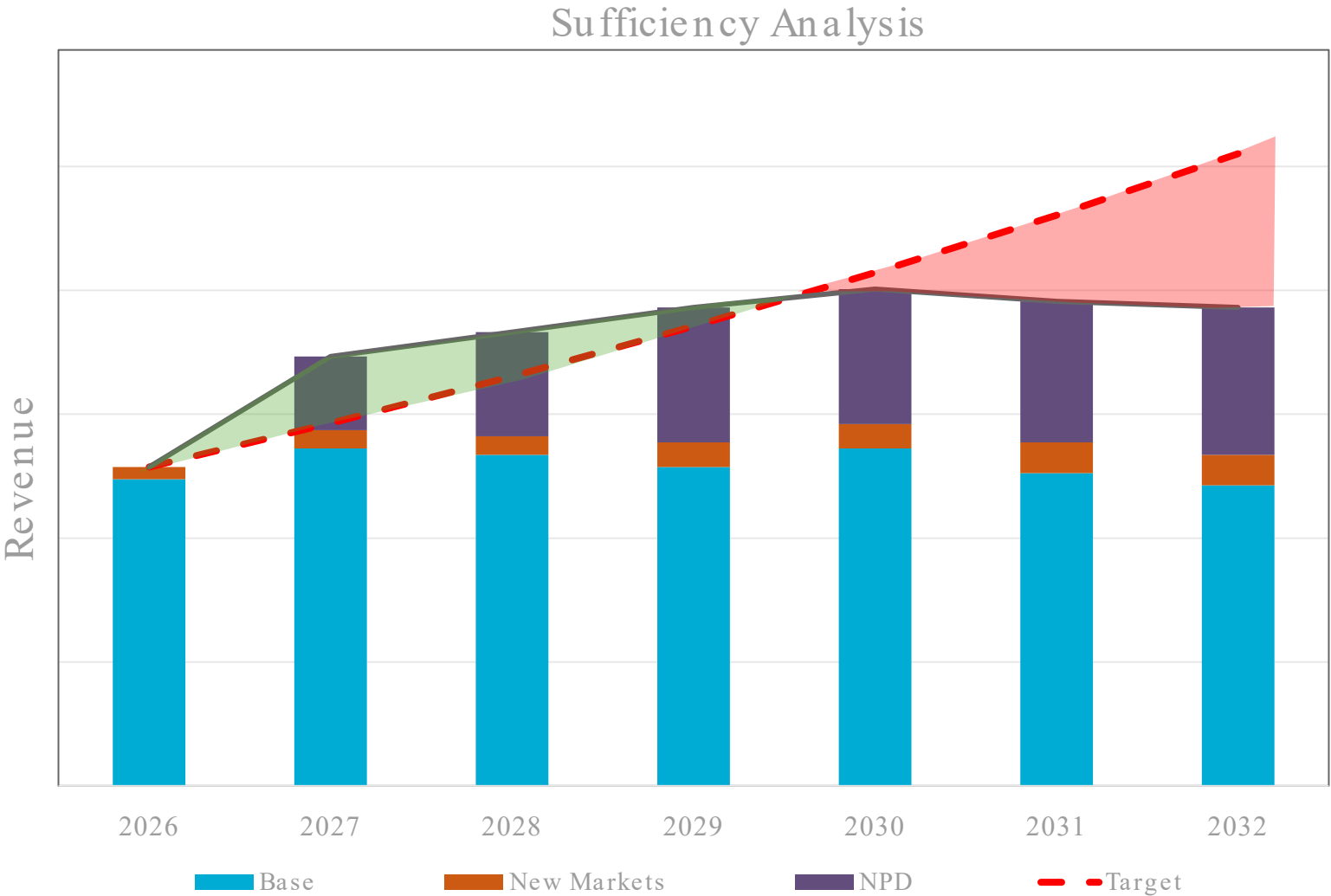
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Surplus

Gap



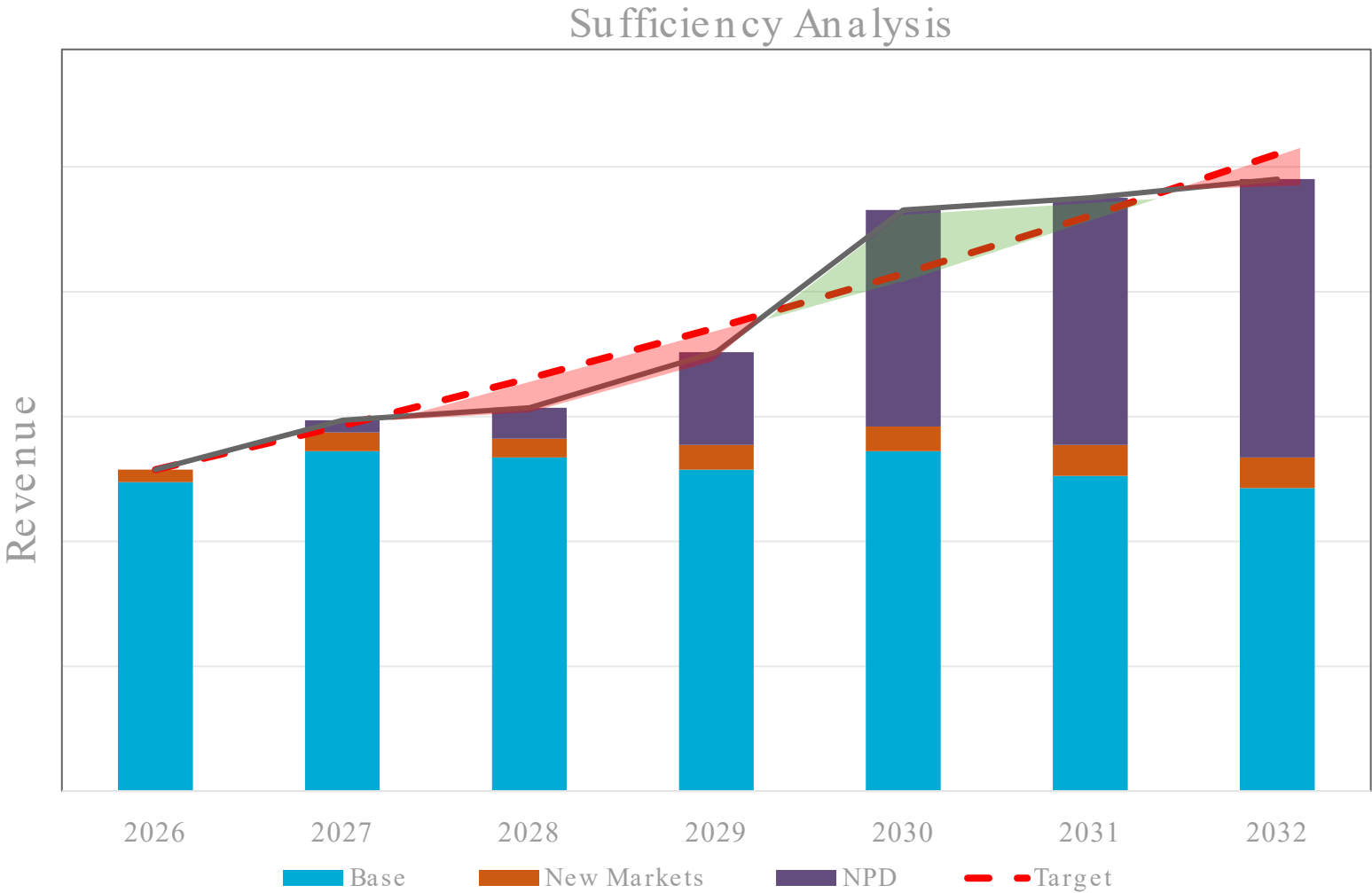
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Surplus

Gap



The journey continues, and we learned some key lessons along the way.

The process must be driven by management.

There must be something in it for the project owners/scientists.

Standardize only what needs to be standardized.

Reward system must be matched to strategic goals.

Optimizing a process is a journey, not a destination.

