

The 13th Annual Americas School of Mines Profit improvement within the mining industry

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*connectedthinking

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What the Industry is Experiencing

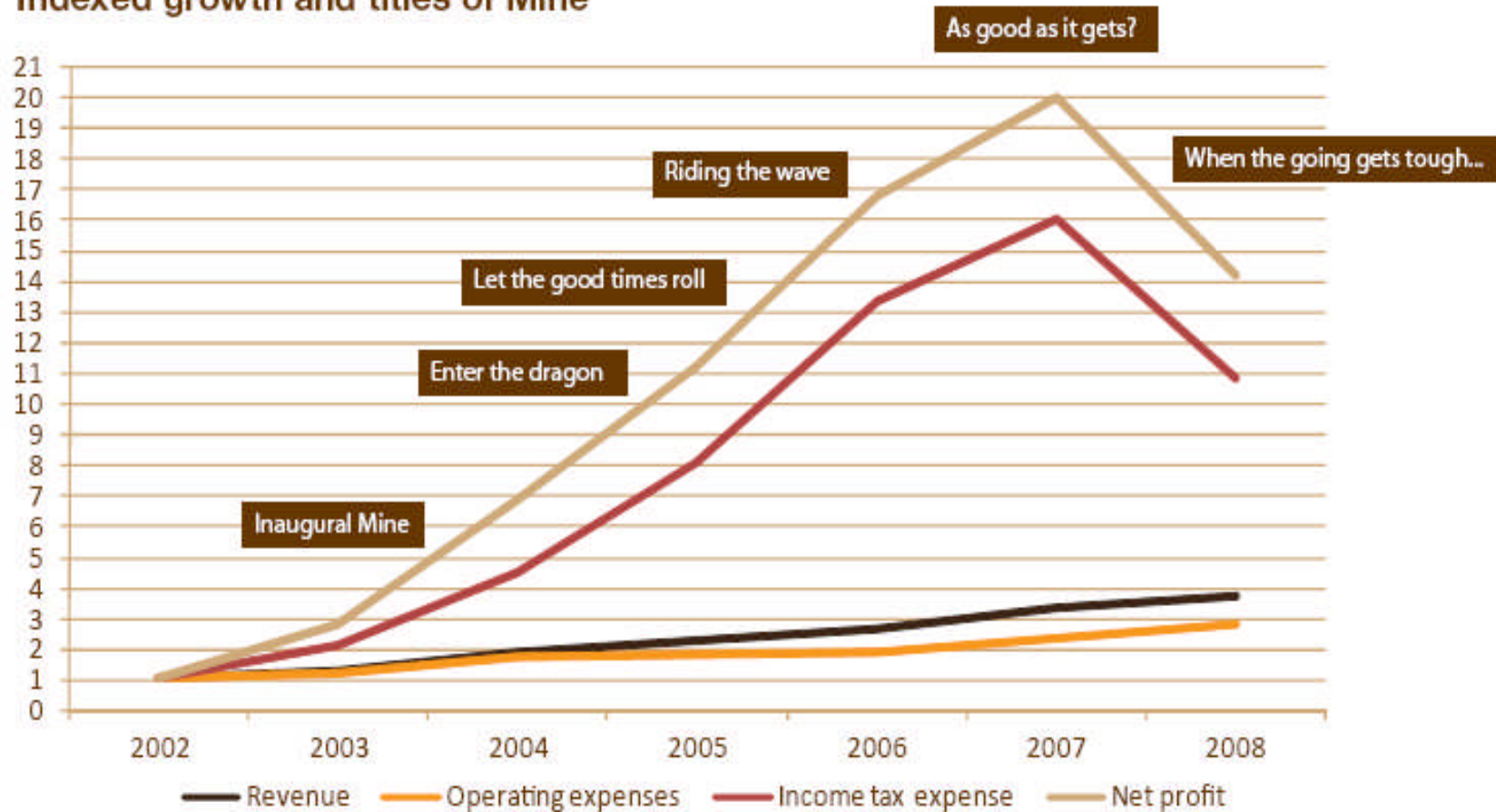
PwC – Review of global trends in the mining industry

Mine publication 2008

- Operating costs continued to rise at a greater rate than revenue (27%).
- 50% of the Top 40 recorded impairment charges in the year (\$31 billion).
- Net profit decreased 14% - the first decrease since the start of our analysis.
- Short-term debt repayments became tough to refinance.
- Outlook for 2009 is bleak given full impact of lower commodity prices will directly impact earnings.
- Turnaround and maintenance costs have increased 30%-50% over the past 5 years.

Trends in Recent Years

Indexed growth and titles of Mine



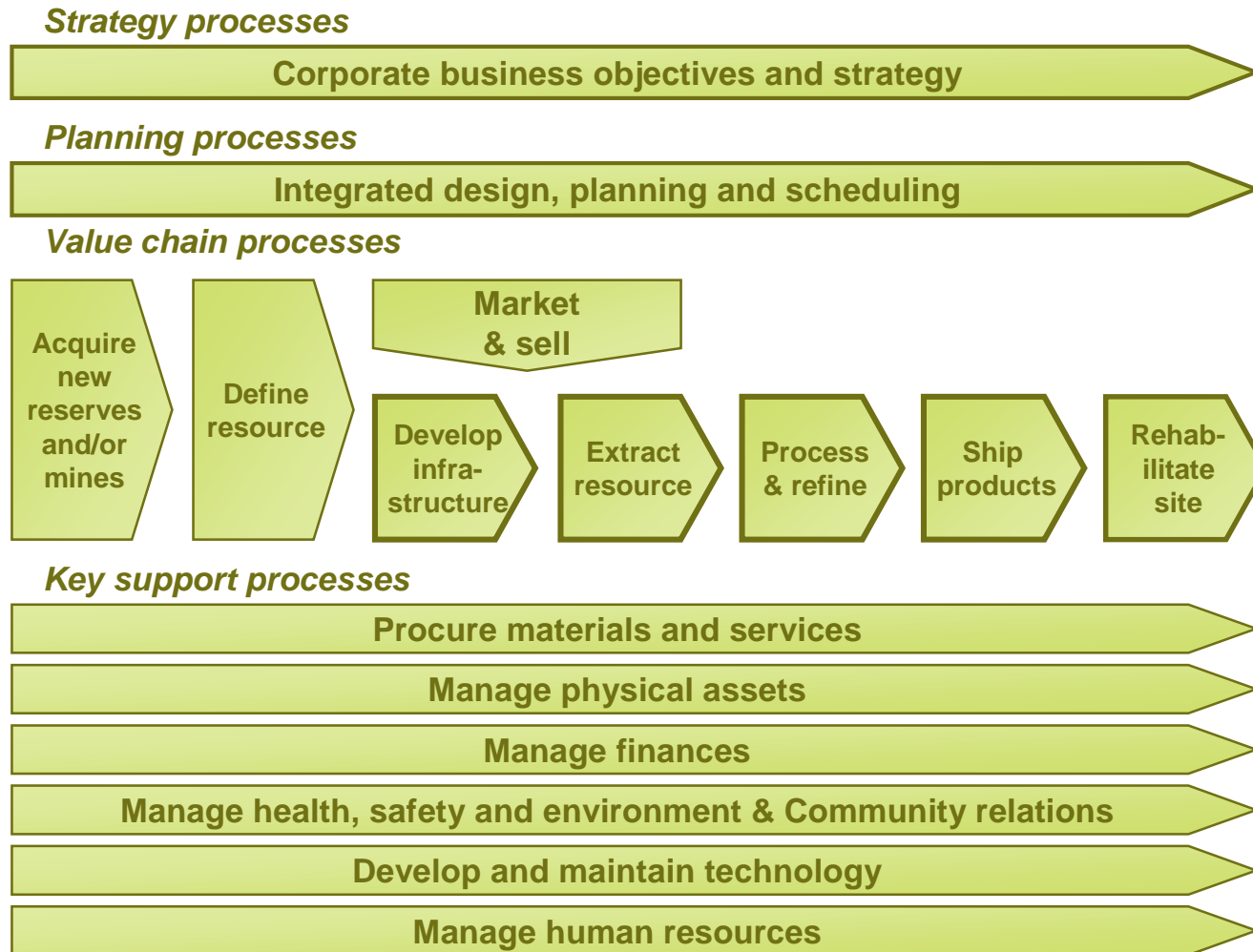
What we have been doing in the Market

- We have been working with clients on major industrial operations and capital projects. This work has focused on improving both financial and non-financial performance through optimization and efficiency.
- Our work has been focused on sustainable improvement and, to a large extent, the application of lean principles and the integration of people, processes and systems.
- We work in conjunction with our clients to identify areas for improvement and joint teams challenge current processes and practices.
- Changes are made where appropriate and improvements are quantified and tracked.
- Whilst we have well developed tools for diagnosis and intervention our approach requires full commitment from the business unit teams across functional disciplines.
- The work is conducted by an integrated client and advisor team using as many client side people as available given the requirement to maintain ongoing safe operations and project development.
- If the situation requires, we work with other specialty contractors as well while always maintaining an integrated approach to the change process.

Our Approach – Business Benefits

- We do this with you, not to you.
- Focus on opportunities, not on what was done wrong in the past.
- Joint operator, advisor team which takes a whole system (line & function) approach.
- Ability to focus on end-to-end value drivers individually or in multiples.
- Focus on stability & sustainability that is the platform for a continuous improvement cycle.
- Materiality of the target improvements - Return on investment.
- Skills helping teams identify and eliminate waste and embedding those skills into the culture through collaboration and extensive knowledge transfer activities.
- Combination of technical and specialist functional knowledge, change management techniques specific to the environment.
- Rigour and discipline to the change process and improvement needs.
- Experience:
 - We have done this before in capital-intensive industries.
 - We know what to look for and we are familiar with industry trends.
 - We speak the language and we have identified the common shortcuts.
 - We identified and implemented over \$400M in savings for a single client in 2008.

The Mining Value Chain



Mining Activities and Areas of Focus

- Production operations & optimization
- Maintenance, inspections and shutdowns
- Projects, modifications and engineering
- Major capital projects

As well as these key end to end process activities we look in detail at the way the operation is supported by the functional and governance activities such as:

- Planning, scheduling and workplace execution
- Cost capital & control
- Managing 3rd party spend and supply chain management
- The business/performance outcome
- People management

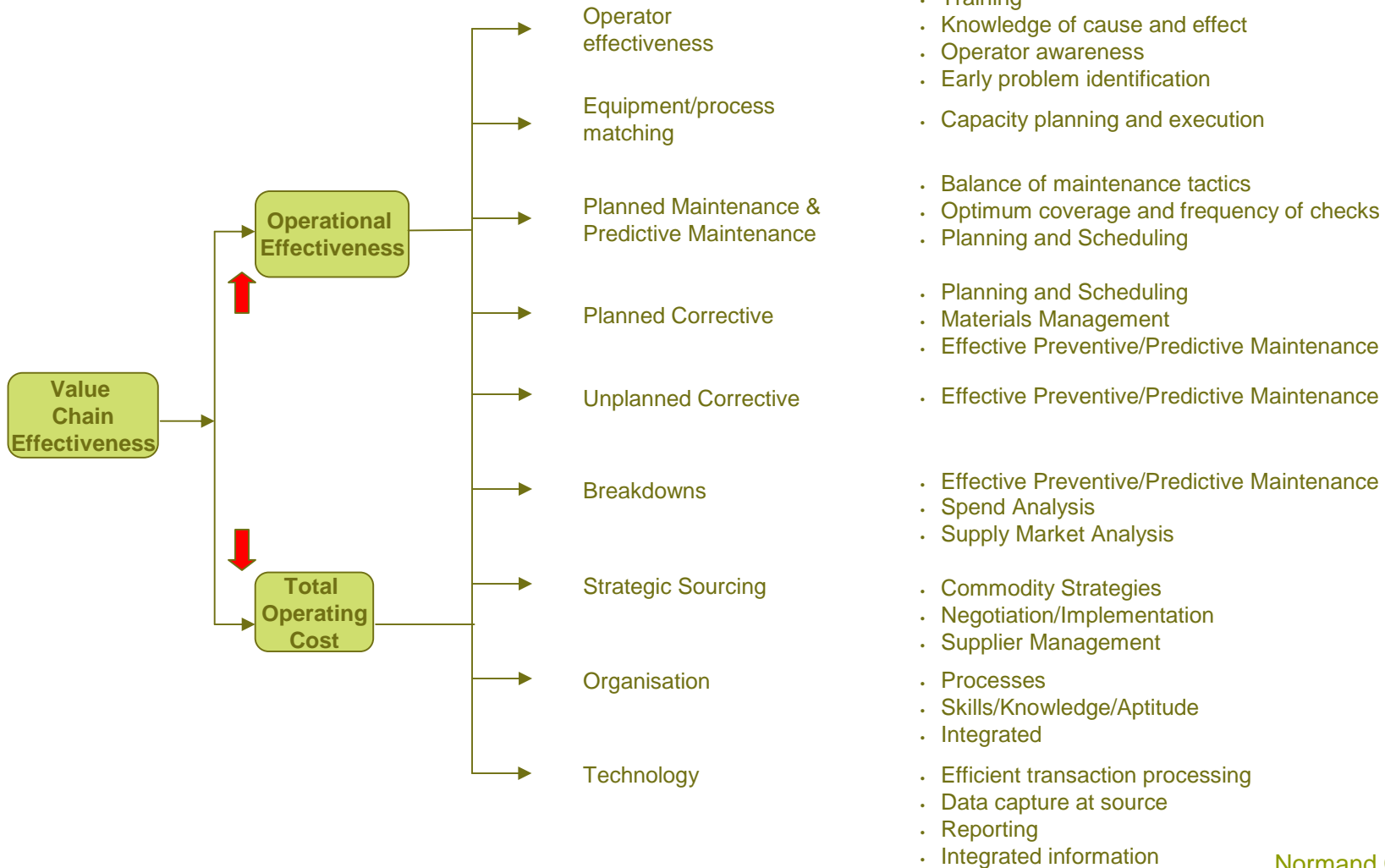
Value Drivers of Cost Effectiveness

Objective

Key Parameter

Key Factors

Drivers



The Direct Cost of Asset Management is High

- Maintaining plant, fleet, facility and equipment is a major % of operating costs: from 30 to 50%.
- About half of the maintenance cost is related to parts or materials management.
- This does NOT include the cost of process interruption, slowdown or scrap - resulting in lost revenue.
- Most mining operations run at <70% operating effectiveness because of breakdowns, idling, recycling.

Traditional Approach & Lessons Learned

Common approach		Common reasons for failure
<p>Top Down</p> 	<p>“Top-down” review of the business – typically organization and process changes are required</p>	<ul style="list-style-type: none"> • Little consideration for the management decisions driving cost • Organization focus and betting on a “silver-bullet” (e.g., shared services and off-shoring) • Complexities of reducing costs and existing behaviors are not changed
<p>Slash and Burn</p> 	<p>Business as usual but at less cost due to reduction in operating plans by a set target (e.g., 10% cost reduction)</p>	<ul style="list-style-type: none"> • Reactive and focused on survival • Short-term cost cutting and focus on one-off savings (e.g., travel) • Based on arbitrary targets • Savings difficult to manage and track • Negative impact on morale and culture
<p>Boil the Ocean</p> 	<p>A bottoms-up detailed analysis across all departments to identify potential opportunities</p>	<ul style="list-style-type: none"> • Timeframe constraint and lack of urgency • Greater investment required • Typically loses momentum and focus • Negative impact on morale and culture • Process often only produces lists • Departments become personally invested in their own budgets and rarely find waste

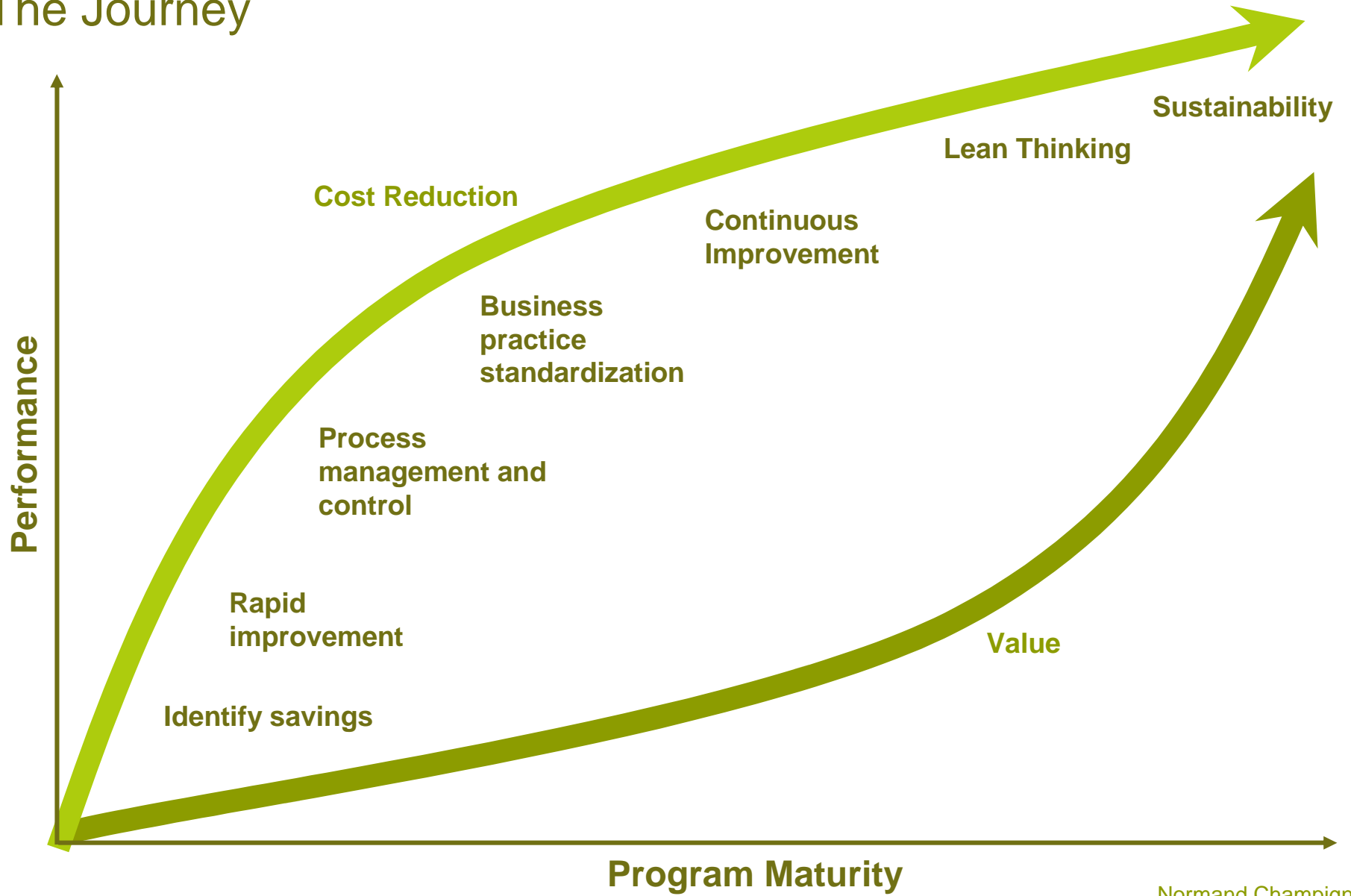
The focus needs to be on waste and outcomes rather than inputs, “eliminate bad costs and support or even increase good cost”.

Traditional Approach to Cost Reduction & Lessons Learned

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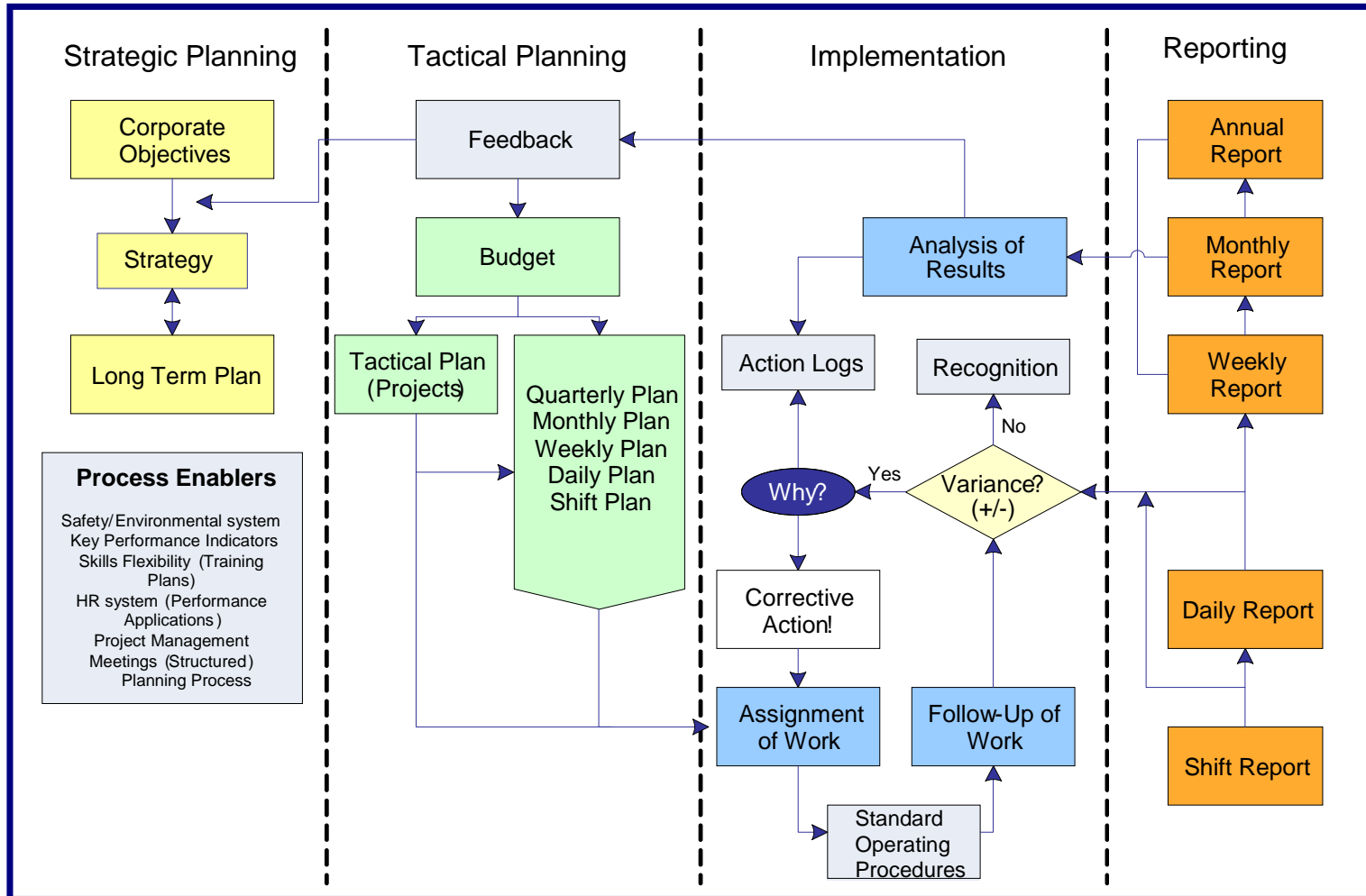
- Traditional methods of cost reduction often fail over time.
- A strong foundation for cost reduction activities must be established before introducing game-changing transformational initiatives.
- There is no accountability, accuracy, or way to evaluate cost reduction efforts without clarity of operating cost drivers and linkages to financial plans.
- There are a number of steps companies can take immediately to move to sustainable cost reduction.
- If the spend culture isn't addressed cost reductions won't be sustainable.

The Journey



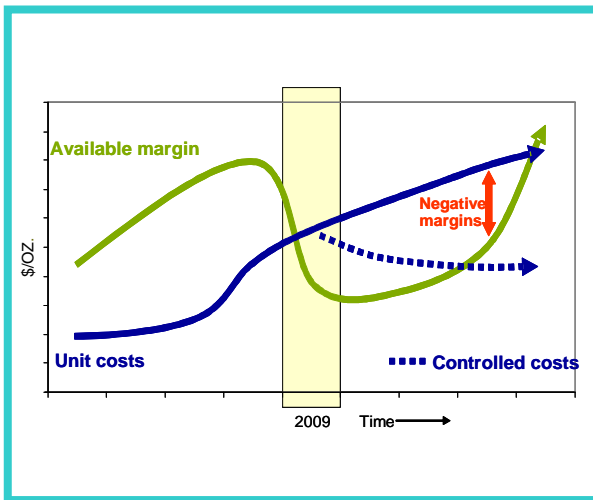
Business Performance Management Strategy

Performance improvement programs must take on a system wide approach.



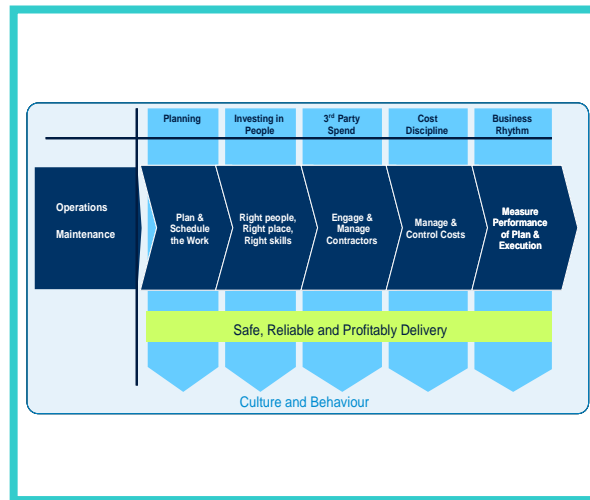
The Business Case – 3 Phase Approach

Initial Analysis



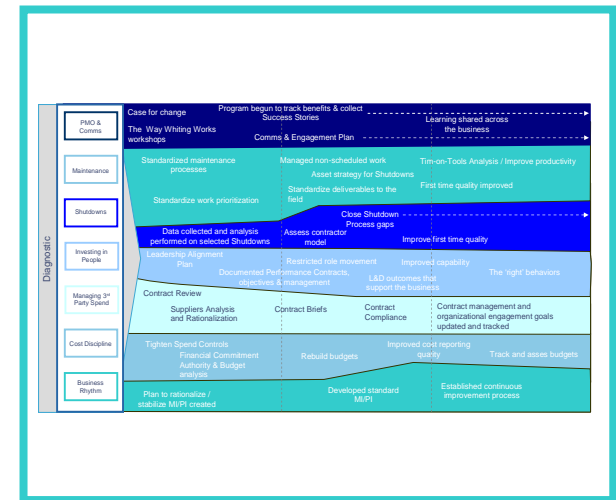
WHAT are the potential savings?

On-site Diagnostic



WHERE are the potential savings?

Improvement Plan



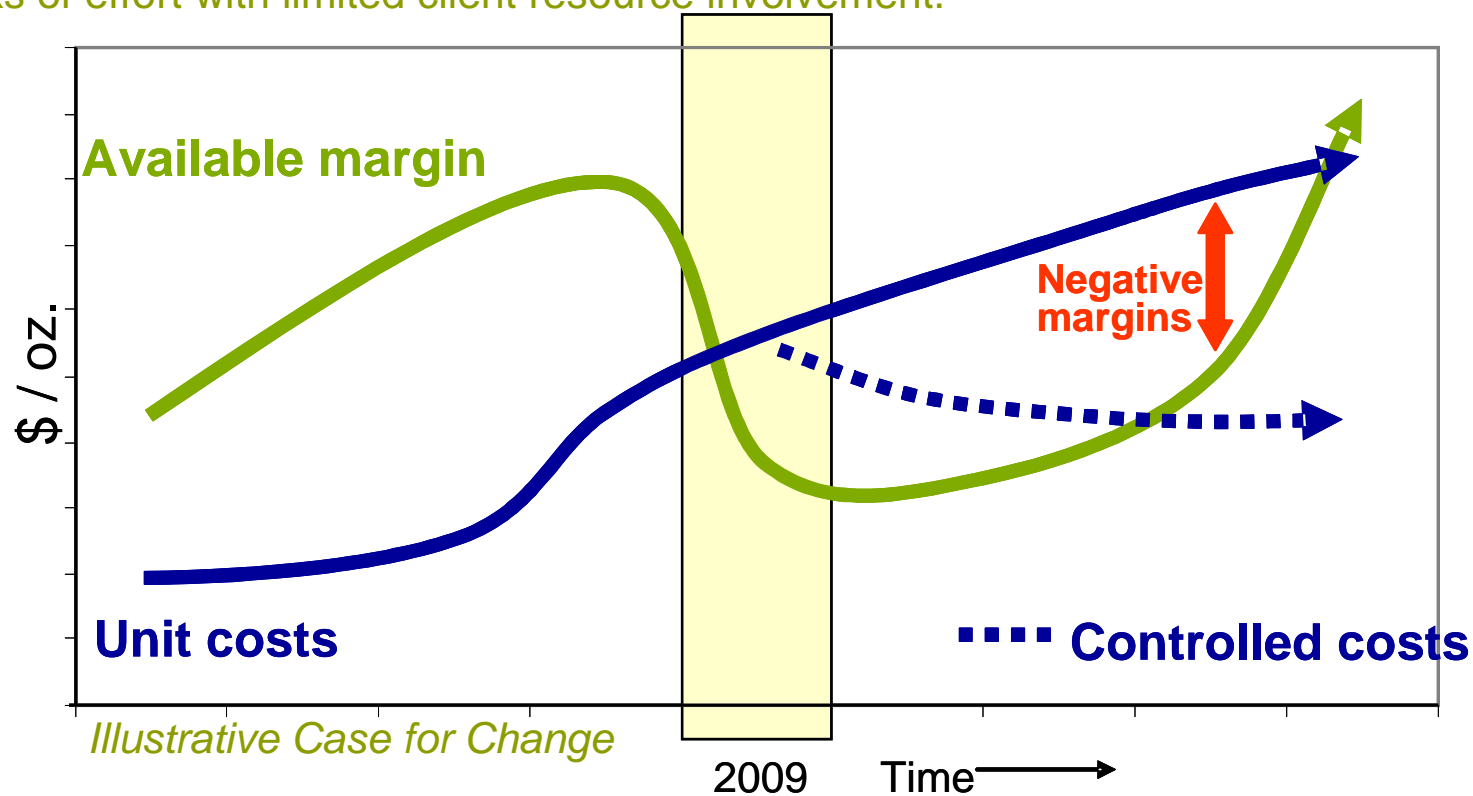
HOW do we realize the savings?

Phase 1 * Initial Analysis

High level review of current data to identify potential savings and opportunities.

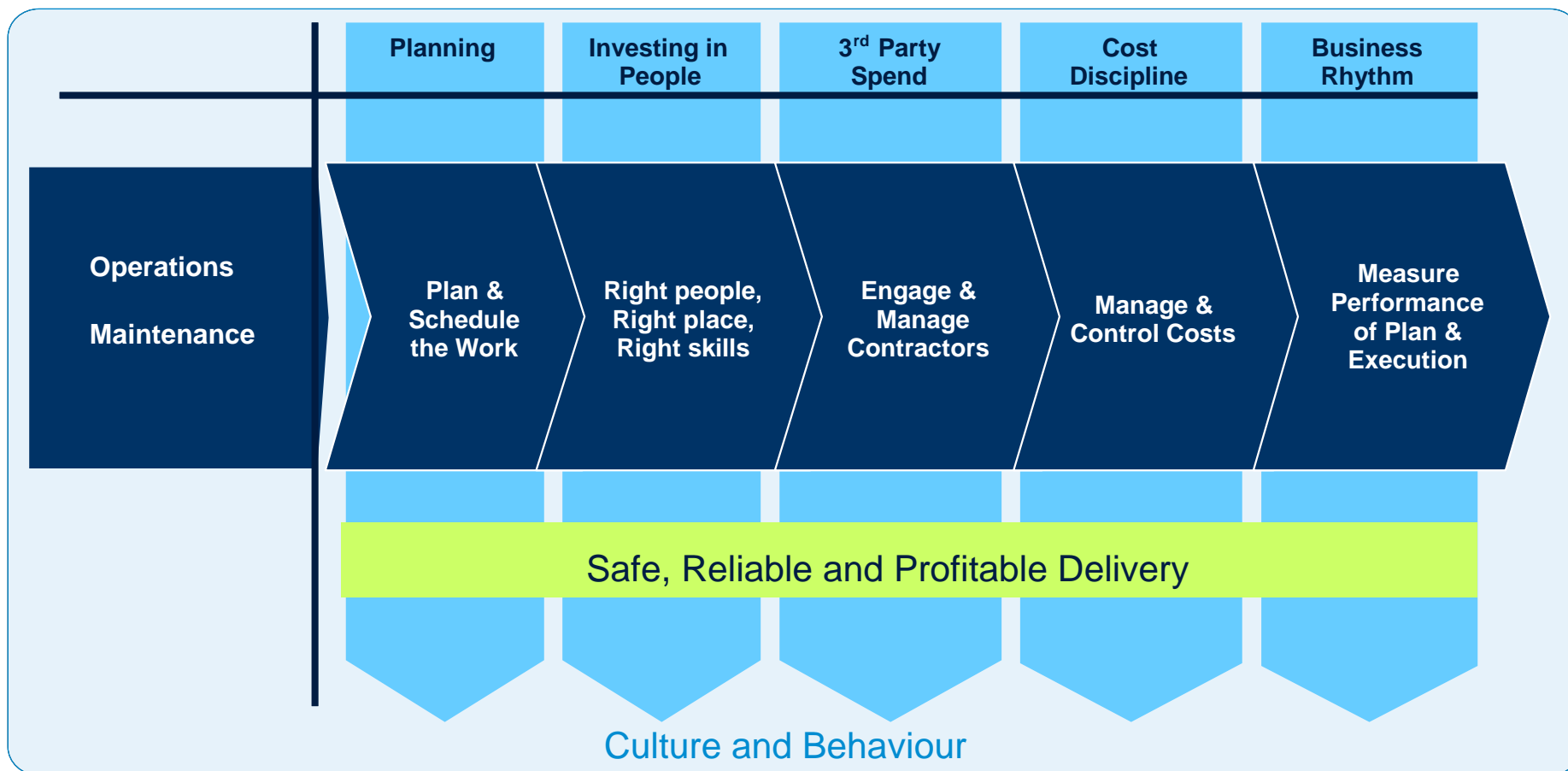
Key constraint areas can begin to drive prioritization.

Typically conducted remotely and focused on data analysis and rationalization. Generally 1-2 weeks of effort with limited client resource involvement.



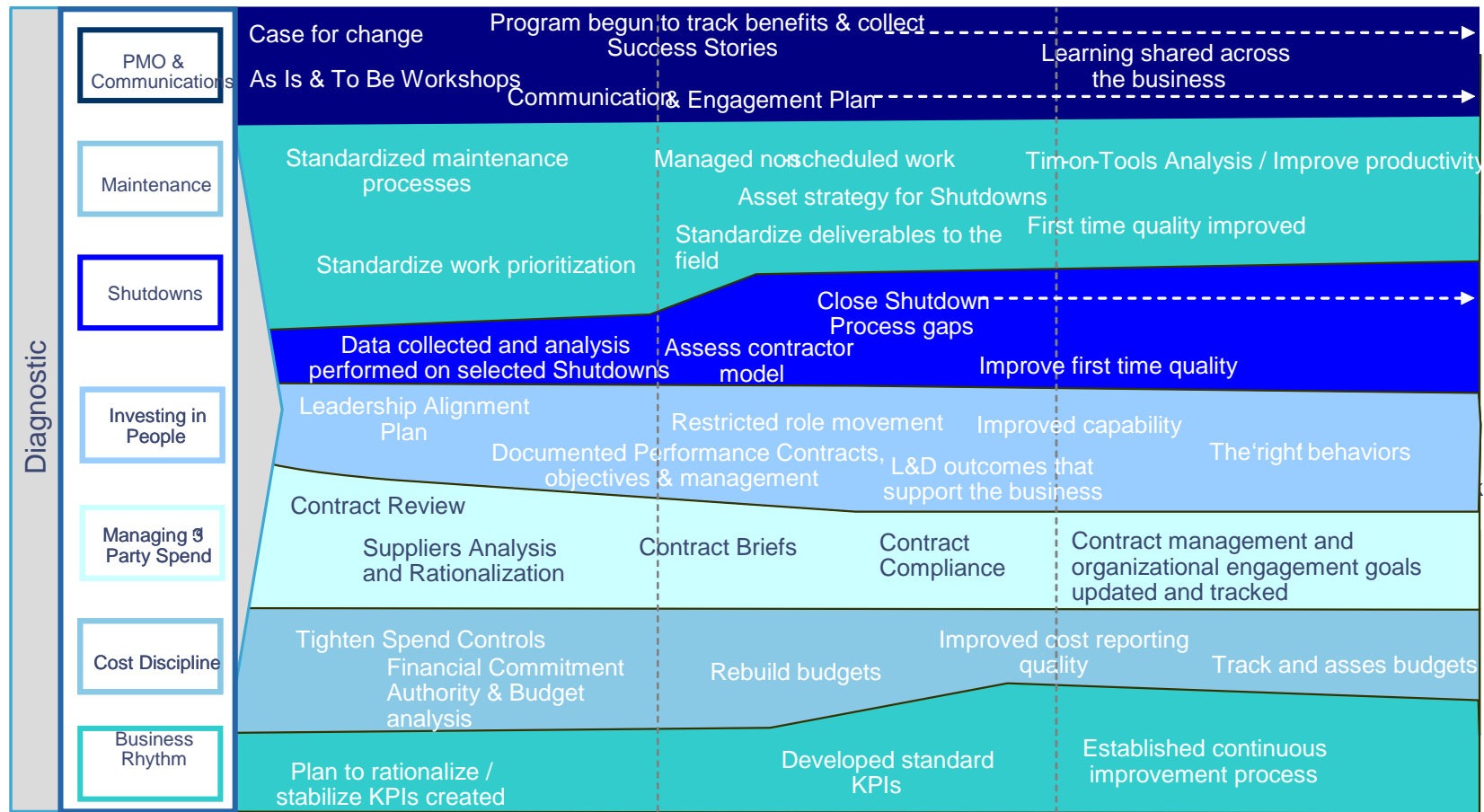
Phase 2 * On-site Diagnostic

Diagnostic to identify the issues that lie across one or more of the end-to-end processes. Analysis points to the focus areas for improvement. Typically 3-4 weeks of effort conducted on-site with diagonal slice of site involvement.



Phase 3 * Improvement Plan and Execution

The scale & complexity of some of the projects can be great and we have developed an approach which takes manageable steps 100 days at a time with clear business outcomes (ROI) emanating from each step. Large scale joint project team with cross operations unit involvement.



“Innocence to Excellence” Practices in Mining

	Geology and Mine Planning	Process Plant Operations	Mine Operations	Maintenance	Supply Chain	Finance
Excellence	<ul style="list-style-type: none"> Formal principles Continuous updating Simulation methods Regular audits Team sign off Reconciliation as driver Integrated perf. mat 	<ul style="list-style-type: none"> Formal integrated planning Flexible KPI's Integrated risk planning Ops/Mtce, Geo/Mill/Ops Utilisation >95% Plan compliance >90% CI optimization studies 	<ul style="list-style-type: none"> Formal integrated planning Rolling structured LOM Integrated risk planning Ops/Mtce, Geo/Mill/Ops Utilisation >95% Plan compliance >95% Integrated perf. mgt 	<ul style="list-style-type: none"> Unplanned Work < 15% Availability top decile Integrated inventory mgt TPM, RCM, CBM etc in use Integrated CMMS Integrated planning Integrated perf. mgt 	<ul style="list-style-type: none"> Documented Supply Chain strategy Integrated KPI's Strategic sourcing for 100% of spend Full use of top tier ERP Utilisation of e-commerce 	<ul style="list-style-type: none"> KPIs drive business Planning based on agreed strategy & key drivers Reconciliation as driver >75% time on decision support Shared services in place
Competence	<ul style="list-style-type: none"> Blind checks & re-assays Geological continuity Geostatistics employed Multiple cut-offs used Industry definitions Geo & engineer sign-off Differences investigated Spot checks & standards 	<ul style="list-style-type: none"> Formal and functionally integrated planning Regular coordination with Mine/Mtce/Geo/Eng. Utilisation >90% Plan compliance >80% Specific process perf mgt. 	<ul style="list-style-type: none"> Formal planning process Annual structured LOM Plans discussed Ops/Mtce & Geo/Mill/Ops Utilisation >80% Plan compliance >80% Std performance measures 	<ul style="list-style-type: none"> Unplanned Work >15% Availability top quartile Controlled Parts Store Condition Maintenance CMMS for Work Orders, Backlogs, Schedules Std performance measures Unplanned Work > 30% 	<ul style="list-style-type: none"> Clear direction with supporting KPI's Strategic sourcing at regional level Direct charge < 10% Contract spend >90 % ERP capability in use 	<ul style="list-style-type: none"> Leading and lagging KPIs Using rolling forecasts Root cause analysis of variances >30% time on decision support Standardised processes
Understanding	<ul style="list-style-type: none"> 2D interpretation Standard practices One cut-off Proven/probable only Engineer sign-off only Balancing of results 	<ul style="list-style-type: none"> Qtrly plans with S/T plans Data shared between Geo/Mine Ops/Eng'g Availability <90% Key process measures used Specific optimization studies identified 	<ul style="list-style-type: none"> Short & long term plans Quarterly plans Data shared between Geo/Mill/Ops, Ops/Mtce Utilisation 70-80% Plan compliance <80% Key measures used 	<ul style="list-style-type: none"> Average Availability Fixed Interval PM Parts Controlled Systematic Maintenance Disparate systems in use Key measures used 	<ul style="list-style-type: none"> Some site-wide SC initiatives Key measures in use Direct charge < 25% Contract spend 70-90% Local strategic sourcing 	<ul style="list-style-type: none"> Balanced set of KPIs Developing rolling forecast Variances reviewed monthly <30% time on transaction processing Recognise need for change
Awareness	<ul style="list-style-type: none"> Sampling averages Imprecise interpretation Black box optimisation Borrowed parameters Proven inventory Stand-alone geology LOM only reconciliation 	<ul style="list-style-type: none"> Ad hoc optimization studies Weekly schedules Some linkage Mine/Geo Global perf. measures Availability <85% 	<ul style="list-style-type: none"> No long term planning Weekly schedules Some Ops/Mtce exchange Some linkage to Geo/Mill Some measures in place Utilisation <70% 	<ul style="list-style-type: none"> Unplanned Work > 50% Inconsistent availability Manual Parts Store Preventive Maintenance Some work orders used Paper Work order mgt Some measures in use 	<ul style="list-style-type: none"> Little direction Some key measures in use Direct charge < 50% Contract spend < 70% Low use of ERP capability 	<ul style="list-style-type: none"> Historic financial measures Detailed plans prepared annually as one-off project Superficial ad hoc variance analysis > 50% time on transaction processing Processing by spreadsheet
Innocence	<ul style="list-style-type: none"> Selective assaying No geological input Closest sample approach Low cut-off, big number "Apples & oranges" Promoter sign-off Use total mineral content 	<ul style="list-style-type: none"> Daily schedules No maintenance linkage No linkage to Mine/Mtce. No optimization strategy Availability <75% Few perf. measures 	<ul style="list-style-type: none"> No long term planning Daily schedules No maintenance linkage No linkage to Geo/Mill Utilisation <50% Few perf. measures 	<ul style="list-style-type: none"> Unplanned Work > 75% Poor availability Ineffective Parts Store Breakdown Maintenance Manual Work order mgt Few perf. measures 	<ul style="list-style-type: none"> No SC strategy Few perf. Measures Direct charge >80% Contract spend <40% Primarily manual process 	<ul style="list-style-type: none"> No KPIs No formal planning Inconsistent Chart of Accts No variance analysis >75% time on transaction processing Labour intensive processes

	Mine Operations	
Excellence	<ul style="list-style-type: none"> • Formal integrated planning • Rolling structured LOM • Integrated risk planning Ops/Mtce, Geo/Mill/Ops 	<ul style="list-style-type: none"> • Utilization >95% • Plan compliance >95% • Integrated perf. mgt
Competence	<ul style="list-style-type: none"> • Formal planning process • Annual structured LOM • Plans discussed Ops/Mtce & Geo/Mill/Ops 	<ul style="list-style-type: none"> • Utilization >80% • Plan compliance >80% • Std performance measures
Understanding	<ul style="list-style-type: none"> • Short & long term plans • Quarterly plans • Data shared between Geo/Mill/Ops, Ops/Mtce 	<ul style="list-style-type: none"> • Utilization 70-80% • Plan compliance <80% • Key measures used
Awareness	<ul style="list-style-type: none"> • No long term planning • Weekly schedules • Some Ops/Mtce exchange 	<ul style="list-style-type: none"> • Some linkage to Geo/Mill • Some measures in place • Utilization <70%
Innocence	<ul style="list-style-type: none"> • No long term planning • Daily schedules • No maintenance linkage 	<ul style="list-style-type: none"> • No linkage to Geo/Mill • Utilization <50% • Few performance measures

Supply Chain	
Excellence	<ul style="list-style-type: none"> • Documented Supply Chain strategy • Integrated KPI's • Strategic sourcing for 100% of spend • Full use of top tier ERP • Utilization of e-commerce
Competence	<ul style="list-style-type: none"> • Clear direction with supporting KPI's • Strategic sourcing at regional level • Direct charge <10% • Contract spend >90 % • ERP capability in use
Understanding	<ul style="list-style-type: none"> • Some site-wide initiatives • Key measures in use • Direct charge <25% • Contract spend 70-90% • Local strategic sourcing
Awareness	<ul style="list-style-type: none"> • Little direction • Some key measures in use • Direct charge <50% • Contract spend <70% • Low use of ERP capability
Innocence	<ul style="list-style-type: none"> • No supply chain strategy • Few performance Measures • Direct charge >80% • Contract spend <40% • Primarily manual process

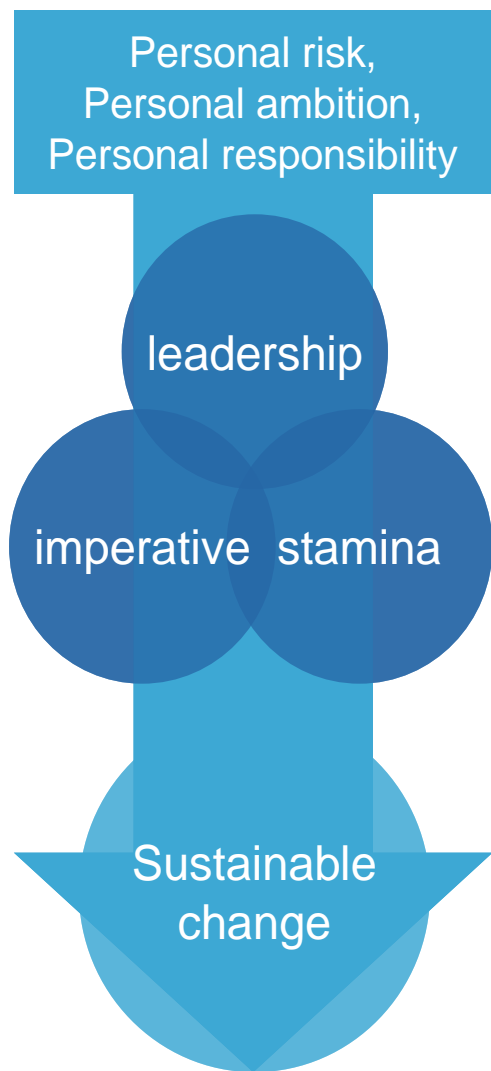
Cost Reduction Opportunities – Operations

- Do more and better maintenance planning and scheduling.
- Increase mobile equipment utilization.
- Improve strategic sourcing.
- Optimize shift changes/downtime.
- Do less rebuilds and component replacements.
- Maximize truck dispatch system.
- Reduce overtime.
- Implement effective warranty tracking process.

Cost Reduction Opportunities – Capital Projects

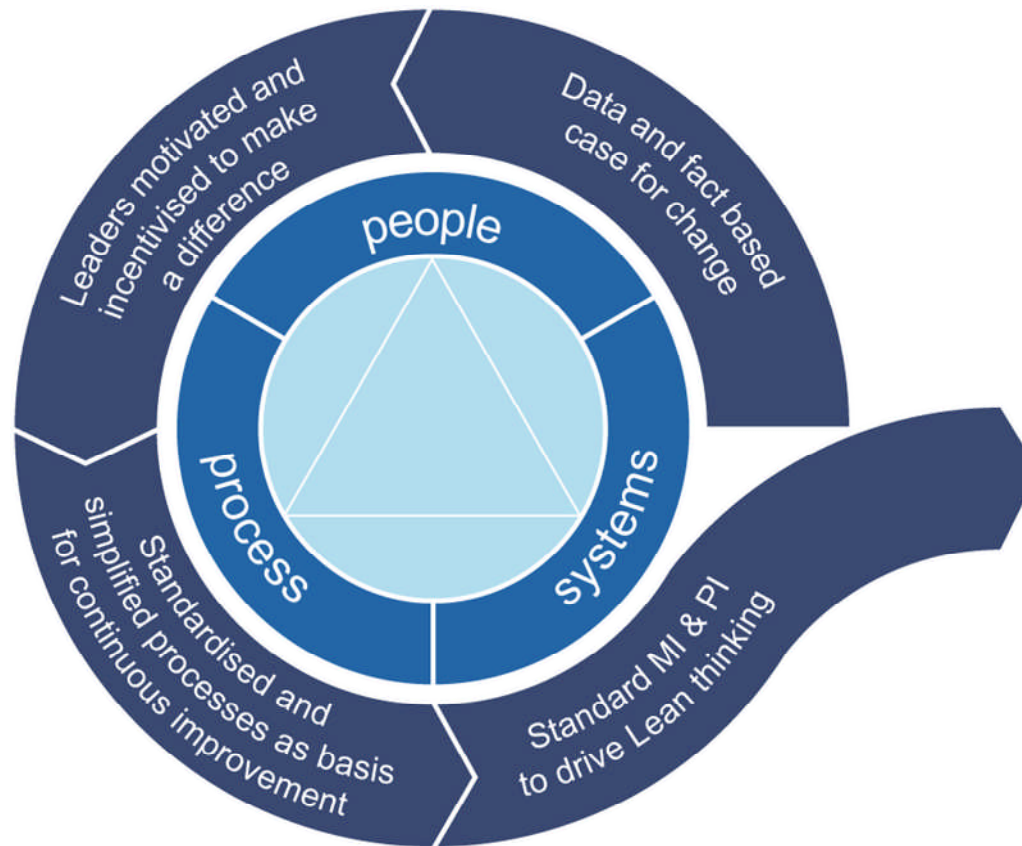
- Carry out accounting for actuals.
- Improve and review forecasts.
- Focus on % project advancement.
- Assess schedule compliance.
- Perform regular QA/QC audits, re-work/re-design, field change orders.
- Ensure technical integrity and user acceptance.
- Always analyze scope compliance.

Critical Success Factors



- Strong sponsor with the authority to change.
- Integrated client/advisor team where the client is leading.
- A strong and agreed case for change.
- Facts and data – benefits quantified.
- Leadership, corporate strategy and rewards – aligned and visible.
- Anticipate tough decision points and put them on the table.
- Prioritization – to create breakthrough performance.
- Benefits built in to performance contracts.
- Engage organization with trust and listening.
- Balance quick wins with long term sustainable change.
- People, then process, then systems.
- Operations, then functions.
- Knowledge transfer throughout to encourage sustainable change.

Lean & Efficient Operational Excellence



Sustainable cost reduction and business transformation is a journey. Success lies in identifying the opportunities, being rigorous in the implementation of changes, communicating success and rewarding continuous improvement behaviours.

Thank you

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