



KPMG Mining Operations



KPMG MINING OPERATIONS

YOUR TRUSTED PARTNER TO ASSIST IN THE NAVIGATION OF A FAST-PACED, DYNAMIC ENVIRONMENT.

A well-developed view of operations challenges in practice

Built on our experience leading operational teams and working with mining clients globally on a broad range of issues, we have a well-developed perspective of the real-world operations challenges that you face day in and day out.

This includes how risks and opportunities are managed in an integrated manner by management systems, what the key interfaces between these management systems are, and the key levers to drive value.

A collaborative approach that delivers results efficiently

KPMG work with you, not to you. Based on our years of experience we start with a hypothesis-driven approach, which allows us to eliminate those areas of lesser opportunity and focus on the more prospective areas.

We work collaboratively with our clients' subject matter experts to ensure we leverage their insights and knowledge.

Deep understanding of processes and decision-making in mining operations

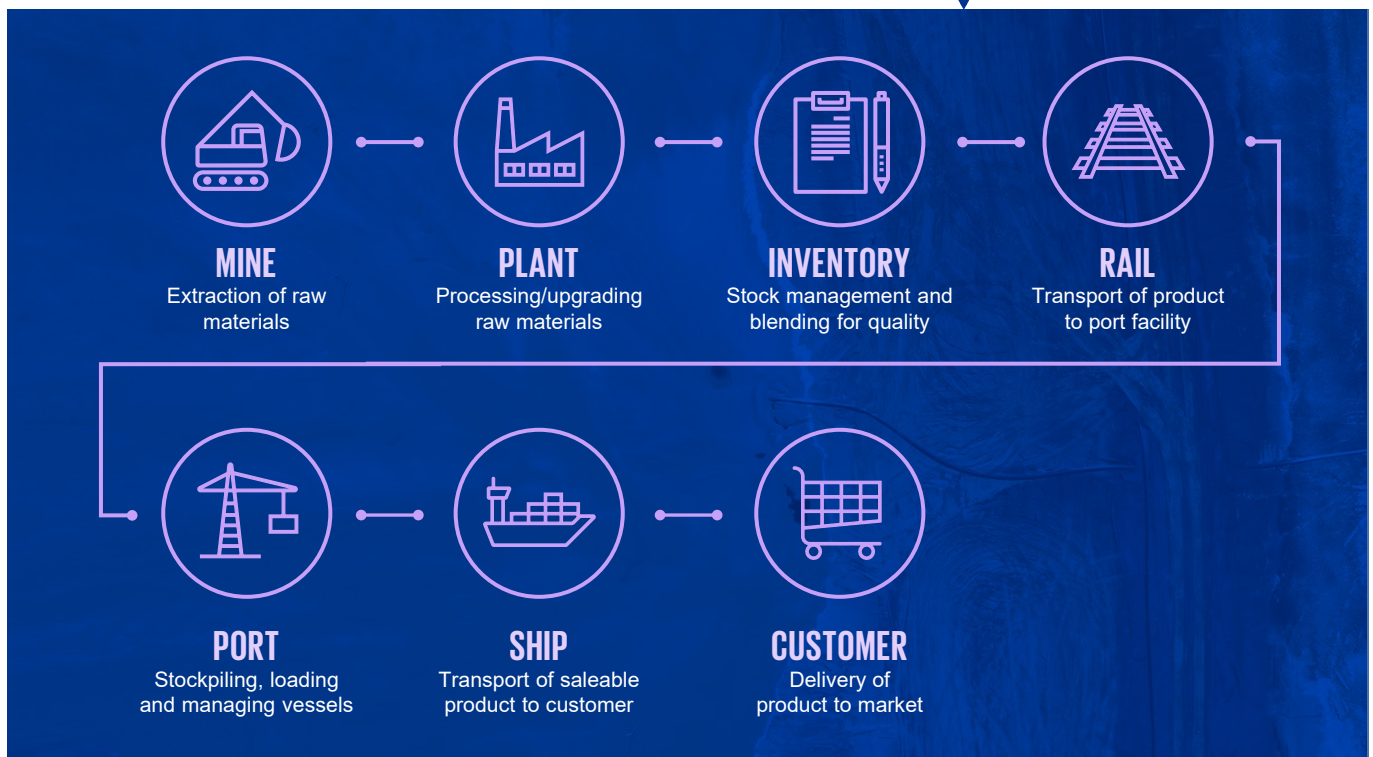
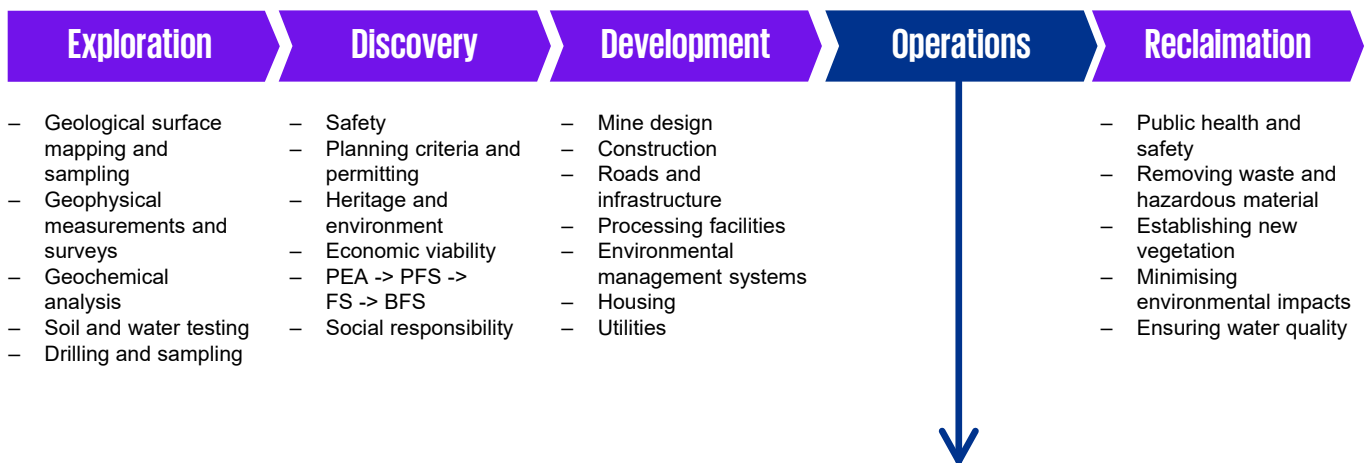
KPMG understands drivers of value in a mining context, operational processes, and how decisions are made at all levels of the organisation, and across the asset lifecycle.

We work with clients to ensure the business is set up for success and activity is in alignment to desired business outcomes.

What is Mining Operations?

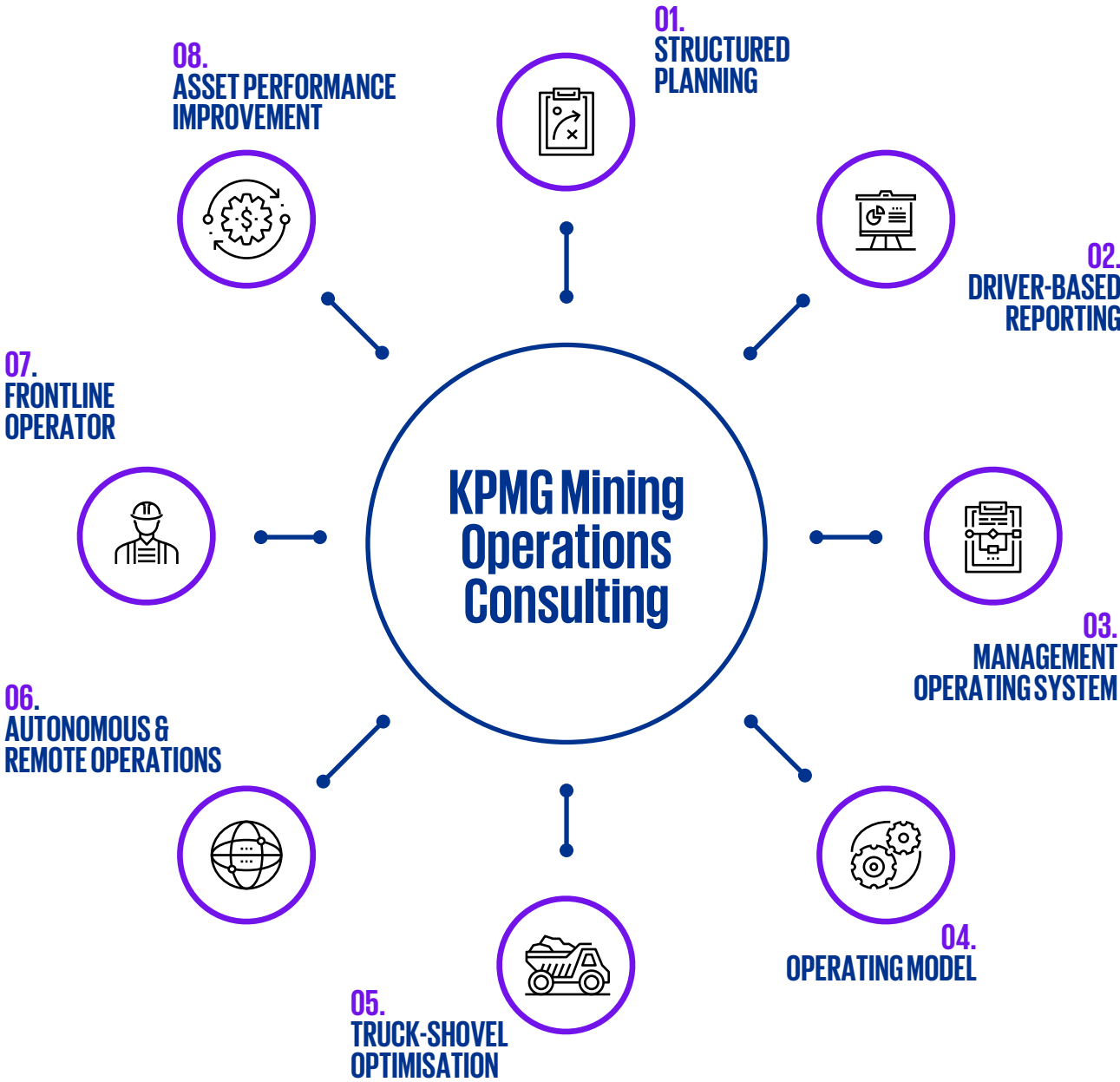
THE TERM GETS USED WIDELY AND FOR DIFFERENT THINGS: ENSURING CLARITY FROM THE OUTSET ALLOWS US TO FOCUS ON THE THINGS THAT MATTER TO YOU AND YOUR BUSINESS.

MINING



KPMG Mining Operations Services

WE HAVE LEADING EXPERTISE AND EXPERIENCE ACROSS A WIDE RANGE OF TIER ONE MINING CLIENTS AND CAN EFFECTIVELY ASSIST YOUR ORGANISATION ACHIEVE BEST PRACTICE.

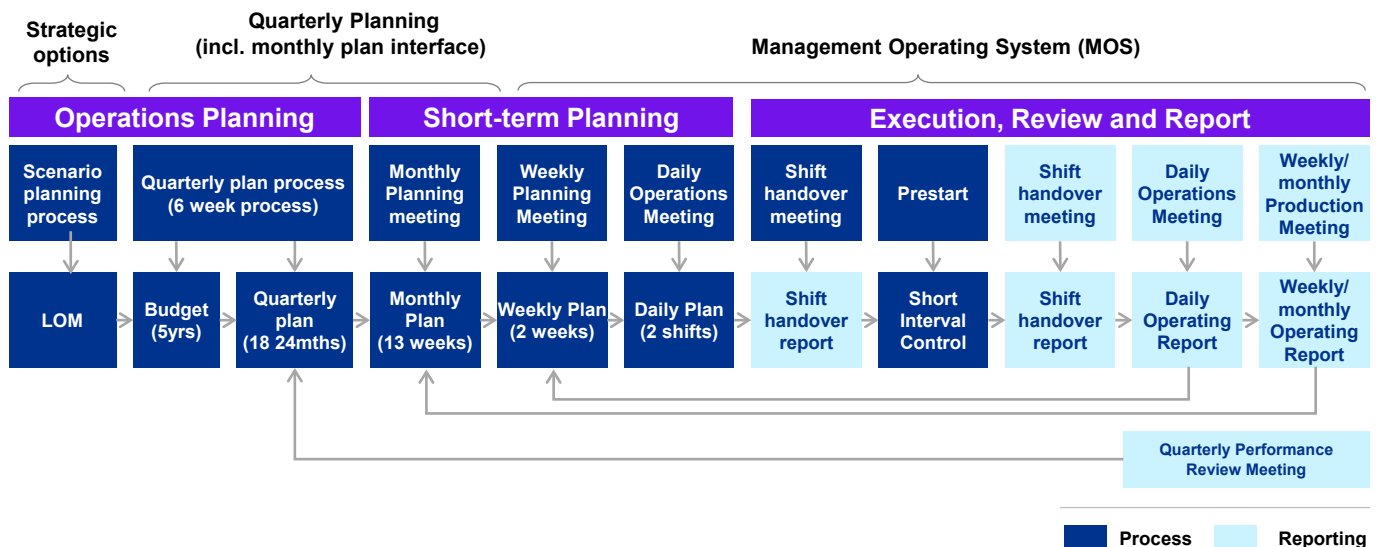


01. STRUCTURED PLANNING



KPMG has been assisting clients to successfully address complex issues such as non-conformance to plan and improvement of plan compliance by the considered design and implementation of an effective and efficient planning system, including:

- Business Planning
- Strategic Planning
- Quarterly Planning
- Short-term Planning



TYPICAL MINING CHALLENGES

- Poor information flow within and between corporate and operational planning function.
- Constant deviation away from key plans, leading to ad hoc, fire-fighting work practices.
- Poor identification of requirements and interdependencies between departmental actions to meet plans.

THE BENEFITS OF GETTING IT RIGHT

- Substantiated, aligned and well-informed plans to help meet production and financial targets.
- Plans reflect inputs from wider departmental range, making them more reflective of operations and requirements, and implementable on the ground.
- Identification and mitigation of issues identified through higher-level plans.
- Reduced deviation from plan.

CASE STUDIES

CASE STUDY 1

Addressing Non-conformance to Plan | Iron Ore Miner

Background & Client Challenges

- Schedule non-conformance a key operational issue.
- Planning process lacked buy-in.
- Operations failed to find the critical path.
- High potential Business Improvement (BI) initiatives required scheduling changes.

KPMG Approach

- Established and facilitated three cycles of the integrated quarterly planning process.
- Provided visibility on and third-party verification of key assumptions behind the forecast.
- Worked with management to identify and communicate critical path activity, particularly those with dependencies across the departments.
- Established due diligence in the quarterly forecast, strong day-to-day controls, and robust feedback loop.

Value Delivered

- Smoother budget process.
- Improved planning processes, reducing variation and losses.
- Improved adherence to schedule to deliver changes underpinning other BI initiatives.



CASE STUDY 2

Structured Planning Process | Coal Miner

Background & Client Challenges

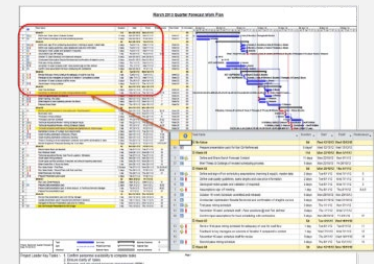
- Planning process had poor buy-in and a lack of integrity.
- The operations failed to find the critical path.
- Cash flow expectations informed by loosely defined and poorly adhered to planning process.
- Little due diligence or operational ownership.

KPMG Approach

- Reviews with delivery stakeholders and technical assurance review by the third-party team.
- Analysis of forecast revenue and cost analysis vs budget using cost driver analysis tool.
- Annual planning calendar and integrated quarterly forecast with a 16-week schedule.
- A set of three executive-level driver trees was created.
- Cost reporting alignment project initiated to align ABC and driver tree analysis and embed in management reporting.

Value Delivered

- A robust process implemented to complete a comprehensive quarterly forecast over a six-week period.
- Improved planning processes reduced variation and associated losses.



CASE STUDY 3

Improving the Planning Process and Plan Compliance | Gold Miner

Background & Client Challenges

- A lack of confidence in site management to deliver the plan and a poor track record of plan compliance.
- The planning process had inadequate ownership at site level and the mine, plant, and shutdown plans were not well-integrated.

KPMG Approach

- Designed a quarterly planning process for the site.
- Focused on improving the planning culture through leadership and broad operations buy-in to the new planning process.
- Due to the complexity of the ore bodies and refractory processing, bespoke tools were developed to complement sophisticated but opaque in-house plan optimisation tools.

Value Delivered

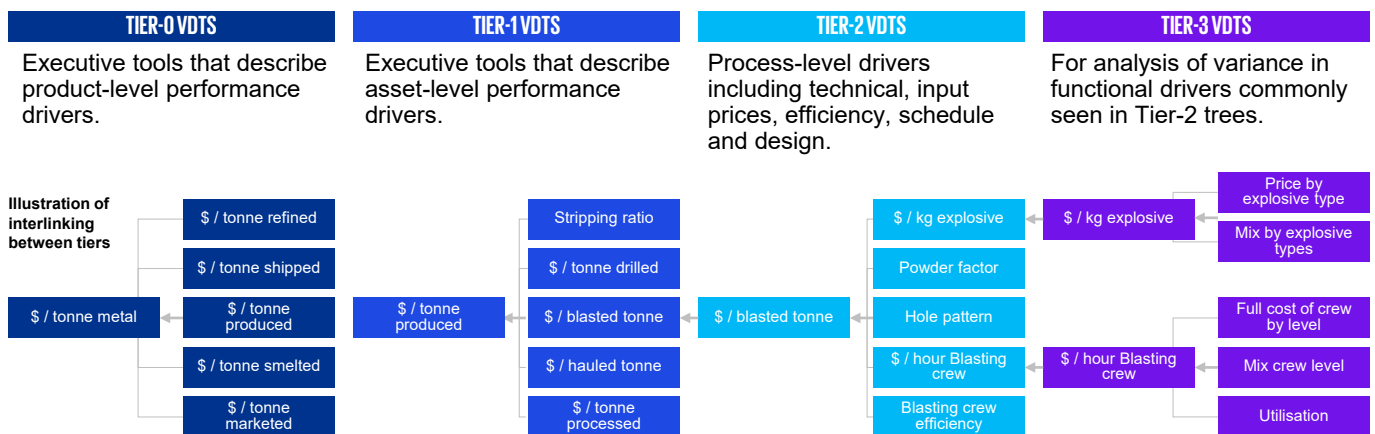
- Embedded and comprehensively documented a tailored quarterly planning process through facilitation and coaching of two quarterly planning cycles and established a culture which values and believes in the planning process.
- Identified opportunities for improved short-term plant optimisation, through cascading planning concepts to short-term planning and execution.

02.

DRIVER-BASED REPORTING



KPMG's approach to driver-based reporting is not a stock standard reporting tool, it takes into account the drivers of your operations. It allows mine planning drivers to be highlighted and not only whether budgets were met, but how they were met, ensuring significant performance issues are not obscured by short-term responses.



TYPICAL MINING INDUSTRY ISSUES

- Most Value Driver Trees are reverse-engineered from the P&L. This approach typically misses important operational issues.
- ‘All of my KPIs are green, but I’m not getting the end result I need’ – the root cause will usually be the absence of one or two key drivers.
- Comparisons vs budget are common, however the performance comparison at the asset level is not generally linked to the performance of lower level KPIs and frequently the messages are contradictory.
- Operations are frequently overwhelmed with different reports, each focused on different aspects of the operation. It is difficult and time-consuming to reconcile the data contained and distil a consistent and quantified overall picture of performance.

KPMG'S APPROACH

- Build process-grounded production driver model and only then build the unit cost driver model.
- Activity cost drivers use appropriate denominator and are linked by a volume driver tree which includes inter-activity stock movements and other physical relationships.
- Driver tree compares two datasets of which one is a reference dataset such as budget, forecast, or benchmark standards.
- These same models can be used to compare whole of year forecast vs budget.
- Consolidate numerous physical and cost drivers into a logical and comprehensible number of grouped drivers in a standard format.
- Tried and tested chart format and layouts.

CASE STUDIES

CASE STUDY 1

Executive Management Reporting | Oil Sands Miner

Background & Client Challenges

- Client needed to improve Integrated Management of the operation through connecting the key drivers of performance from 'shovel to gate'.

KPMG Approach

- Worked with leadership to understand and document the key drivers of production and cost within the business.
- Developed driver tree in Excel which connects existing sources of data and can be populated on a monthly basis.
- Piloted VDTs with the business and implemented processes allowing reporting to be led by frontline personnel.

Value Delivered

- Built a driver tree reporting solution to give management much simpler and clearer information, in an integrated and comprehensive form, and 100% aligned with operational reality.
- Reduced management noise – both upwards and downwards – and improved quality of decisions and operational integration between departments.

CASE STUDY 2

Evaluation of Autonomous vs Manned Fleet Performance | Iron Ore Miner

Background & Client Challenges

- Fleet A (autonomous) trucks had operated for 18 months, but mixed views existed on their effectiveness.
- Comparison between fleets hampered by the fact that they operated in different areas, with different diggers, and with different assignment rules.

KPMG Approach

- Worked with site personnel to understand trucking productivity drivers and their application in practice.
- Expanded existing truck-shovel driver tree model to incorporate Fleet A specific elements.
- Dealt with significant data errors and gaps.
- Isolated drivers related to the trucks vs drivers relating to how the trucks were used.
- Broke down reasons for productivity differences and showed which fleet was more productive.

Value Delivered

- Created automated reports that break down all of the drivers of performance and allow comparisons vs budget or other datasets.
- Identified a range of highly-leveraged improvement opportunities.
- Created a tool to facilitate the decision on the effectiveness of Fleet A to drive investment decisions and contract negotiations.

CASE STUDY 3

Driver-based Reporting | Coal Miner

Background & Client Challenges

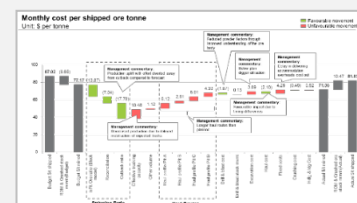
- Monthly reports were typically accounting focused and did not easily communicate the real value drivers between site and executives or the board.
- If key issues had been known and appropriately escalated, an unplanned ore hiatus may have been prevented.

KPMG Approach

- Developed a Tier-1 value driver tree reporting tonnes shipped and cost per shipped tonne as key outputs.
- Designed three driver trees:
 - Effective haul distances
 - Tonnes shipped
 - Cost per ore tonne shipped.
- The value driver tree is used as the 'analysis engine' for a pragmatic, easy to use and maintain monthly reporting tool.

Value Delivered

- Implemented a driver-based report that highlights the impact of key drivers on tonnes shipped and cost per tonne shipped.
- Enabled clear and transparent monthly reports of site's performance by showing impact of each individual driver on outcomes.



03.

MANAGEMENT OPERATING SYSTEM



THE RIGHT INFORMATION

- Meaningful KPIs and metrics
- Information to enable decision-making
- Accurate data from reliable sources

THE RIGHT INTERVALS OF CONTROL

- Aligned with plan rhythms and horizons for work levels
- Adequate frequency to detect early signs of issues and enable timely intervention
- Timeframe tailored to the intervention requirements

THE RIGHT PEOPLE

- Reinforce role accountabilities
- Appropriate escalation and cascading mechanisms
- Reaffirm work horizons and working levels approach (planning layers)

THE RIGHT BEHAVIOURS & CAPABILITY

- Relevant skills and experience
- Constructive conversations
- Fact-based engagement
- Position decision-makers to remove roadblocks
- Outcome, problem-solving orientation

STRUCTURE – PROCESS – BEHAVIOUR – TECHNOLOGY

Bottom line benefits

- Staff utilisation and efficiency
- Ensures focus on the critical performance drivers
- Understanding key sensitivities and the 'money-makers'
- Driving performance improvement ideas
- Controlled, repeatable results.

Cultural benefits

- Alignment across and down the organisation
- Reaffirm accountability and work levels
- Motivated team with a sense of purpose
- Team effectiveness
- Increased consistency ('the way we work around here').

Other benefits

- Productive, time-effective meetings
- Encourages action
- Sustainable.

CASE STUDIES

CASE STUDY 1

Site-wide MOS Implementation | Gold Miner

Background & Client Challenges

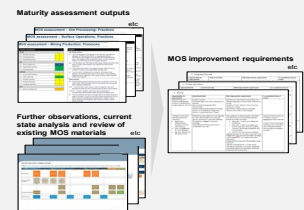
- Client saw MOS as one of its six world-class core capabilities and had recently developed a corporate MOS standard.
- At its most important site, previous MOS implementations hadn't gained traction; the client was looking for support to implement MOS to the standard.

KPMG Approach

- Undertook a diagnostic across the site to understand the level of maturity relative to the standard.
- Invested effort in translating the standard into the key MOS elements that were prioritised for implementation given site and department-specific circumstances.
- KPMG worked over a nine-month program to implement MOS across all operational and support departments on the site in two waves.

Value Delivered

- MOS implementation that has 'stuck' due to KPMG's focus on building MOS into existing management activities and sustainability.



CASE STUDY 2

Short Interval Control | Iron Ore Miner

Background & Client Challenges

- Frontline personnel had very limited information on which to make decisions.
- There was limited understanding of the drivers of productivity.

KPMG Approach

- The team conducted a quick, high-level diagnostic.
- Made improvements to planning processes.
- Updated elements of the site MOS, particularly pre-start and productivity meetings.
- Built a driver tree to identify productivity drivers and their impact on production outcomes.
- Built a real-time information system for Mine Controllers and Mining Supervisors.
- Worked with Mining and Processing to improve quality and timeliness of plant feed.

Value Delivered

- More than 10% improvement in equipment productivity
- Filled in gaps in plant feed, for a benefit of over \$100m p.a.
- Video: http://youtu.be/t5Vs-G-fb_Y



CASE STUDY 3

MOS Implementation | Coal Miner

Background & Client Challenges

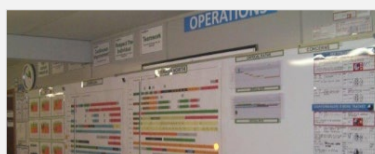
- Front line often lacked core information required to do their job.
- No context provided, so personnel unable to coordinate plan B when things went wrong.

KPMG Approach

- An MOS was customised for the site, utilising cascaded operational controls and lean information centres.
- Information centres made crucial data visible.
- Effective and accountable decision-making drove a commercial focus.

Value Delivered

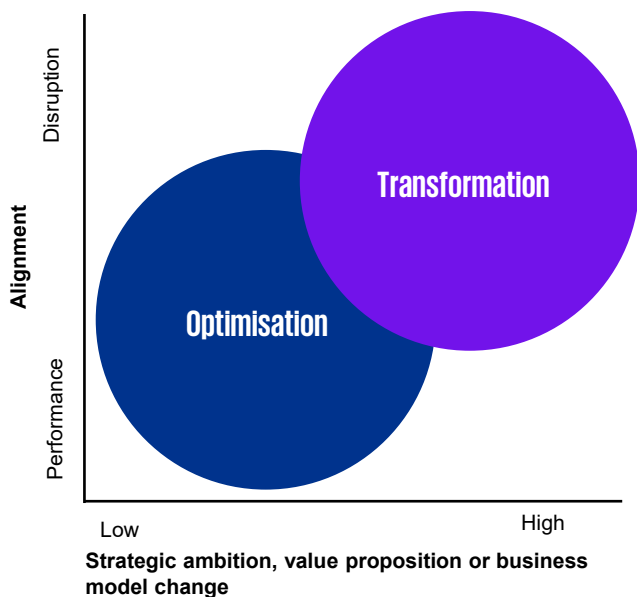
- Drilling was de-bottlenecked, with monthly records broken.
- Blasting broke daily site records and were able to reduce fleet size.
- Overall site productivity improved.



04. OPERATING MODEL



An operating model describes how a business organises and governs its capabilities and assets to deliver its strategy. The operating model within mining operations can be complex as it sits across different organisational levels. **However, it is within the operations that strategy is turned into reality** and is a critical junction.



TRIGGERS FOR OPERATING MODEL TRANSFORMATION



STRATEGY AND LEADERSHIP
Significant changes to the strategy and business model driving operating model change



CUSTOMER
Changing customer behaviours and buying preferences



DIGITAL AND TECH
Opportunity to embrace emerging technology and process digitisation



ORGANISATIONAL EFFICIENCY
Misalignment between organisational structure and strategic priorities



COST AND FUNDING
Underperformance against financial targets or versus peers



REGULATORY/REPUTATION
Increased regulation on pricing and performance impacting margins

TRANSFORM OR OPTIMISE

Operating model **transformation** is required where an organisation has significantly changed its strategic ambition or requires a fundamental shift in its value proposition and business model.

Operating model **optimisation** is where an organisation needs to improve its organisational effectiveness and efficiency in order to improve performance to meet its strategic ambition and enact its business model.

Six Design Layers of the Operating Model



SERVICE DELIVERY MODEL



PEOPLE



PROCESS



TECHNOLOGY



PERFORMANCE INSIGHTS AND DATA



GOVERNANCE

KPMG's Six Design Layers ensure that a holistic operating model solution is built that considers all aspects of an organisation and is **HOW an organisation implements to achieve its strategic ambition and deliver on its business model.**

CASE STUDIES

CASE STUDY 1

Operational Capability Program | Alumina Miner

Background & Client Challenges

- Client engaged KPMG to perform a detailed assessment of their mining operations organisation and design, management operating systems, information systems capability, and operational performance and capability with a view to understanding the current organisation capability.

KPMG Approach

- KPMG worked collaboratively with the client team to identify gaps and areas for improvement through stakeholder interviews across all levels of the organisation and analysis of the existing processes to determine the current state.
- KPMG identified key areas for improvement including eight key initiatives to uplift the capability of the mining organisation and address key technical and operational root causes as well as improvements to the operating model.

Value Delivered

- KPMG was re-engaged to provide services to help the client implement these key eight strategic initiatives that also included a program management and change management, to ensure the program was successfully implemented and the benefits realised across the business were successfully communicated across the various levels in the organisation.

CASE STUDY 2

Operating Model Realignment | Iron Ore Miner

Background & Client Challenges

- Frivolous capital requests from supporting functions not aligned to business output.
- Replicating and retrofitting the existing production planning tools and processes to the other business functions driving more siloed behaviour and independent outcomes.

KPMG Approach

- Review of all the functional areas' current planning process and understanding of their drivers.
- Review of all the existing business planning and reporting artefacts.
- Interviews and socialisation with key functional stakeholders.
- Detailed design of business planning process and cadence.
- Tactical action plan PMO design and set-up.
- Measurement metrics design and set-up.

Value Delivered

- Alignment of all functions around a common goal, ensuring the production plan remains as the stake in the ground, which is the driver for what other functions look to achieve.
- High-level mapping of current state business planning process.
- Design of business planning process.
- Fit-for-purpose functional artefacts designed, built and integrated into each function of the business.
- Tactical action plan PMO process.

CASE STUDY 3

Technical Services Operating Model Review | Global Multi-commodity Miner

Background & Client Challenges

- Client was undertaking a large cost-out process across many functions and wanted to better understand the misalignment within technical services and the potential levers that could be pulled from an operating model perspective.

KPMG Approach

- Developed and presented a view on opportunities for greater efficiencies within the Technical function.
- Formulated initial hypothesis/options based on KPMG's experience.
- Used current organisational structures, and available costings as provided to establish a baseline for the purposes of comparison.
- Drew on industry benchmarks, insights, and industry experience to support our hypothesis and presented options.

Value Delivered

- Comprehensive, evidence-based, operating model review of its Technical functions.
- Provided three substantiated options to increase efficiency across the functions, considering operating model in conjunction with other efficiencies as applicable/appropriate to requirements.
- Developed pros and cons for each hypothesis/option and the potential cost impacts.

05.

TRUCK-SHOVEL OPTIMISATION



Through years of experience and analysis, KPMG have worked with clients on one of the **most dynamic challenges within their operations, the truck-shovel system**. KPMG doesn't treat and solve for challenges within truck or shovel circuits separately, we consider the truck and shovel cycles as a unified process. KPMG have developed a sophisticated productivity driver model for truck-shovel systems.

CONSIDERATIONS

 <p>The truck-shovel unit process is the core operational process at the heart of mining operations.</p>	 <p>Sites are increasingly investing in production data capture systems for their truck-shovel fleets.</p>	 <p>A model of the truck-shovel unit process complements this by providing a rigorous, and consistent view of performance.</p>
 <p>Mutually exclusive efficiency KPIs are the clear accountability of particular planning, dispatch, operations and maintenance roles.</p>	 <p>The Overall System Effectiveness (OSE) metric combines all of the efficiency KPIs, providing an excellent foundation for C.I.</p>	 <p>Consistent real-time reporting of performance variances by cause relative to a mine plan.</p>

KPMG DIFFERENCE

Powerful insights

KPMG can assist in delivering powerful insights to support:

- Manned vs AHS comparisons to help support business cases
- Performance criteria for AHS implementation contracts
- Insights for AHS productivity opportunities and challenges.

Range of FMS experience

KPMG has experience working with, and generating insights from, a range of different fleet management systems, including:

- Minestar
- Modular
- Wenco.

KPMG differentiators

- Others model truck fleet productivity in isolation
- KPMG considers the truck-shovel system as a single integrated system of both trucks and the associated loading units
- Other approaches consider cycle time as a primary driver, which obscures powerful insights from more granular drivers.

CASE STUDIES

CASE STUDY 1

Truck-shovel Model | Iron Ore Miner

Background & Client Challenges

- To understand the productivity of its truck-shovel operations and where improvements could be made.
- Very difficult to compare productivity across fleets due to differences in how they are deployed – digger size, terrain, assignment dynamics, etc.

KPMG Approach

- Completed a mathematical decomposition of the operational drivers of truck-shovel productivity, integrating both truck and shovel characteristics.
- Analysed the company's operational data, finding significant errors at a driver level.
- Developed a visual comparison of productivity that clearly displayed driver impacts on outcomes.

Value Delivered

- Developed strong understanding of performance across several fleets and time periods.
- Project drove significant data integrity improvements.
- Information used to drive capital decisions and contract negotiations.
- Performance measures developed through the project are to become the main performance metrics for truck-shovel operations.

CASE STUDY 2

ROM Redesign | Iron Ore Miner

Background & Client Challenges

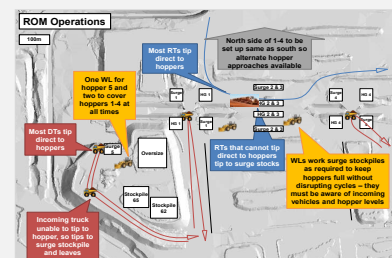
- Significant plant capacity wasted by irregular truck deliveries.
- Inefficient use of machinery due to over-engineered blending approach.
- Significant levels of rehandle.

KPMG Approach

- Analysed plant feed types against feed rates and plant flow rates and plant downtime to determine causes of go-slow and interruptions.
- Analysed block model grades vs product grades, finding little correlation, and no evidence to support intricate blending strategies that underutilised equipment.
- Designed ROM layout to maximise storage capacity, minimise supply risk, and optimise equipment use.

Value Delivered

- Gaps in plant production filled in, increasing overall plant production.
- ROM equipment better utilised.
- Risk of supply failure significantly reduced.



CASE STUDY 3

Expert Panel | Iron Ore Miner

Background & Client Challenges

- Most easy wins had already been implemented, and the client now sought a low-cost, expedited approach to identify potential for further meaningful improvement.
- Client staff were too immersed in current approaches, and unable to see opportunities for more radical change.

KPMG Approach

- KPMG created a 'panel of experts', composed of eight people with deep industry knowledge across a range of specialist mining domains. Panel included KPMG staff and subcontractors.
- Panel assessed the performance of the operation as a whole over four weeks, generating a series of opportunities to improve.
- Panel generated opportunities, and tested these with operational personnel, as well as data from a range of operational systems.

Value Delivered

- Opportunities presented, with deep dives into data, past experience, or research where appropriate to characterise and substantiate benefits.
- From an already industry-leading operation, the expert panel identified opportunities that led to:
 - 8% decrease in cash costs
 - \$80m revenue uplift.

06.

AUTONOMOUS & REMOTE OPERATIONS



AUTONOMOUS HAULAGE

Despite many claims, automation technology is yet to decisively prove productivity improvement against manned fleet.

Industry insights into proven benefits of implementing autonomous trucks

1. **Increase in safety.** Autonomous vehicles have proven to have fewer safety incidents than manned vehicles.
2. **Decrease in labour costs.** Removing the driver of the vehicle has decreased the cost of labour, including salary, accommodation and flights.
3. **Increase in vehicle utilisation.** Removing human-related activities has improved utilisation (e.g. no need to stop for shift changes or crib breaks, longer periods between service requirements, and minimised unscheduled downtime).
4. **Mixed results on productivity (per operating hour).** Although OEMs are claiming productivity increases between 20-25%, this is generally under 'lab conditions' and is not validated by our experience with the major mining companies when operating at scale.

The truck-shovel productivity model as a companion to improved decision-making in the operation of an AHS mine

1. For **digger operators** provided with in-cab performance KPIs (match factor, bunching, mean loading time and loading time standard deviation) to maximise real-time efficiency for the truck circuit which they control.

2. For **superintendents** to support daily performance accountability meetings. And for **mining managers'** site production reviews and external reporting of performance variances to corporate.

3. For **long-term mine planners** to optimise waste dump design for minimum cumulative waste haul distance, and to optimise crusher moves for minimum cumulative ore haul distance over time.

4. For **supervisors and mine controllers** to be provided with real-time feedback on performance against mine plan as well as forward projections to support in-the-field decision-making.

5. For **medium-term mine planners** to optimise the road layout for shortest hauls and to schedule trucking requirements with more precision.



CASE STUDIES

CASE STUDY 1

Social and Economic Impact of Autonomy | Global Miner

Background & Client Challenges

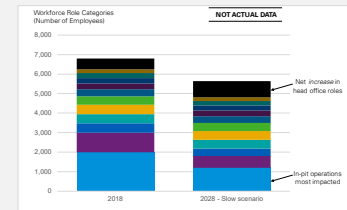
- Client was undertaking an autonomy program and wanted to get on the front foot to define the risks and opportunities related to autonomy and develop management strategies in response.

KPMG Approach

- Split approach into three phases:
 1. Understand the future
 - scenario analysis.
 2. Understand the impact.
 3. Develop strategies.
- Undertook extensive analysis of the likely workforce impact of automation by job category and location, mapping this back to indigenous communities and the towns where FIFO workers live.
- Led multiple workshops with client stakeholders from across the organisation.

Value Delivered

- Bought cross-functional client team members together to discuss this important subject, often for the first time.
- Client had a clear view of likely risks and opportunities of automation and management strategies to employ.



CASE STUDY 2

AHS Implementation Support | Multi-commodity Miner

Background & Client Challenges

- Client was about to go to tender for a suitable AHS provider with the objective to acquire a system that must be able to operate in deep open-pit mines in arctic conditions with high availability and utilisation while providing significant increase in safety and productivity as well as a decrease in production cost.

KPMG Approach

- This piece of work was the initial stage in a potentially larger piece of work. The initial stage involved a review of tender and advice on framework of productivity performance acceptance metrics appropriate at each stage gate of the AHS implementation.
- Split approach into three phases:
 1. Reviewed existing documentation and tender.
 2. Provided recommendations and amendments to the draft rollout plan.
 3. Data quality analysis.

Value Delivered

- KPMG recommended a number of modifications to their approach, which the client saw as pivotal insights to support effective implementation. These recommendations included:
 - Tollgate tests at each of the suggested stage gates on the implementation and what these would look like.
 - Suite of key production performance metrics that are within the vendor's control and can drive greater productivity.
 - Suggested targets to be achieved by each stage gate within the implementation.

CASE STUDY 3

Autonomy Business Case Review | Iron Ore Miner

Background & Client Challenges

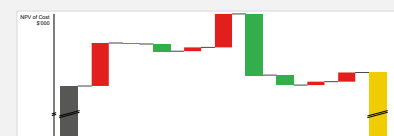
- Client required assumptions in the business case to be reviewed for reasonableness, including consideration of an OEM vs non-OEM autonomy solution.

KPMG Approach

- Performed site visits and interviews to determine mine context.
- Assessed current maturity of the business and its processes to support the assumptions in the business case.
- Reviewed the operational productivity assumptions for reasonableness and performed a high-level assessment of the autonomous suppliers and their respective cost models.
- Identified additional initiatives to enable the business case's assumptions to be achieved.

Value Delivered

- Assessment of the reasonableness of the assumptions in the business case.
- Key operational KPIs to improve and understand autonomy.
- Improvement initiatives to assist the business case and the mine overall.



07

FRONTLINE OPERATOR



RESILIENT OPERATIONS

Underpinned by an enduring operating model that meets day-to-day operations while adapting to changing environments.

SAFE OPERATIONS

Integrating capabilities, ways of working and culture to drive operational excellence in a safety critical environment.

TRANSPARENT OPERATIONS

Deliberate visibility of operations to drive greater control to connect customer and business value.

OPTIMISED OPERATIONS

Embedding continuous improvements to ensure operations are as efficient and effective as possible.

OVERVIEW

Mining Operations are under increasing demands, continuously having to adapt to volatile market prices, managing fluctuating demand, meeting new compliance and regulatory requirements, delivery of long-term growth, and decreasing the cost of operations. Frontline operations need to respond to these accelerating forces and evolve the delivery model to meet the demands in what can be complex and challenging environments.

Modern frontline operations as the enabler

Modern frontline operations:

- have digitised processes
- have lean, cross-functional ways of working
- are delivered through an engaged, agile and productive frontline workforce
- have frontline workers connected with field equipment and corporate systems
- enables faster, more distributed and higher quality decision-making
- enables the safe operations.

Key Drivers Influencing Frontline Operations

MARKET SHIFTS

Volatile market prices, fluctuating demand, new compliance and regulatory requirements, long-term growth, cost of operations and the need to diversify their products and services.

SHIFTING RISK AGENDA

Shifting challenges of talent, supply chain, cyber, environmental and operational risks.

INCREASED CUSTOMER/STAKEHOLDER EXPECTATIONS

Better connected and more demanding than ever before driving stakeholder centric operating models that build trust and transparency.

TALENT AND THE FUTURE OF WORK

Specialist technical skills and digital literacy is converging, ageing workforces with the need to still have access to specialist skill sets, automation is accelerating and upskilling and reskilling will be critical for workers' employability and effectiveness.

TRANSFORMATION SPEED

Rapidly realign capabilities, people and ways of working to enable the delivery of products and services at variable speeds and scale consistently across all geographically dispersed operations.

DIGITAL ACCELERATION

Acceleration of digital strategy requiring the delivery of digital business capabilities, creating new business models and ways of working.

CASE STUDIES

CASE STUDY 1

Organisational Capability Uplift Program | Iron Ore Miner

Background & Client Challenges

- Client was experiencing a mismatch between production and ore reserve depletion, and the specific causes of ore feed surprises which were negatively impacting processing performance. Longer term the mismatch, unresolved, could have resulted in an ore reserve write-down.

KPMG Approach

- Containment Phase: Immediate interventions included reducing the density assumption, trial and implement a lower grade product and apply short-term grade adjustment factors.
- Systems Phase: A series of recommended actions to ensure the appropriate governance and systems are put in place across the demand system.
- Improvement Phase: Investigation of options to improve the mining process for improved ore feed quality and resource recovery.

Value Delivered

- Defined accountabilities across long-term planning to mine execution covering clear role purpose statements, key deliverables, measures of success, and key systems that need to exist or are maintained.
- Delivered a deep-dive review of end-to-end short-term mine planning to mine execution process covering short-term planning and execution monthly as well as weekly and daily execution. This included triggers, measurements, high-level outcomes, inputs, and cycle time.

CASE STUDY 2

Rail Inspection Activity Optimisation | Iron Ore Miner

Background & Client Challenges

- Throughput constrained by heavy haulage railing capacity, but needed to know inefficiencies to increase the fleet's use of availability before investing.
- Discrete business improvement activities did not deliver on envisaged outcomes and operational and maintenance practices were disjointed.

KPMG Approach

- Applied Lean Six Sigma tools to establish which improvement activities were impactful and which were not.
- The key change: a 24/7 ongoing fleet inspection and maintenance activity that used to forcibly stop a train for 18-24 hours at a scheduled frequency was significantly modified.
- Visibility of concurrent activities and foresight of upcoming idling times at the yard was facilitated through a large dashboard feed with live data, which was made available to operational people.

Value Delivered

- An additional 2.5% in rail haulage capacity was delivered to the value chain bottleneck at virtually zero cost.
- This particular initiative was awarded "Certificate of Recognition for highest value creation for 2013" and was a finalist for the "Annual Innovation and Business Improvement Award" within this mining organisation.

CASE STUDY 3

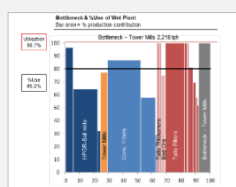
Magnetite Optimisation: Bottleneck Analysis | Magnetite Miner

Background & Client Challenges

- Many inter-related factors drive plant performance and can make it difficult to understand observed throughput.
- Client employed a simplistic model to understand their plant's throughput, and could not understand why the observed results were less than half of what they expected.

KPMG Approach

- KPMG modelled the detail of the plant, and in particular the reliability of the various modules of the plant, identifying shifting bottlenecks driven by 'partial use' scenarios caused by module downtime in parallel streams.



Value Delivered

- Plant model accurately predicted performance.
- Model identified highly leveraged improvement opportunities.
- Model used to systematically work through and justify, capital and operational improvements to more than double throughput.

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ASSET PERFORMANCE IMPROVEMENT



PRINCIPLES

Transparency

Establishes clear financial and organisational baselines, providing visibility of key financial drivers.

Hard economics

Dispels myths and provides a factual view of the value and risks driven by rigorous data analysis.

Comparators

Describes real-life, tangible operational alternatives and uses multiple data points to triangulate and quantify opportunities.

Speed

Rapid ‘deal-speed’ diagnostic, driven by hypotheses – builds critical early momentum and a focus on developing 80/20 solutions in the early stages.

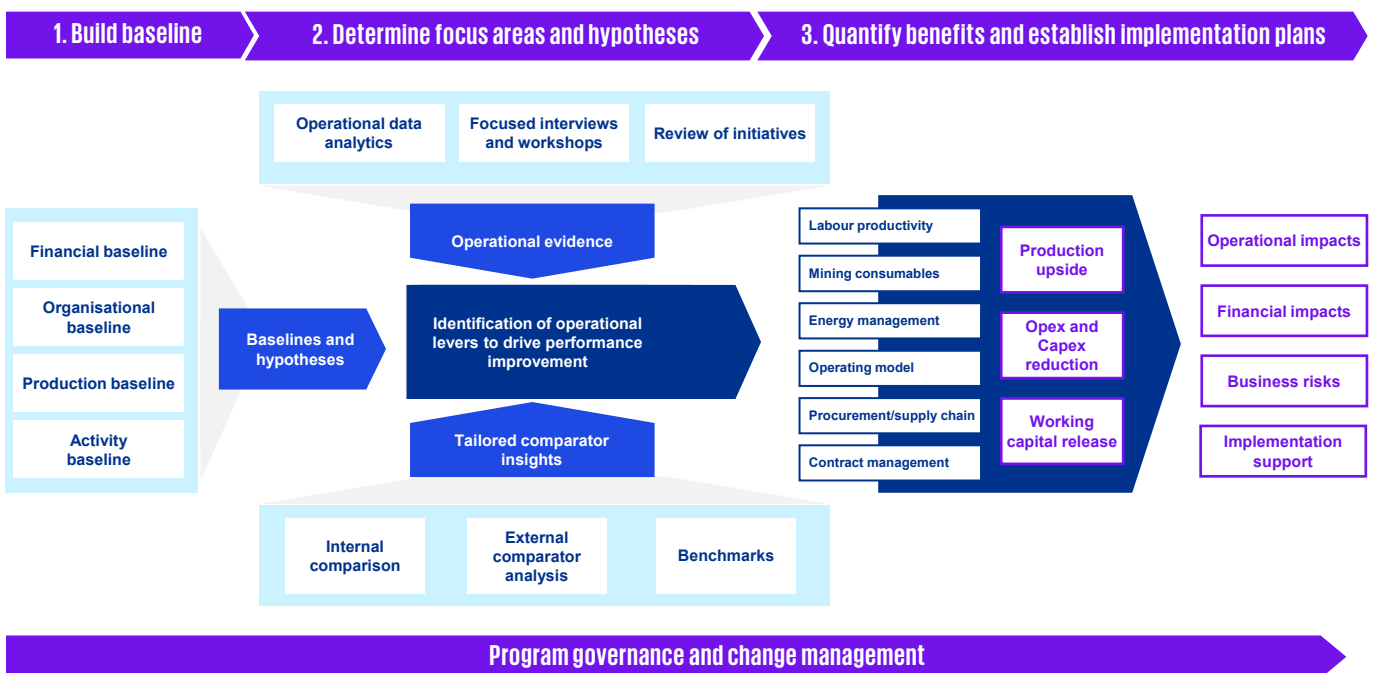
Engagement

Strong governance in design, delivery and ultimate execution is paramount – this wraps the decision-makers in early and builds ownership.

Sustainability

Considers all aspects of an organisation’s ‘DNA’ that may need attention to sustain the changes and tracks delivery through to the bottom line.

APPROACH



CASE STUDIES

CASE STUDY 1

Value Identification Exercise | Gold Miner

Background & Client Challenges

- The client business operated in a high cost jurisdiction.
- As the price of gold was continuing to fall, the client was facing mounting challenges with increasing costs
- The business engaged us for a 10-week cost optimisation and value identification exercise.

KPMG Approach

- We applied a rapid diagnostic lens using market and internal data to determine where potential opportunities existed in Phase 1.
- In addition, we considered initiatives and projects already flagged by the client to validate benefits that they had already identified.
- These opportunities were further explored in Phase 2 by site visits, operational interviews and operational data analysis to gain an understanding of roles, cost and efficiency opportunities.

Value Delivered

- The recommended opportunities equated to a cost saving and margin improvement of between \$222 and \$297 per ounce.
- Eight hypothesis areas were examined focusing on activities pertaining to labour, aviation, consumables, contract management, procurement, maintenance, and grade control.
- \$87m to \$132m in opex savings.
- \$31m to \$44m in margin upside benefits.

CASE STUDY 2

Contract Leakage Identification | Oil Sands Miner

Background & Client Challenges

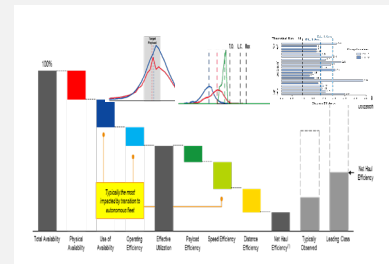
- KPMG's client is an energy company facing profitability challenges at an oil sands asset.
- Given the unique nature of the asset many of the client's traditional operating and management methods were not fit-for-purpose to drive success across the value chain.

KPMG Approach

- In the Baseline phase, KPMG used the SVI framework to develop a 'shovel-to-market' baseline which established a complete understanding of the asset's performance across financial, organisational, and production measures.
- In the Hypothesis Development phase, KPMG identified 11 high value hypotheses across the value chain.
- The Opportunity Quantification phase utilised the baselines to quantify the potential value of the interconnected opportunities.

Value Delivered

- Optimisation opportunities identified across five key areas enable a 10-25% reduction in unit opex.



CASE STUDY 3

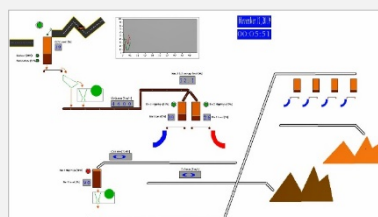
Asset Simulation | Iron Ore Miner

Background & Client Challenges

- Client wanted to better understand bottlenecks in their fixed plant asset and explore the impact of different scenarios and how that would impact the system.

KPMG Approach

- Built model of the system using Rockwell Arena which showed a visual representation of the assets and how they interact with each other based on certain scenarios.



Value Delivered

- Allowed client to understand where the bottlenecks in the system are under various scenarios and conditions.
- Helped understand the failure modes of assets given certain scenarios.

Contacts

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About KPMG

At KPMG Australia, we help our clients not just grow, but grow meaningfully – consciously, collaboratively, transparently and empathetically. It's our deep belief that how you grow matters.

Nationally, over 9,000 people are dedicated to this belief across our network, while providing audit, assurance and risk consulting, deals, tax and legal, management consulting and innovation and digital solutions to entities and organisations that span the nation's industrial, governmental and not-for-profit landscapes. Our global network and deep expertise has seen us work with renowned companies to help them solve complex challenges, steer change, disrupt sectors and grow. Collaboration and innovation are ingrained in our approach, with our people aiming to provide genuine, sustainable value for our clients. Beyond our clients we contribute in voluntary and honorary capacities to assist the wellbeing of the communities in which we live and operate, with a core focus on reconciliation with Indigenous Australia, diversity and inclusion.

In everything we do, our aim is that our clients' growth not only enhances Australia's economic prosperity, but builds trust while benefiting society, people and the environment. Because how you grow matters.

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