



Extracting business value through operational intelligence



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Foreword

The mining industry faces external pressures from volatile commodity prices and increasing costs

During the recent mining boom, high demand and high commodity prices created favourable conditions for investment and expansion of mining operations while masking some inefficient work practices.

The current economic conditions have drawn focus on Australia's relatively higher production and capital costs which are impacting its competitive advantage. Australian mining operators are responding by reducing capital investment, pursuing cost savings and operational efficiencies.

However, a delicate balance has to be maintained between 'cutting too close to the bone' and maintaining a sustainable operation that can respond quickly when the next opportunity presents itself.

All options to optimise productivity gains should be carefully considered and balanced with 'cost-out' initiatives

Ultimately, the goal of any mining operation in simple terms, is to optimise production at the lowest cost with zero harm to the workers and the environment. In broad terms, operational efficiencies can be gained by managing the processes and resources better, automating and integrating information across the value chain as well as taking the more radical step of redesigning the operations.

In Deloitte's experience the case for improving the automation and delivery of operational intelligence across the organisation falls into the 'low-hanging' category.

Therefore, it is no coincidence that *despite* the tougher market conditions, global mining leaders are investing in operational intelligence, remote operations centres, automation, and mobility. Companies that enable their management to respond in a timely manner to operational variances and market volatility are better placed to minimise the adverse impacts.

Furthermore, as connectivity to remote sites improves, a landscape of reporting and analytic solutions are emerging that can enable greater transparency of operational performance in real time to operational staff, site management and executives of the organisation.

CEOs of leading global mining companies are already investing in capabilities by analysing large volumes of data in real time to improve production, quality and equipment efficiency where they are seeing the benefits now¹.

Operators at remote sites and executives in head office can be presented with the same data, in tailored formats and at the right frequency for all parties to make more responsive and fact-based decisions.



¹ Ker, P 2014, 'Rio Tinto chief Sam Walsh hails \$80 million cash flow boost from big data', The Sydney Morning Herald, 14 March 2014, viewed 15 May 2014.

Insightful use of information

Leading companies continually return to a few simple questions regarding key productivity enablers

It is clear from our experience that tackling the questions below in a holistic manner will ensure a more sustainable business outcome.

Operational intelligence

- Are we measuring the right things?
- Are measures clearly linked to key business value drivers?
- How can we improve reporting and visualisations across the end-to-end processes?
- How can we get insights from operational data?

Operational data

- How can we improve the data quality and data governance processes?
- What are the information needs and data quality requirements by role and location?
- How can we step up the level of automation and integration of data acquisition and presentation?

Technology

- How can we establish robust, scalable, standardised systems, architectures and support mechanisms?

The operational technology environment is typically quite heterogeneous and the operations at risk of being managed in silos, it is imperative that the information models are designed in a manner that can easily show the end-to-end process and support function inter-relationships.

For example, mine development to production to processing to transportation, together with the inter-relationship of support functions such as maintenance, spares inventory and equipment availability.

In addition to taking a process view of the information, a hierarchical view will ensure that there is strategic and operational alignment across the organisation.



The pyramid in Figure 1 illustrates the type of information requirements for different layers of a mining organisation.

The architectural design should bring together the process and the organisation views while addressing each of the frequency dimensions.

Assembling and delivering this information in a manner that ‘stitches’ together operational and executive management requirements will enable organisational alignment.

The default state for large, geographically dispersed organisations tends to be different reporting and analytic solutions, working off different data sources often with subtly different data definitions.

However, for operational intelligence to be a true lever of operational efficiency, management teams and operators should be working off the same underlying information and consistent data definitions.

For example, the data on real-time equipment performance used by an operator, when aggregated across sites and time periods, is useful for conducting comparative analysis, benchmarking studies and identifying operational improvement opportunities.

Moving from frameworks toward putting this information in the hands of management teams and operators who need it is key to realise these opportunities.

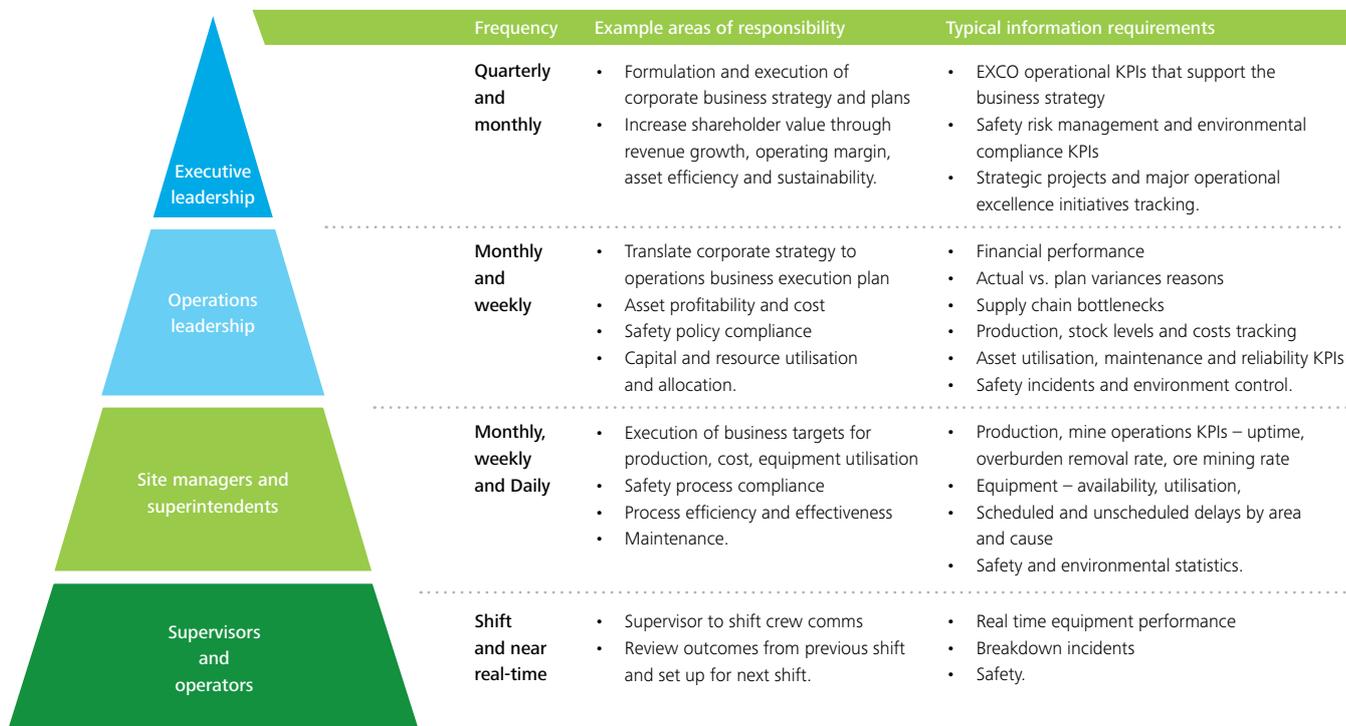


Figure 1: An organisational view of Information Requirements

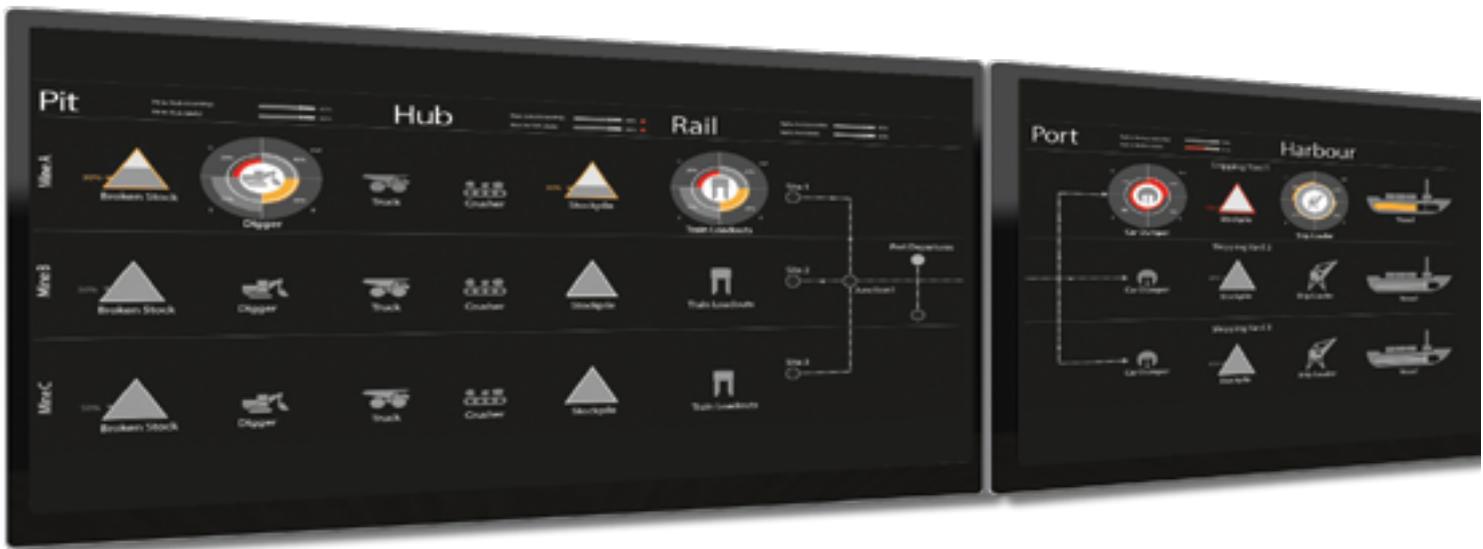
Role based dashboards with operational performance delivered on mobile devices will soon be the industry standard.

‘The automation of operational data collection and delivery will improve the transparency of detailed operating costs, performance and trends. This will enable our operations to make informed and timely decisions in their drive towards optimised process efficiency’

Chris New, Manager Performance Analytics
MMG Limited



Large screen visualisation of performance for the 'pit-to-port' processes within remotely located operational 'nerve-centres'.



'For the first time we can see our total supply chain, in real-time and in one place, enabling us to proactively make the right decisions for the whole business'

CEO, Global Mining Company

Challenges and solutions

This begs the question, ‘why aren’t more integrated operational intelligence solutions already in place to realise productivity gains?’

Common Challenges

Getting agreement on what needs to be measured:

this is particularly important as there is a tendency to over-measure and not to take an “end-to-end” view. This issue is amplified by the ‘bottom-up’ nature of the operations environment.

A history of building reporting by necessity:

many of the issues are the result of multiple reporting and analytical solutions that have been developed across organisational silos e.g. Excel based reporting and a lack of consistency in the application of KPIs is a legacy of ‘working’ reporting models that have been designed independently across organisational silos/ departments.

Data quality and integration: sourcing data from multiple sites and different systems means varying granularity, quality and standardisation across different time horizons, resulting in difficult consolidation and comparison. Furthermore, data integrity issues related to multiple data sources and the need for manual adjustments may mean significant effort is required to automate its capture.

Reluctance to expose operational data before it has been validated: this has prevented a faster evolution of more integrated and timely operational intelligence solutions by encouraging localised site based operational data and reporting architectures.

Operational intelligence delivering on the productivity imperative

Operational intelligence solutions are leveraging user experience design techniques borrowed from consumer-focused online developers, and delivering insights through large visualisation panels, mobile tablets and smartphones. For example, the Key Operational Metrics covering Safety, Volume, Equipment Utilisation and Cost are being delivered on mobile devices to the Chief Operating Officer and the Site Management on a near real-time, daily and weekly basis enabling senior management to get closer to the resolution of operational issues in a timeous manner. This minimises production losses as it is almost impossible to recover a day’s production loss due to asset under-utilisation or equipment failure.



Varying degrees of automation of reporting across each site at the operational technology level should not be a deterrent to initiating solutions that provide a common view across the operations. The journey to the 'end-game' can begin by firstly setting a solid governance foundation of consistent definitions and visualisation standards followed by progressively improving the automation and integration of the key data points.

Operational intelligence is one of the key levers for uplifting operational efficiency. It equips mining organisations with actionable insights into their key drivers, across the entire value chain and between mine sites.

Along with improvements in network connectivity to remote sites, it is reporting and analytics together that will take productivity and safety to the next level. Analytical applications and database technology platforms are improving at exponential rates in areas such as 'in-memory' technology, visual intelligence and advanced and predictive analytics e.g. predicting when the next safety incident is likely to occur or discovering the impact of the non-availability of spares (i.e. poor supplier performance for reservations in full on time) on the execution of planned and scheduled plant maintenance programs. Cloud-based solutions will get you there faster and in a more cost effective manner.

An effective Operational Intelligence capability will provide CXOs with valuable insights to help remediate production variances and identifying operational improvement opportunities

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