COSOL

THE PATH TO MINING PRODUCTIVITY

How achieving digital asset management maturity can help mining organisations increase productivity and gain a compettive advantage.

COSOL

CONTENTS

Executive summary

The mining industry faces a stark choice. It can take a passive approach to the threats that confront it. Or it can adapt and overcome. Amid the threats to the industry lie exciting opportunities for mining organisations to supercharge their productivity by leveraging advances in technology and data to transform the management of their asset portfolio. Those organisations that continue to allow their productivity to be constrained by ineffective asset management technologies and systems will find productivity gains and competitive advantage increasingly elusive.

There is a solution – and mining organisations can realise its benefits now. The implementation of an integrated asset information ecosystem will enable mining organisations to move to a predictive maintenance state supported by real-time, data-driven insights, where unplanned asset downtime is minimised, asset productivity is optimised and asset failures can be almost completely eliminated.

Data: the key to unlocking asset productivity

In this eBook we will explain why miners can no longer afford to take a passive approach to asset management. Continued reliance on the asset management functionality contained in their Enterprise Resource Planning (ERP) software is not a viable strategy if they are to leverage the asset data-driven insights they need.

Achieving predictive maintenance means putting data at the centre of your organisation's operations. Establishing a Common Data Environment (CDE) enables a single source of truth from which asset insights can be delivered to asset and reliability managers and members of other departments within an organisation to deliver the productivity gains they need to drive profitability.

The good news is that mining organisations can implement a dedicated Enterprise Asset Management (EAM) platform that integrates seamlessly with their existing ERP systems and is enabled by a CDE to reduce complexity and ensure the right data is delivered to the right decision-maker at the right time. The outcome is optimised asset productivity and the ensured safe and reliable running of operations.

This isn't about using future technology. The technology exists now.

Bringing these technologies together, along with data, people and processes in a strategically planned integrated Asset Information Ecosystem, organisations can make the transition towards Digital Asset Management Maturity and move from a reactive maintenance model to a predictive-based one. The productivity gains from reduced maintenance costs and reduced lost time to equipment failure can safeguard mining operations' future competitiveness and maximise profitability.

The path to predict: achieve digital asset management maturity

COSOL understands what's required. We help mine operators build a roadmap and meet key criteria benefits at each stage on their path to Digital Asset Management Maturity. We assist organisations to realise their strategic objectives by bringing technologies, data, people and processes together as part of an Asset Information Ecosystem and we work with them to accelerate changes so they can achieve faster 'time-to-value'.

In the face of the unique set of challenges confronting the mining sector, asset-intensive operations can rely on COSOL's unparalleled expertise to deliver an end-to-end asset management solution.

Find out how COSOL can help your organisation unlock the rich potential contained in your data and realise your true asset potential. ⟲

DID YOU KNOW?

Time lost to equipment failure can be reduced by up to 25% when a dedicated EAM solution is implemented.

Predictive maintenance can reduce costs by as much as 20%.

SOURCE: IBM

Adapt and thrive

Miners must evolve – or be left behind

Better productivity means improving how assets are managed. But how many mining organisations find themselves shackled by ineffective asset management technologies and systems?

72% of industrial products executives say digital initiatives will be critical to the success of their organisation in the next three years.

IBM INSTITUTE FOR DIGITAL VALUE

TOP STRATEGIES FOR GROWTH

Mining organisations list 'Productivity gains from existing operations' and 'Innovation and technological transformation' among their top 4 strategies for growth.

Top growth strategies for 2022	
1	Organic growth
2	Mergers and acquisitions
3	Productivity gains from existing operations
4	Innovation and technological transformation

SOURCE: KPMG GLOBAL MINING OUTLOOK 2022

The mining industry is in the midst of profound change. Seismic shifts are taking place that are forcing mining organisations to examine how they can improve efficiencies across their entire operations.

Over the last decade, the sector has come under increasing pressure with fluctuating commodity prices, scarcity of viable assets, tighter regulations, labour constraints and constricted supply chains. Coupled with global political uncertainty, a push for nationalisation of resource ownership and a higher level of 'social conscience' among individuals, investors and within resource companies themselves, we find the sector in an adapt or die position.

All these issues are causing mining organisations to rethink their business priorities, just as other industry sectors are rethinking theirs.

Against this backdrop, mine operators understand the need to adapt so they can overcome prevailing threats. One way they can do this is to take advantage of new digital technologies that can significantly improve asset performance management, enable significant gains in predictive analytics and compliance, and reduce costs and risk. These digital technologies are fast superseding traditional operating methods and sorting mining industry operators into two groups: laggards and leaders.

As we realise the full potential of the 4th Industrial Revolution, an era defined by the fusion of physical, digital and biological technologies, digital transformation is unleashing a wave of productivity gains that mining operators realise they must ride if they are to maximise the efficiency of their operations. Miners have much to gain from investing in an integrated Enterprise Asset Management (EAM) solution that can deliver them the insights they need to supercharge their productivity.

Unleash productivity with better asset management

Mining industry leaders understand that they need to extract productivity gains from their existing operations. They also understand the need to focus on initiatives that will guarantee sustainable productivity increases over the long term.

Failure to act means mining operators will continue to lose out in the productivity stakes. A recent McKinsey & Company report shows that mining productivity peaked in the 1990s and, since then, has fallen by more than 30 per cent. The risks associated with inaction are simply too great.

Until recently, mining organisations have tended to rely on the asset management functions included in their Enterprise Resource Planning (ERP) software. But built-in asset management modules frequently play a secondary role to other business-critical functionality contained within an ERP solution. In essence, ERP software is a jack of all trades, but a master of none.

Mining organisations operate in asset-rich environments and demand fully featured asset management functions that are beyond the capability of even the most powerful ERP systems. When a dedicated EAM is integrated into their business as part of an asset information ecosystem, however, it can provide the comprehensive data-driven insights they need for effective asset decision-making.

Risks associated with a 'passive' approach to asset management

With a 'passive' approach to asset management, mining operators typically over-maintain their assets to reduce risk and costs associated with asset failure. They are prepared to accept losses in individual asset productivity through excess asset downtime rather than invest in managing each asset effectively. It is critical to be able to extract the maximum value out of assets by extending the mean time between failures to lower the total cost to maintain, without putting the operation at risk.

There are sustainability impacts, as well. These organisations are more likely to use materials, parts and equipment at a greater rate, with consequences for their ability to meet their Environmental, Social and Governance (ESG) targets.

Furthermore, when an ERP system is relied on to monitor and maintain assets, asset data is tied to an organisation's corporate structure and systems, and not to the asset itself. This has negative ramifications when a mining asset or ▶

> "If you're not investing in enterprise data asset management, you're not investing in your future."

Forces affecting mining

Mining organisations are being buffeted by a range of external forces that are forcing fundamental business change. However, there are factors within their control through which they can shape their success.

External forces being felt right across the mining sector are forcing organisations to change their approach to asset management. However, mining organisations can take steps to enable success. They can bolster organisational efficiency by implementing back-end standardisation of costs and control. And they can look to differentiate their front-end offering by implementing business, technology and process innovations.

External Pressures

- $ Increased CapEx accountability
- Tighter regulations
- Higher stakeholder expectations
- Commoditisation of technology

Market Forces

- Constricted supply chain
- Constrained resources & reserves

Mining company

- Shift to 'just in time' demand chain models
- Change in commodity types in demand

- **Standardisation** for back-end efficiency
- **Agility** for front-end differentiation

Business Controls

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site is transferred to new ownership as a result of a merger or acquisition. The long-term impact of taking a passive approach to asset management can be profound. The likely outcome is that an organisation will suffer a downturn in productivity over time and severely limit their future growth.

Realise the power inherent in data

The Digital Mining Evolution is upon us – and operators must move with the times or be left behind. Among the major challenges they face is making sense of the abundance of information produced by their assets. With equipment sensors generating a wealth of data, it's more important than ever that organisations cut through the information overload and glean concise insights from their assets.

That means investing in an EAM solution that can provide them with the right data, at the right time, to the right decision-maker. Companies that don't innovate risk missing out on enormous opportunities to improve the efficiency of their asset management.

When an organisation can unlock the power of its data, it can facilitate advanced analytics, Machine Learning (ML), autonomous operation and Artificial Intelligence (AI), all of which are the next frontiers of productivity. And when it has full visibility over its assets, it can implement predictive asset maintenance, pursue 'zero D' (zero defects, zero downtime) and extract maximum efficiency from its operations.

Mining operators have traditionally been slow to adopt innovative ▶

> "
> Mining companies need to rethink their passive approach to asset management, which is limiting their future growth and competitiveness.

THE TALENT CRISIS

As companies embrace new digital and analytics solutions, so too must they attract and retain digital talent.

Mining and resources organisations are competing with firms outside the sector for employees who have the right set of digital and technology skills. KPMG recently identified attracting and retaining talent as one of the Top 10 risks facing the mining sector in 2022.

The sector has an ageing workforce and needs a new wave of talent to fulfil the specialised and technology-centric roles that will be a hallmark of progressive organisations. These include roles such as data analysts, enterprise asset managers, computer scientists and more.

Mining and resources organisations are faced with their own 'build it and they will come' moment. By implementing modern technologies in their suite of operations, they will open their doors to a new generation of diverse talent that has the skills to meet the asset management needs of tomorrow.

Mining industry organisations say the talent crisis is the

9th

most pressing risk facing the sector.

KPMG GLOBAL MINING OUTLOOK 2022

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practices that can rapidly improve their operational efficiency. But there is a proven integrated solution that mining organisations can use to ease their transition to full digital asset management maturity.

Crucially, it has been implemented by organisations in other sectors, such as transport and oil and gas, to deliver quantifiable success across numerous metrics. It puts assets and asset data at the heart of organisations' operations, enabling them to make enhanced decisions, actively pursue 'zero D' and analyse the impact of new technologies in advance of their implementation.

Mining operators can draw on the example of these early adopters who have tested, learnt and profited from the cutting-edge platforms – and they can apply them to become a leader in their own sector.

The 4th Industrial Revolution

Mining organisations stand to benefit from the great innovations underway during the current 4th Industrial Revolution, which is being defined by advances in robotics, AI, Machine Learning, biotech, nanotech and green energy.

1st	1784	Mechanical production
		Coal, steam, iron
2nd	1870	Mass production
		Electricity, steel, mechanisation
3rd	1969	Automated production
		Electronics, digitalisation
4th	NOW	Intelligent production
		IoT, networks and Big Data

SOURCE: WORLD ECONOMIC FORUM

Discover the benefits of a dedicated EAM

The efficiencies offered by an EAM platform stand in stark contrast to those offered by an ERP platform.

Forward-thinking organisations understand that there is tremendous value to be realised if their assets are managed and maintained by a dedicated EAM platform. Plus, they recognise that to be successful, they must treat data as a critical asset.

Asset data that is siloed can't reveal the true performance of an asset, nor is it sensitive to the characteristics of that asset – the location of the asset, the unique conditions it operates in, and what operation and maintenance needs it has so it can function optimally.

Integrated asset data can reveal a rich web of information to asset and reliability managers – and it makes no concessions to the complexity of the asset system. Through the creation of a Common Data Environment (CDE), asset insights are delivered from a single source of truth that asset and reliability managers and members of other departments within an organisation can use and easily interpret.

The good news is that mining organisations can seamlessly integrate an EAM platform with their existing ERP platform to ensure safe and reliable operations, reduce complexity and maximise profitability while retaining the critical business functions their ERP provides.

As can be seen in the following pages, COSOL offers a solution that can help organisations take full control of their asset operations, enable them to integrate an EAM within their incumbent ERP system and build a roadmap to help them move from a scheduled or reactive maintenance model to a predictive-based one.
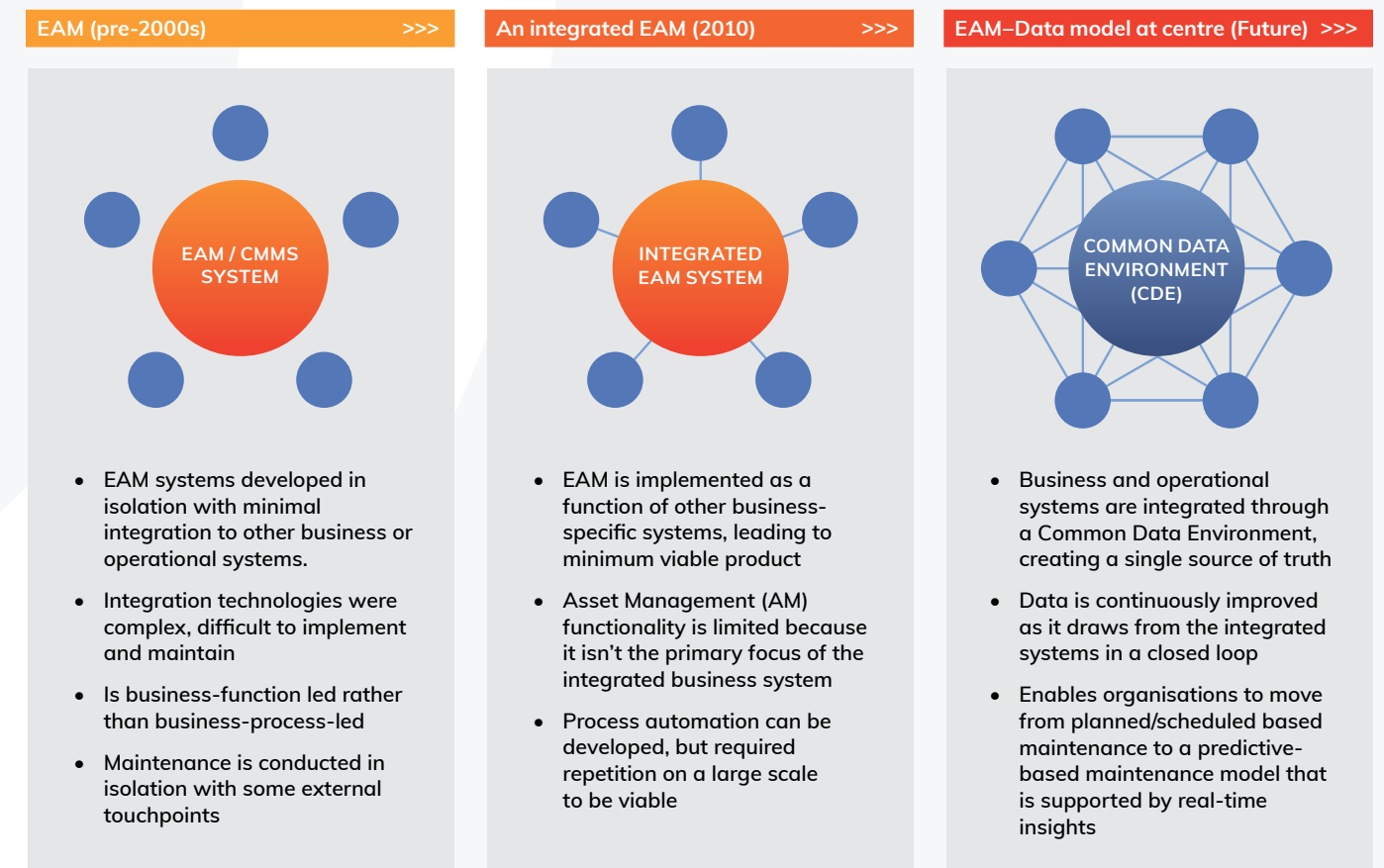
Prepare now for the future

Mining enterprises have traditionally taken a conservative approach to enacting business-wide change. But the example set by early adopters in other sectors shows that an innovative approach to enterprise asset management can yield remarkable results.

For mining organisations, preparing for success means adopting a best-of-breed EAM platform (such as IBM's Maximo Application Suite) and Asset Information Ecosystem thinking that can assist them with their digital transformation journey.

Mining organisations find themselves faced with a stark choice. They can invest in their asset information management now. Or they can face an uncertain future. ↻

Evolution of EAM in a snapshot

Siloed data from sub-optimal asset management systems offer limited operational benefits. With the shift towards an integrated asset information ecosystem, the right data can be served at the right time to enable the right decisions.

EAM (pre-2000s) >>>	An integrated EAM (2010) >>>	EAM–Data model at centre (Future) >>>
EAM / CMMS SYSTEM	**INTEGRATED EAM SYSTEM**	**COMMON DATA ENVIRONMENT (CDE)**
• EAM systems developed in isolation with minimal integration to other business or operational systems. • Integration technologies were complex, difficult to implement and maintain • Is business-function led rather than business-process-led • Maintenance is conducted in isolation with some external touchpoints	• EAM is implemented as a function of other business-specific systems, leading to minimum viable product • Asset Management (AM) functionality is limited because it isn't the primary focus of the integrated business system • Process automation can be developed, but required repetition on a large scale to be viable	• Business and operational systems are integrated through a Common Data Environment, creating a single source of truth • Data is continuously improved as it draws from the integrated systems in a closed loop • Enables organisations to move from planned/scheduled based maintenance to a predictive-based maintenance model that is supported by real-time insights

WHY ASSET PERFORMANCE IN MINING MATTERS

The global economy depends on the success of the mining sector. It means resource extraction efficiency is a matter of critical importance.

US$656 BILLION

Revenue of the top 40 global mining companies in 2020

SOURCE: STATISTA

15%

improvement in asset life by using an EAM solution

SOURCE: IBM

14%

decrease in the global mining sector's net profit margin between 2010 and 2020 (from 25% to 11%)

SOURCE: STATISTA

10%–20%

Reduction in labour costs when using a dedicated EAM solution

SOURCE: IBM

UP TO 25%

reduction in time lost to equipment failure when using a dedicated EAM solution

SOURCE: IBM

US$1235 BILLION
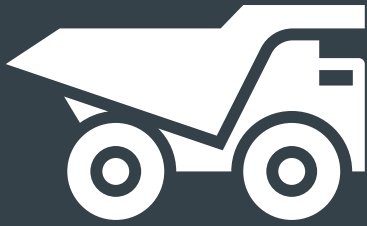
Total assets of the top mining companies worldwide

SOURCE: STATISTA

87%

of mining executives think technology and innovation will play a key role in solving ESG challenges

SOURCE: KPMG

50%

increase in the lifetime of key fleet components using sensors and Machine Learning

SOURCE: MCKINSEY & COMPANY

84%

of executives believe technological disruption presents an opportunity for their business

SOURCE: KPMG GLOBAL MINING OUTLOOK 2022

94%

of industrial products companies have implemented digital initiatives to reduce operational costs

SOURCE: IBM

A leading auto manufacturer increased asset availability by 50%

by moving to a predictive-based maintenance model

SOURCE: IBM

6.9%

The global mining sector's contribution to GDP worldwide

SOURCE: CHINA GEOLOGY SURVEY

UP TO 20%

reduction in downtime and material costs when using a dedicated EAM solution

SOURCE: IBM

Cost overruns in the resource sector, including mining, often exceed 30%

SOURCE: DELOITTE

An optimised EAM solution to harness the power of data

Mining organisations can unlock the tremendous potential of their assets when they understand everything about their performance and how to extract maximum value from them.

The era of mining operations over-maintaining their assets is over.

Organisations in the mining sector could once afford to run their assets hard and just purchase new equipment to ensure or increase productivity, knowing that their healthy margins could cover the cost. Now, however, they must look to extract what productivity improvements they can. Asset management strategies and processes are under scrutiny precisely because they are so important to long-term business profitability.

How can mining operators improve their asset performance? First, they must devise an asset strategy that can leverage their business's master data and business processes.

Second, they need to implement technology architecture that can radically transform management of their assets. And finally, they must integrate 'best-of-breed' platforms and technologies that will enable

them to achieve full digital asset management maturity and a predictive maintenance model.

This last step is of critical importance. Commonly used Enterprise Resource Planning (ERP) software automates and manages core business processes, but is typically accounting focused and doesn't prioritise operational considerations.

A dedicated Enterprise Asset Management (EAM) platform as part of an integrated Asset Information Ecosystem, however, can deliver two main benefits:
- Improved asset productivity by reducing cost to run
- Improved asset operation through reduced asset downtime and better inventory optimisation.

Only when a fit-for-purpose EAM solution is implemented can mining organisations harness the full potential of their plant and equipment. ▶

> " Organisations in the mining sector could once afford to just buy new equipment to increase productivity. Now they must look to extract what productivity improvements they can.

EAMaaS as a secure private cloud platform

Accurate ESG data insights

AI-driven remote monitoring

Better work order management

Improved problem diagnosis and resolution

A holistic view of asset health

Reduced unplanned downtime

Reduced operational risk

Detection of performance anomalies

Become an employer of choice

Reduced likelihood of asset failure

Minimised compliance issues and risk

Minimised inventory stock and costs

Improved work health and safety outcomes

Unlock your organisation's asset potential
Mining enterprises generate multiple benefits when they put data at the centre of their operations.

Your organisation's data at the centre

Disruptive digital technologies have changed the way mining organisations need to approach asset management. To remain competitive, they must understand their assets in a way they never have before.

Before they can reach a state of digital asset management maturity – a state in which predictive maintenance becomes possible – mining organisations must elevate the role of data in their asset management operations. Miners currently have access to a massive amount of asset data, but their ability to extract valuable analytics and insights from it to improve asset performance are constrained by the limitations and siloed structures of their technical architecture.

To bring data to the centre of an organisation, a Common Data Environment – CDE (or model) is needed that creates a common language between all integrated systems and enable information to flow freely and easily between them. The CDE enables a single source of truth for asset information that is delivered as insights via real-time dashboards to everyone from mobile teams and contractors through to asset operators and owners.

A CDE not only enables a 'single source of truth', it is critical in helping organisations see and understand their assets' performance and potential. When assets are treated more 'intimately' – when more is understood about the environment (i.e. underground, coastal) and conditions (i.e. dry, humid) they function in – mining operators can learn how they differ from one another, what their individualised maintenance requirements are, and they can identify trends and patterns that predict asset inefficiency or failure.

Importantly, achieving digital asset management maturity ensures an organisation's data and systems are integrated and continuously improved over time through a closed data loop and Machine Learning.

When an organisation can deliver asset monitoring, maintenance and reliability data on a single platform in real-time, it can facilitate a holistic understanding of asset performance, remove data silos and enhance data sharing with an integrated user experience.

Boost your ERP with dedicated EAM functionality

Mining organisations can collect, organise and integrate previously siloed asset data when they integrate a powerful EAM into their existing ERP platform. IBM Maximo Application Suite (MAS) is a market-leading EAM software solution that enables organisations to sign on to a single, integrated platform to access key monitoring, management and maintenance applications.

45% of mining organisations say they don't have a clear and coherent digital strategy

Eleven (primarily gold and copper) mining companies were asked whether their organisation has a clear and coherent digital strategy in place. Five out of the 11 stated their organisation doesn't.

When asked if their organisation recognises the importance of adopting a strategic approach to its data, the respondents gave themselves a score of 3.45 out of 5 on average. However, they gave themselves a score of 2.55 out of 5 on average when asked how well they understood and managed data — and only 2.27 out of 5 on average when asked how effective they thought their governance of data was.

Clearly, mining organisations are making advances in their digital strategy without laying some of the foundations they need for their digital journey.

When asked where they were at in terms of digital maturity, four out of the 11 mining companies said they were in a 'maturing' state, two said they were in a less-progressed 'developing state' and five said they were in the 'early' stages of digital maturity only.

How does your organisation's progress towards digital maturity compare?

The relative stages mining organisations said they were at when asked to self-assess their digital maturity

Maturing:
36%

Developing:
18%

Early:
45%

Note that organisations who are actively engaged in digital transformation tend to rate themselves lower. Organisations that are in preparation stages tend to be more optimistic.

SOURCE: COSOL

TOWARDS NET ZERO ASSET OPERATIONS

Mining industry organisations recognise the importance of building a sustainable business. It's never been more important for mining operators to use the data at their disposal and install reporting mechanisms so they can deliver on their Environmental, Social and Governance (ESG) commitments.

One of the newest solutions to help mining organisations manage and monitor their ESG is Envizi, which integrates with an EAM (such as IBM Maximo). It can enable organisations to consolidate their energy data and make use of advanced analytics and workflow tools to manage their energy usage. The software automates the collection and consolidation of more than 500 types of environmental data so users can assess sustainability risk and report on their environmental performance.

The software isn't just a powerful ESG tool, it offers proof of IBM Maximo's ability to prepare mining operators for stricter environmental regulations to come.

IBM MAS uses IBM Maximo technology that has been 'designed by engineers for engineers'. In this respect, it differs dramatically from ERP-only systems that only offer rudimentary asset management functions.

Insights derived from connected assets and multiple data sources via IBM Maximo help inform the preventive, predictive and prescriptive actions that organisations need to improve efficiencies and reduce operating costs. Studies show that predictive maintenance alone can reduce costs by as much as 15–20% and reduce lost time to equipment failure by up to 25%.

IBM MAS can be implemented in such a way as to provide an optimal 'time-to-value' outcome for users.

The software consists of modules including 'Manage, Monitor, Health and Predict' so it can be rolled out at a pace that suits the organisation.

It can also create more resilient and sustainable operations and supply chains. By integrating IBM Envizi software (see 'Towards Net Zero Asset Operations') into IBM MAS or other software suites, organisations can analyse and report on their environmental goals, identify sustainability opportunities and assess sustainability risk. This can play an invaluable role in assisting them to meet their ESG objectives.

Organisations can choose IBM MAS as a base product option or they can opt for an Enterprise Asset Management as a Service ▶
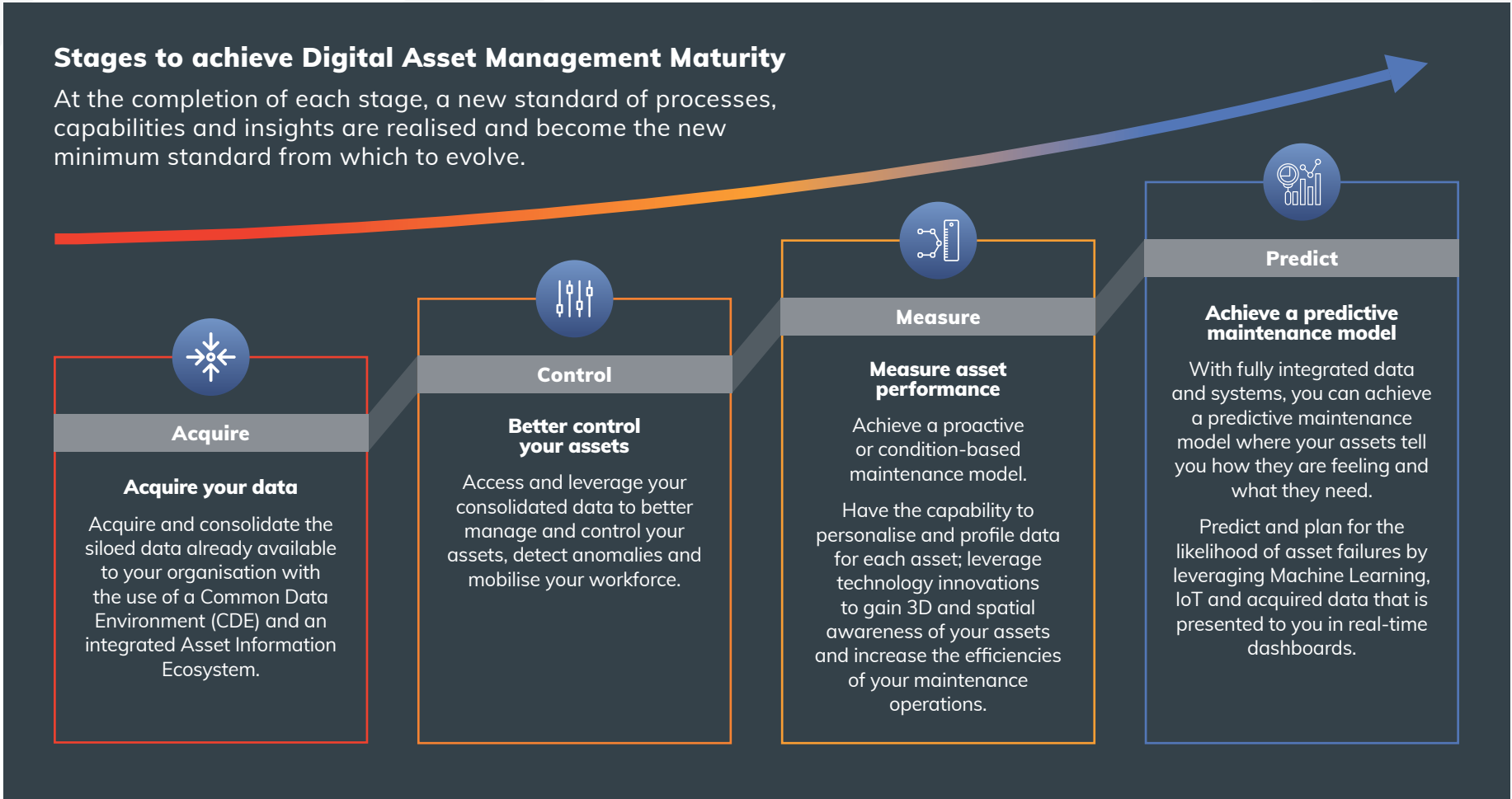
> "Predictive maintenance can reduce costs by as much as 20% and reduce lost time to equipment failure by up to 25%.
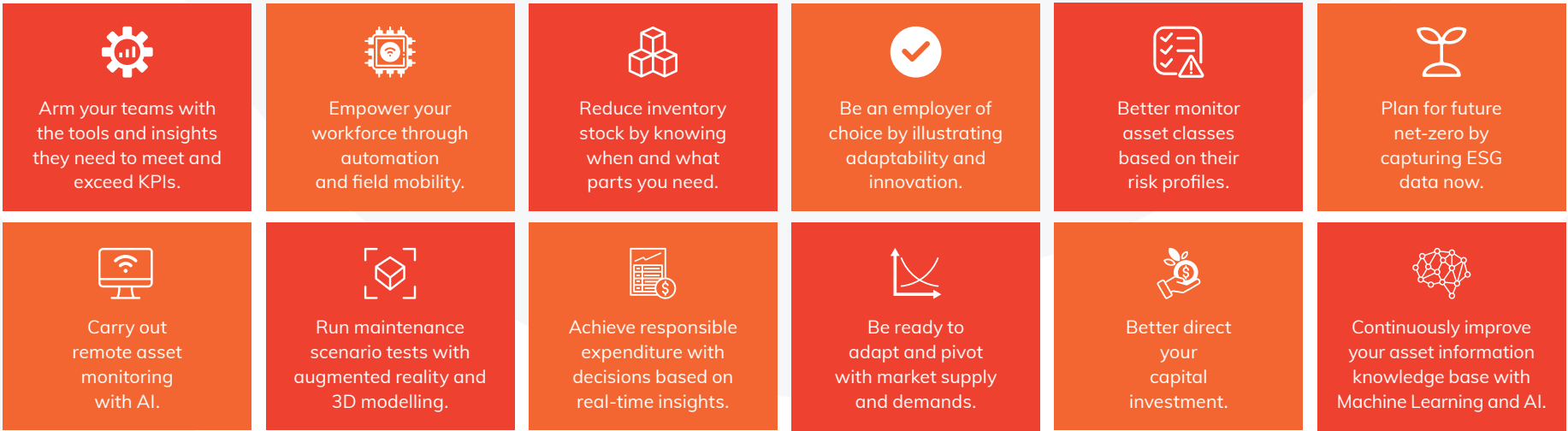
SOURCE: IBM

The Digital Asset Management Maturity Model

The Digital Asset Management Maturity model illustrates the four critical stages that an organisation must move through in their business journey in order to achieve a predictive maintenance state. COSOL works with mining organisations to help them understand where they are on the Digital Asset Management Maturity model, identify what best-of-breed technologies their business needs as part of their Asset Information Ecosystem, and realise efficiencies at each stage on the 'Path to Predict'.

Stages to achieve Digital Asset Management Maturity

At the completion of each stage, a new standard of processes, capabilities and insights are realised and become the new minimum standard from which to evolve.

Acquire
Acquire your data

Acquire and consolidate the siloed data already available to your organisation with the use of a Common Data Environment (CDE) and an integrated Asset Information Ecosystem.

Control
Better control your assets

Access and leverage your consolidated data to better manage and control your assets, detect anomalies and mobilise your workforce.

Measure
Measure asset performance

Achieve a proactive or condition-based maintenance model.

Have the capability to personalise and profile data for each asset; leverage technology innovations to gain 3D and spatial awareness of your assets and increase the efficiencies of your maintenance operations.

Predict
Achieve a predictive maintenance model

With fully integrated data and systems, you can achieve a predictive maintenance model where your assets tell you how they are feeling and what they need.

Predict and plan for the likelihood of asset failures by leveraging Machine Learning, IoT and acquired data that is presented to you in real-time dashboards.

Characteristics of an organisation that has achieved Digital Asset Management Maturity

Arm your teams with the tools and insights they need to meet and exceed KPIs.	Empower your workforce through automation and field mobility.	Reduce inventory stock by knowing when and what parts you need.	Be an employer of choice by illustrating adaptability and innovation.	Better monitor asset classes based on their risk profiles.	Plan for future net-zero by capturing ESG data now.
Carry out remote asset monitoring with AI.	Run maintenance scenario tests with augmented reality and 3D modelling.	Achieve responsible expenditure with decisions based on real-time insights.	Be ready to adapt and pivot with market supply and demands.	Better direct your capital investment.	Continuously improve your asset information knowledge base with Machine Learning and AI.

(EAMaaS) model that enables them to leverage up-to-date technologies in a cloud environment. EAMaaS can be integrated with other applications (including an ERP), either in enterprise or in external systems, to deliver best-of-breed technology and expand an organisation's asset management capabilities.

IBM MAS can also be selected as a managed service, thereby transforming the 'break-fix' model of support into a proactive program of monitoring, maintenance and continual improvement of an organisation's Asset Information Ecosystem.

Towards greater asset understanding

Using the digital technologies now available, and by implementing a CDE, asset and reliability managers can make smarter and fact-based decisions about their organisation's assets.

The Internet of Things (IoT) can collect data from sophisticated sensors and systems reporting on the operating performance of physical assets. GIS (Geographic Information System) and mobility systems allow the capture of meaningful location-based insights. Building Information Modelling (BIM) can support a 3D representation of your assets to deliver a Digital Twin that assists planners and operators diagnose problems or improve maintenance planning.

The data collected from physical assets by the IoT can then be augmented with powerful cognitive insights driven by Artificial Intelligence (AI). Data captured can be integrated to create reliable statistical models that asset and reliability managers can use to make rapid and informed decisions about where, when and what maintenance is required.

These cutting-edge technologies present an opportunity for mine operators to maximise the useful life of their assets, reduce the risk that comes with asset downtime, minimise inventory stores and unlock productivity gains. They can also play a role in providing stakeholders with emissions insights to inform sustainability strategies.

As executives of agile mining firms understand, attaining digital asset management maturity is much more about grasping a business opportunity than just a technology opportunity.

The 'path to predict'

# The asset information ecosystem for mining

Asset-intensive mining operations can rely on COSOL's asset information ecosystem expertise to reduce unplanned downtime, extract actionable data insights and maximise the value of their assets.

> **AI analytics can reduce inspection costs by 40% relative to visual inspections.**
> IBM MAXIMO

> "COSOL's ecosystem approach to enterprise asset management optimises each stage of the asset lifecycle."
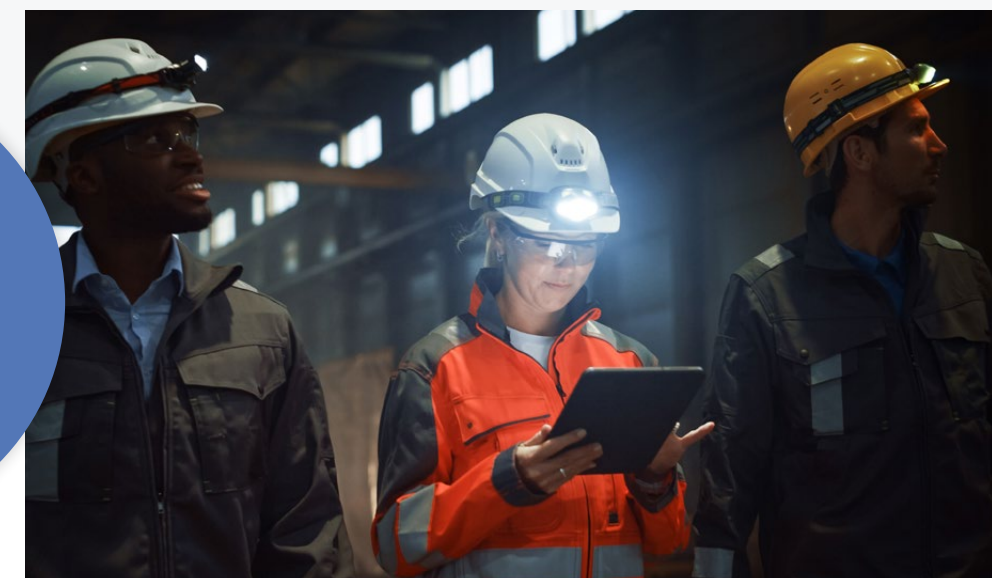
Mining organisations are currently experiencing an 'explosion' in the amount of data available to them. How they utilise that data will determine how successfully they position themselves for profitability and future growth.

Making the most of your organisation's data and extracting optimal performance from assets requires a partner with real-world expertise. COSOL makes it easy for your organisation to identify opportunities in your existing asset management systems, leverage the extensive information contained in your data and facilitate a comprehensive digital representation of your physical assets.

Our tried and tested ecosystem solution

COSOL has experience working with organisations across the utility, public infrastructure and defence sectors to facilitate their path to Digital Asset Management Maturity and a predictive maintenance model. We work with our clients to implement best-of-breed solutions and we embed processes that stakeholders can follow and understand to maximise their asset use.

Using a strategically planned Asset Information Ecosystem model (see pp20–21), we enable our clients to unlock the rich potential in their assets and make the transition towards Digital Asset Management Maturity. The model envisages an integrated data environment that brings together data systems to capture and interpret information so as to achieve a single source of truth.

COSOL's ecosystem approach to enterprise asset management optimises each stage of the asset lifecycle (Acquire, Utilise, Maintain and Dispose). And it allows for reliable performance insights to be gleaned and actioned so organisations can make better asset lifecycle decisions and streamline efficiencies in inspections, maintenance, repairs and improvements.

Furthermore, it helps organisations achieve previously unachievable levels of productivity. An asset maintenance regime that was once based on reactive decision-making becomes one in which predictive maintenance decisions can be made that deliver substantive asset efficiency and value gains.

The end-state is one in which all of an organisation's systems and data are integrated and maintenance decisions can be made on the basis of how they best serve business profitability and sustainability.

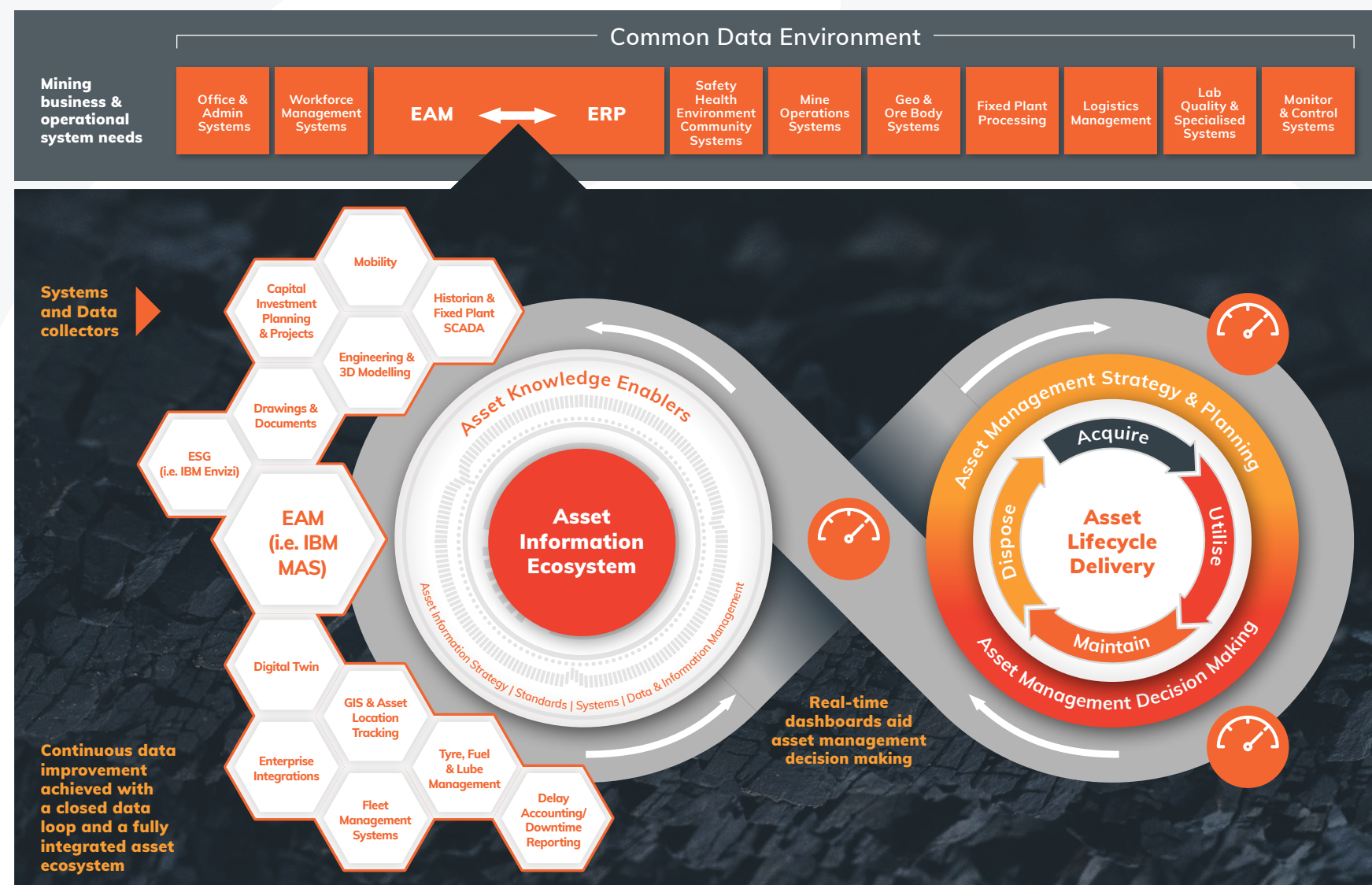### An integrated ecosystem for mining

Having taken lessons from solutions applications in other sectors, we have applied our 20 years' experience in the mining industry towards developing an Asset Information Ecosystem model specific to mining. At the heart of the mining ecosystem is a powerful EAM solution (such as IBM MAS) that delivers asset monitoring, maintenance and reliability on a single platform.

This ecosystem approach facilitates a holistic understanding of asset performance, removes data silos and enhances data sharing.

Together with software solutions that enables mobility, asset tracking and spatial awareness (i.e. Esri ArcGIS), digital access to asset engineering drawings (i.e. RedEye DMS), 3D Modelling/BIM and ESG solutions (i.e. IBM's Envizi), we make it possible to implement and implement a rich network of information technologies. These can be seamlessly integrated with any existing ERP platform to deliver powerful insights. ▶

The Integrated Asset Information Ecosystem for mining

Common Data Environment

Mining business & operational system needs

| Office & Admin Systems | Workforce Management Systems | EAM ⟷ ERP | Safety Health Environment Community Systems | Mine Operations Systems | Geo & Ore Body Systems | Fixed Plant Processing | Logistics Management | Lab Quality & Specialised Systems | Monitor & Control Systems |

Systems and Data collectors

Asset Knowledge Enablers

- Mobility
- Capital Investment Planning & Projects
- Historian & Fixed Plant SCADA
- Engineering & 3D Modelling
- Drawings & Documents
- ESG (i.e. IBM Envizi)
- **EAM (i.e. IBM MAS)**
- Digital Twin
- GIS & Asset Location Tracking
- Enterprise Integrations
- Tyre, Fuel & Lube Management
- Fleet Management Systems
- Delay Accounting/ Downtime Reporting

Asset Information Ecosystem

Asset Information Strategy | Standards | Systems | Data & Information Management

Asset Management Strategy & Planning

Asset Lifecycle Delivery — Acquire, Utilise, Maintain, Dispose

Asset Management Decision Making

Real-time dashboards aid asset management decision making

Continuous data improvement achieved with a closed data loop and a fully integrated asset ecosystem

How COSOL helps achieve a faster time-to-value

If Digital Asset Management Maturity and a predictive maintenance model are the goal, how does COSOL work with its clients to achieve it?

COSOL works with mining organisations to plan, build and optimise their Asset Information Ecosystem and realise business benefits at each stage of their digital asset management transformation. The roll-out is paced to suit each organisation's transition velocity. And we work with them to accelerate changes so they can achieve faster 'time-to-value'.

Along the way, miners reap the benefits of a proven process without any of the associated risk. Early adopters in other industries have shown that Digital Asset Management Maturity is possible with a staged approach and they have paved the way for sectors with a lower risk appetite – such as mining – to follow.

The path to Digital Asset Management Maturity with a fully integrated Asset Information Ecosystem requires organisations to go through four sequential stages, which deliver productivity benefits, establishes new asset information capabilities, and sets new business standards once each milestone is reached. Prior to commencing the journey, we work with clients to assess where the organisation lies on the path to Digital Asset Management Maturity and what technologies, processes and strategies are required as part of their Asset Information Ecosystem.

The four stages are (see also pp.16–17):
- **Acquire your data** – We help your organisation break down data silos and facilitate the capture of new data from equipment and systems that are already available to your organisation. We help you establish a Common Data Environment that allows your integrated systems to talk the same language and enable free-flowing information.
- **Control your assets** – We help you better access and leverage your consolidated data to better manage your assets, detect anomalies, and mobilise and empower your workforce.
- **Measure performance** – We help your organisation move to a proactive maintenance model that allows you to manage the health and performance of your assets. Your data can be examined as part of an integrated whole via real-time dashboards.
- **Predict and plan** – We help you achieve a predictive maintenance model that enables you to predict when maintenance is needed or a failure will occur. Predictive maintenance strategies can then be developed based on accurate and real time insights.

With a continuous data loop, organisations can continue to grow their asset information knowledge base for the future.

Future-focused EAM

Exciting advances in data capture, advanced analytics, Machine Learning, Artificial Intelligence (AI), robotics and IoT are the defining characteristics of our digital age.

It's clear that mining organisations need to take full advantage of these new and emerging technologies, prioritise their asset data and implement asset ecosystem thinking to realise their asset management potential.

With our real-world experience, our embrace of technologies and skills that can maintain and support outstanding asset management performance, and our track record of integrating data across complex systems, COSOL is a trusted partner to the mining sector. ⟳

COSOL capabilities at a glance

- We're experts at unlocking asset potential
- Our digital solutions serve critical asset-intensive industries
- We connect people, processes, systems and data
- We offer Enterprise Asset Management as a Service (EAMaaS) as a complete managed solution for EAM
- We deliver cost efficiencies and enhanced asset productivity and performance
- We tailor managed services to meet your organisational demands

COSOL works with 15 top mining organisations, including:

AngloAmerican

BHP

FMG Fortescue
The New Force in Iron Ore

About COSOL

A valued partner to the mining sector

We specialise in delivering enterprise asset management platforms and advice to drive quantifiable business improvements through data and analytics.

COSOL is a recognised provider of technology solutions and advice to the mining sector. With more than 20 years' experience in the field, we partner with asset-intensive mining organisations to unlock their full asset potential.

In addition to working with mining operators to optimise the performance of their assets, we offer the insights, advice and solutions they need to enhance business processes across operations, maintenance, logistics, finance and human resources.

Our improvement initiatives are rooted in the value of data, which means we remain resolutely focused on creating data-driven business efficiencies. With the recent acquisitions of Clarita Solutions in 2021 and Work Management Solutions (WMS) in 2022, we have extended our capabilities in delivering digital asset management solutions and business advisory and technical consulting services to mine operators.

We leverage the power of advanced technology

There's no doubt future mining operations will look different to even the most sophisticated of today's mining ventures. COSOL, in combination with its strategic partners, is well positioned to leverage advanced technologies, such as remote data capture, advanced analytics and automation, Machine Learning and Artificial Intelligence (AI), to enable mining organisations to keep pace with change and deliver improved productivity outcomes.

The COSOL group of companies has an enviable track record of working with organisations across various sectors to deliver improvements in the operation

and maintenance of their plant and equipment. Our expertise enables our customers to:

- leverage analytics for data-driven decisions
- explore and harness opportunities in IoT (Internet of Things), AI, Machine Learning and emerging technologies
- establish a Common Data Environment (CDE)
- drive efficiencies by integrating EAM with incumbent systems
- align asset information system investments with strategic asset management objectives and drive continuous improvement.

We assist organisations to realise their strategic objectives by bringing technologies, data, people and processes together as part of an asset information ecosystem. The ecosystem concept enables information to flow freely between systems and allows asset operators to streamline essential tasks such as inspections, maintenance, repairs and improvements.

The COSOL difference

COSOL implements integrated asset management solutions so mining enterprises can generate insights for effective asset decision making. We work closely with our customers to build and implement an optimised asset information ecosystem specific to their requirements. And we provide them with the business optimisation services and operational know-how they need to transform the productivity and performance of their assets.

In the face of the unique set of challenges confronting the mining sector, asset-intensive operations can rely on COSOL's unparalleled expertise to deliver an end-to-end asset management solution. ◐

GLENCORE

NEWCREST
MINING LIMITED

Newmont

RioTinto

> COSOL can unlock the almost limitless power of data so mining organisations can extract greater value from their assets.

Talk to one of our specialists today about partnering with COSOL to improve operational efficiency, reduce risk and maximise your organisation's profitability.

COSOL

Leverage COSOL's industry experience and technical expertise to optimise your organisation's asset performance.

IBM

Leverage our expertise

COSOL is a global leader in digital transformation and data exploitation with more than 20 years' experience partnering with asset-intensive organisations.

In 2021, COSOL Ltd acquired **Clarita Solutions** – a leading Australian asset management system integration consultancy and certified IBM Gold Partners.

In 2022, **Work Management Solutions** (WMS) joined the COSOL group bringing global expertise in physical asset management, asset management consulting and contract resourcing.

Together, the COSOL group of companies have the industry, regional and technical expertise to deliver best-of-breed solutions that drive quantifiable business improvements for asset-intensive organisations worldwide.

COSOL

Get started on your path to digital asset management maturity. Contact one of our specialist teams:

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