



# AI in the Mining Industry



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# AI in Mining

By [Andrew Cooke](#), [Growth & Profit Solutions](#)

This document is brought to you by Andrew Cooke of Growth & Profit Solutions, a leading AI and business consultant. He has an MBA from London Business School, and is an accredited Lead Implementer of ISO-42001: Artificial Intelligence Management Systems – the only global standard for the development, deployment, management, and improvement of AI management systems. He is also accredited in Scaling AI, and is a Graduate of the Australian Institute of Company Directors (GAICD).

## Purpose of Document

The purpose of this document is to outline the key issues and opportunities for the Mining industry in terms of using and integrating AI into their businesses effectively. This document also suggests strategies that can be used in addressing these issues and opportunities proactively.

## Introduction

AI is not only disrupting industries; it is transforming them. AI is recognised for its ability to help businesses improve productivity, gain cost efficiencies, to analyse data and make better-informed decisions, to ideate, to create new content and material, and to free up people to work on more interesting & higher value.


The use of generative AI has increased significantly, jumping from **55% in 2023 to 75% in 2024**. Organisations are using generative AI primarily for **marketing and PR**. Other areas where AI is currently being used include customer service, finance/accounting, legal, IT/tech infrastructure, sales/business development, human resources, and product development. The two primary business outcomes organisations aim to achieve with AI are **employee productivity** and **top-line growth**.

## The Mining Context

In mining, production costs have risen nearly 30% over the last 5 years<sup>1</sup>, making it important to not only find cost-savings and efficiencies (and to assess how these may impact the business), but also how to grow including developing new, innovative production and recovery methods, as well as being to better analyse and uncover new mining opportunities.

For an industry rich in data, AI has the potential to optimise processes and improve performance across the mining value chain - from mineral extraction to customer delivery. This can be seen as below.

**Figure 1: Example of AI technology utilised for improvements across the mining value chain.**

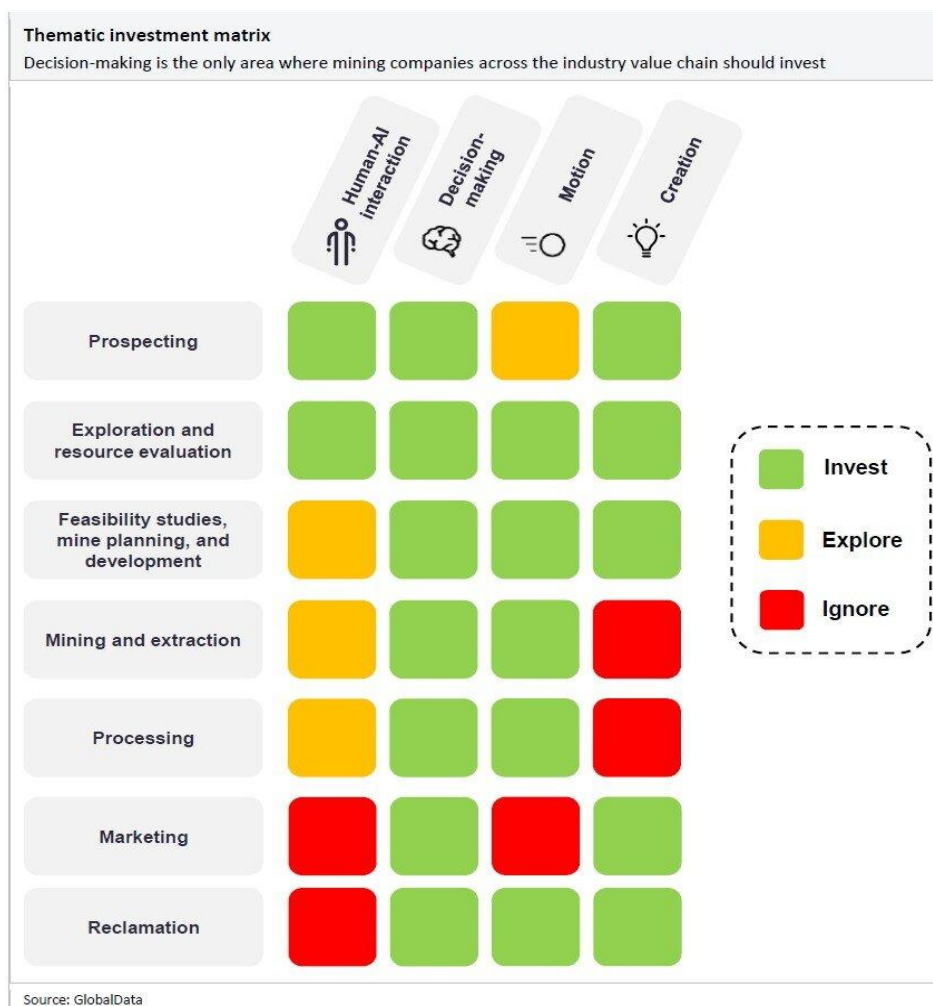


Value Chain Stage	Mine	Processing plant	Inventory	Rail	Port	Shipping	Market
<b>AI technology example</b>	<b>Autonomous Vehicles:</b> self-driving trucks, drills, and loaders use AI for navigation and operation, enhancing efficiency and safety.	<b>Plant Optimisation:</b> AI systems monitor and control processing plants, adjusting parameters to optimise performance and reduce energy	<b>Ore Sorting:</b> AI-powered sensors and machine learning sort ore from waste material, improving ore quality and reducing processing costs.	<b>Predictive Maintenance:</b> AI analyses sensor data from transportation equipment to predict failures and schedule maintenance, reducing downtime and	<b>AI-Powered Cranes:</b> AI systems control cranes for loading and uploading bulk materials, improving speed, precision and safety.	<b>Dynamic Routing:</b> AI algorithms analyse weather data, sea conditions, and vessel performance to determine the most efficient and safe routes.	<b>Demand forecasting:</b> AI models can be used to forecast demand for mining products, allowing companies to adjust production and inventory.

*Source: Artificial Intelligence is unearthing a smarter future, BHP, August 2024*

## Opportunities for AI

According to research from Global Data<sup>2</sup>, the areas of AI in which mining companies should focus their time and resources relate to decision-making, and the use of AI in **Prospecting; Exploration & Resources Evaluation; and Feasibility Studies, Mine Planning, and Development.**



AI has significant abilities in data analytics and optimisation, enhancing productivity, achieving improved efficiencies, uncovering growth and revenue opportunities, and innovation. AI can also significantly reduce time to complete work, improve the quality of output, and develop employees' skills, capacity, and performance.

<sup>2</sup> Global Data: The Impact of AI on Mining, October 2024. Accessed at [The impact of AI on the mining sector - Mine | Issue 145 | October 2024](#) on 5 December 2024

## Benefits of Generative AI in Mining

By leveraging generative AI in mining, businesses can:

- Streamline and simplify administrative/back-office work.
- Free people from low-value/repetitive work, and enable them to focus on more strategic and valuable work.
- Identify bottlenecks and inefficiencies in processes.
- Improved analytics, uncovering patterns and information from large data sets, and enable better data-driven decision-making.
- Optimize resource allocation and reduce costs.
- Improve compliance and risk management.
- Improve agility and responsiveness, enabling increases in agility and responsiveness.

## Key Barriers to the Successful Adoption of AI

There are several issues that combine and compound to make it harder for businesses to implement and integrate AI successfully. These include:

- **AI Literacy** – overall there is very low level of AI literacy across businesses. Many businesses have no plans to train their people compounding the lack of understanding of AI, how it works, its benefits, and its limitations.
- **Overwhelm** – many business leaders don't know where to start or how in adopting and implementing AI. They lack the time and energy to focus on this, as well as the processes, tools, and support to help them break down, prioritise, and address key issues and opportunities.
- **Competing Demands** – leaders are frequently pulled into operational matters, making it hard to think about how to use and deploy AI strategically.
- **Lack of AI Expertise** – there is a lack of suitably experienced and qualified people who understand AI, how to use it, and its limitations and what is required to successfully integrate it in the business' context.
- **No Clear AI Strategy or Plan** – business leaders lack an AI strategy and AI roadmap which is aligned with the business strategy goals. This makes AI implementations ad hoc and sub-optimal.
- **Fear & Resistance** – AI will have an impact on work, employment and on society in general. Many people are afraid of AI, fearing their job will be taken by AI, and resist or undermine efforts to use it.
- **No Implementation Process** – business leaders lack a clear implementation process. This results in the AI use cases or projects failing to achieve the outcomes sought, incurring cost overruns, take longer than expected, or sub-quality outputs.

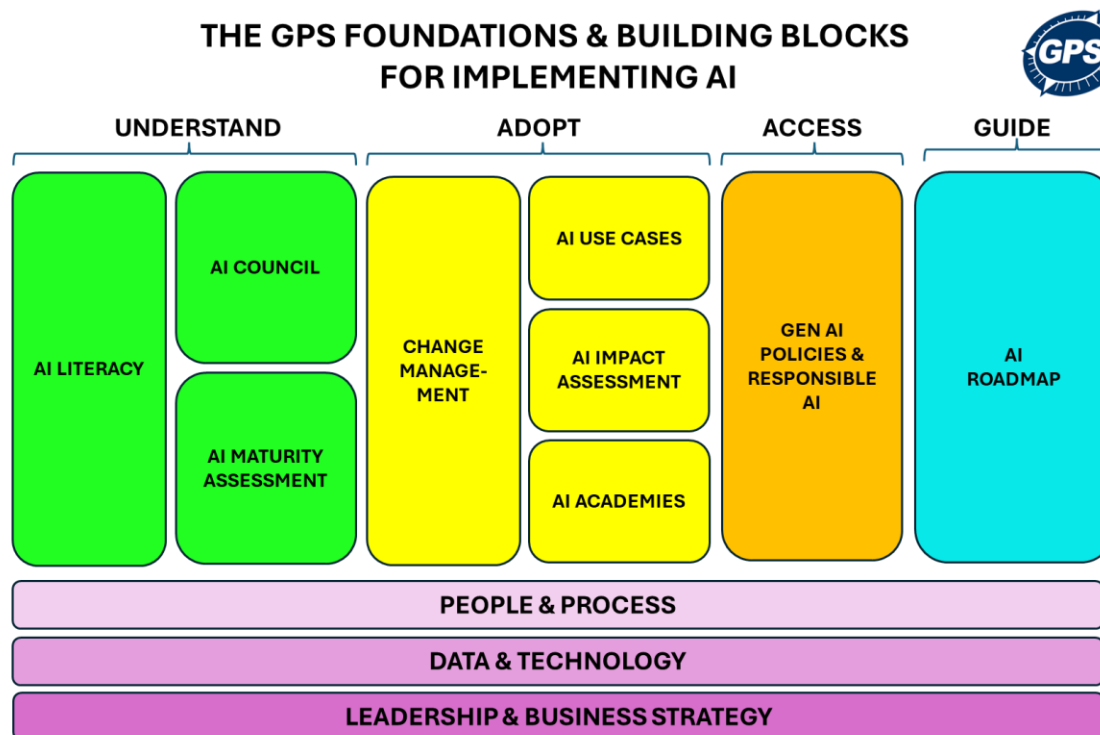


- **No GenAI Policies or Responsible AI Principles** – with this lack, businesses risk ethical issues like bias, privacy violations, and misinformation, which can erode trust and damage reputations. Operationally, inconsistent AI use and lack of accountability may lead to inefficiency and misuse, while legal and compliance risks, such as regulatory breaches or intellectual property disputes, can result in costly penalties. Additionally, the absence of a structured approach can hinder innovation, misalign AI efforts with business goals, and leave organizations vulnerable to competitors with robust AI strategies.

## Addressing the AI Implementation Challenge & Opportunity

To help address this, Growth & Profit Solutions have developed the **GPS AI Implementation Model** below. This model provides a roadmap for business leaders looking to implement AI successfully.

The integration of AI within a business requires a focus on three foundational factors and nine critical building blocks. These elements are central to the program, guiding participants through each stage of AI implementation.



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### Foundational Factors:

#### 1. Leadership & Business Strategy:

AI *must* be integrated into the business's broader strategy, enhancing the delivery of products/services and supporting long-term goals. Businesses that align AI with their strategic objectives have reported substantial improvements in efficiency (source: Deloitte, 2023). Leaders must actively support, enable, and lead the ongoing development, deployment, maintenance, and improvement of AI Management Systems within the business.

#### 2. Data and Technology Infrastructure:

The effectiveness of AI in business hinges on the quality of the business's technology and data governance. Leaders must ensure their infrastructure, technology stack, and data is secure and



AI-compatible. Businesses with robust AI and data governance policies have seen significant gains and efficiencies.

### 3. People and Processes:

AI adoption requires the right skills and workflows. This includes training people, building AI literacy across the whole business, adapting processes, and ensuring that AI tools augment rather than replace human expertise. This requires developing a continuous learning strategy that includes AI training tailored to the specific needs of legal professionals.

#### Building Blocks

The nine building blocks are the key elements that need to be considered and addressed when planning for and implementing AI. These include:

1. **AI Literacy:** Equip your team with a deep understanding of AI, its ethical implications, and its practical applications within the industry.
2. **AI Maturity Assessment:** Evaluate your business's current capabilities and readiness for AI to identify strengths and areas for improvement.
3. **AI Governance Council:** Establish a cross-functional team to oversee AI strategy, ensuring it aligns with legal and ethical standards, acts as a catalyst for the successful use & uptake of AI.
4. **Ethical AI Policies:** Implement policies governing the responsible use of AI, with a focus on maintaining confidentiality, avoiding bias, and ensuring accuracy.
5. **AI Impact Assessments:** Regularly assess how AI affects processes, staff, client relationships, and business risk management, and management itself.
6. **Change Management:** Engage your team in the AI adoption process to minimize resistance and ensure a smooth transition.
7. **Education & Training:** Provide continuous learning opportunities tailored to your needs to ensure all staff are equipped to work with AI tools.
8. **AI Academies:** Establish in-house AI academies or knowledge hubs to support ongoing learning and adaptation.
9. **AI Roadmap:** Develop a strategic AI roadmap that guides the business's AI initiatives over the next 12-24 months, prioritizing actions that align with legal and business goals.

#### The Four Stages of the Model

There are four key stages in this model. These include:

##### 1. Understand

This is where people and the business understand what AI is, its risks and benefits, how to use it, and the implications of AI for individuals, teams, the business, industry, and society. AI Literacy is the cornerstone for using AI. Not understanding AI, having a low level of AI literacy, will compromise your ability to use it effectively and realise the benefits.

In understanding how AI might be used in your business, you want an AI Council - a group of curious and passionate people who want to understand AI, assess its impact, and responsibly apply it for the good of the organization and its stakeholders. You also need an AI Maturity





Assessment which helps to determine the business' ability and readiness to adopt/improve AI. This feeds into the development of the AI Roadmap.

## 2. Adopt

For AI to be used effectively you need change management to engage people, so they understand how it benefits and helps them, and they are aligned with and committed to using AI to achieve personal, team, and business goals. This includes identifying and assessing initial AI use cases, assessing the impact of AI in these use cases and elsewhere, and establishing internal AI Academies to help grow and develop in-house the necessary technical, business, personal and inter-personal skills to implement, support, and develop the use of AI within the business.

## 3. Assess

The implementation of AI does not happen in a vacuum. How it is used, and its inherent limitation and key implications need to be allowed for and managed. For example, issues around data privacy, confidentiality, security, copyright, access to information, generative AI and associated policies, and responsible AI principles need to be determined and managed, with suitable 'guardrails' put in place.

## 4. Guide

AI implementation needs to occur in a controlled and planned manner. Looking ahead to the next 12 to 24 months, businesses need to anticipate how the technology, their needs, and their environment will change so they can be proactive in developing how they use AI safely and securely. This is brought together in the AI Roadmap which guides the business, over 12-24 months, and aligns decisions, effort, resources, and investments in achieving business goals.

## Risk Management

The risks associated with the development, deployment, and on-going use of AI need to be identified, assessed, prioritised and managed. This needs to be built into the implementation process, and a structured on-going process for reviewing, updating, and managing risks on an iterative basis needs to be created.

For this, the ISO-42001AIMS (Artificial Management Information Systems) is the only global standard and framework. It includes best practices, and can be adapted to the business' context and requirements

### Overview of ISO/IEC 42001:2023

ISO/IEC 42001:2023 establishes requirements for an **Artificial Intelligence Management System (AIMS)**. This standard aims to ensure responsible, efficient, and ethical use, design, and deployment of AI systems within organizations<sup>3</sup>.

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<sup>3</sup> Andrew Cooke is certified in ISO/IEC 42001:2023 as a Lead Implementer, see page 12.



### *Key Benefits of ISO/IEC 42001*

These include:

1. **Ethical AI Use:** The standard promotes fairness, transparency, and accountability, aligning with societal values.
2. **Risk Management:** It incorporates AI-specific risk management practices to address biases, system failures, and evolving threats.
3. **Improved Decision-Making:** Facilitates responsible decision-making processes using AI by setting guidelines for explainability and documentation.
4. **Innovation and Governance Balance:** Encourages organizations to innovate while maintaining robust governance frameworks.
5. **Regulatory Compliance:** Helps organizations meet growing global regulations on AI, such as the EU AI Act and other frameworks.
6. **Enhanced Stakeholder Confidence:** Boosts trust among clients, partners, and regulatory bodies through demonstrable adherence to best practices.

ISO/IEC 42001 helps the business in a number of ways including

- **AI Risk Assessment:** Identifying and treating potential risks during the lifecycle of AI systems.
- **Transparency in Operations:** Creating clear documentation for decision-making processes.
- **AI Ethics Frameworks:** Establishing ethical review boards and accountability structures.

### *Why Businesses Should Adopt ISO/IEC 42001*

Key reasons include:

1. **Competitive Advantage:** Demonstrates commitment to responsible AI, distinguishing the business in competitive markets.
2. **Enhanced Performance:** Provides measurable performance indicators for AI systems, driving continual improvement.
3. **Risk Mitigation:** Proactively addresses AI-related risks, reducing the potential for operational, financial, or reputational harm.
4. **Alignment with Global Standards:** Ensures compatibility with international regulatory expectations and technical frameworks.
5. **Trust and Accountability:** Builds confidence among stakeholders by embedding fairness and transparency into the organization's operations.

ISO/IEC 42001 is not just about compliance - it's a strategic decision to leverage AI responsibly and align it with organizational goals. It equips businesses with the tools to innovate sustainably while addressing the unique challenges posed by artificial intelligence.



## Recommendations for Actions

So, where should the business start? There are a number of key steps that need to be taken early on including:

- **Develop a Clear AI Strategy:** Align AI adoption with long-term business goals and commitments.
- **Develop AI Literacy:** provide all staff with the training so they understand what AI is, how to use it, its benefits, its limitations, its risks and issues, and how to work around these.
- **Develop & Implement GenAI Policies & Responsible AI Principles:** establish who can use what AI tools, when, and how; and who can access what data and when
- **Invest in Training:** Upskill employees to work alongside AI systems and foster a culture of innovation. Develop a training plan to skill up your people with the AI and soft skills they need to be high-performing.
- **Workforce Planning:** ascertain how roles and responsibilities will change with the adoption of AI, and the positions, people and skills you will need to perform in the future.
- **Leverage Partnerships:** Collaborate with AI specialists to accelerate adoption and access cutting-edge solutions.
- **Monitor and Iterate:** Continuously evaluate AI systems' performance and refine strategies based on outcomes.

## Conclusion

AI will play a prominent role for mining in the future, especially with the rise of generative AI and the acceleration of the development and use of AI-tools in the industry. According to a 2024 Global Data mine-site technology adoption survey, 96% of employees at major mines globally believe AI will have a noticeable impact on their mines.

The ability of AI to help miners across the whole value-chain is clear. Those miners who are slow to adopt AI, or adopt AI in an ad hoc manner, or which lack clear, active support from the top, will be left behind as other miners use AI to create and maintain competitive edge, higher value, and improved levels of performance, productivity, and profitability.

By adopting a clear, structured and supported approach in developing, deploying, managing, and improving your AI management system, you can achieve a wide range of benefits, manage the risks, and develop the in-house skills and capacity to be successful both now and in the longer-term.

## Next Steps

To discuss this and other matters relating to AI, and to understand how you can implement and use AI successfully in your business, then please contact Andrew Cooke as below.

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## Who Is Andrew Cooke & Growth & Profit Solutions?

Growth & Profit Solutions (GPS) is a WA-based business and AI consultancy practice that works with established businesses to help them take the business to the next level smoothly, easily, and sustainably. It was founded in 2009 by Andrew Cooke after he left EY Perth.

Andrew Cooke founded Growth & Profit Solutions in 2009, and has over 35 years business experience. He has a strong background working in the consulting and technology sector, and can “translate” and align business needs with technological solutions that deliver real results. He previously worked with Oracle Corporation (UK) as a senior business consultant, ensuring that major technology projects delivered the business results. This included work in strategy, business process improvement, change management, training and development.

### AI Consultancy & ISO-42001

As a leading AI consultant, Andrew is certified in the only global standard for artificial intelligence – ISO/IEC-42001: AIMS. This focuses on establishing, implementing, and improving an **Artificial Intelligence Management System (AIMS)** within organizations. It provides a structured framework for businesses to responsibly use, develop, and manage AI systems while addressing unique challenges such as transparency, accountability, and continuous learning. If you already have ISO accreditation in other areas this builds on and leverages your work done elsewhere. Establishing your AIMS using the ISO-42001 framework incorporates best practices and enables:

1. **Trust in AI Systems:** It builds trust by ensuring ethical, safe, and effective AI operations.
2. **Risk Management:** The standard guides organizations in identifying, assessing, and mitigating AI-related risks.
3. **Strategic Alignment:** It aligns AI strategies with business objectives and societal expectations, ensuring innovations remain responsible.

Andrew is also certified in Scaling AI. He has an MBA from London Business School, and is a graduate of the Australian Institute of Company Directors (GAICD).

### Industry Workshops

Andrew has delivered many workshops – private and public - to businesses on how to use integrate and implement artificial intelligence successfully. In 2024 he delivered two series of a 3-workshop program on "*ChatGPT & Generative AI for Accountants*" with the Chartered Accountants Institute of ANZ (WA). These programs were well-attended and well-received, and in March 2025 Andrew will be delivering with the CA ANZ (WA) a new program of 3 workshops on "*Implementing AI into Your Accounting Business*".

### Other Workshops:

There is a range of workshops on artificial intelligence available for businesses. privately or publicly, either on a face-to-face or virtual basis. These include:

1. **Foundations of AI:** Learn the basics of AI, its workings, and how to apply it in your business. Gain foundational knowledge to identify AI opportunities and add value to your role.
2. **Prompting for AI:** Master how to design and use prompts effectively for better AI outcomes. Gain hands-on experience in refining your interaction with AI tools.
3. **Advanced Prompting for AI Users:** Refine prompt design and scaling for better efficiency and outcomes. Build a library of reusable prompts to automate tasks effectively.



4. **AI Health Check:** Assess your current AI capabilities, identify strengths, and develop improvement strategies. Leave with actionable insights for maximizing AI potential.
5. **AI in Business:** Explore practical AI applications tailored to your business. Understand how AI can streamline processes and improve decision-making.
6. **AI Risks and Ethical Considerations:** Understand AI-related risks and ethics to address challenges confidently. Develop strategies for responsible AI use and compliance.
7. **AI Strategy for Leaders:** Align AI with your strategic goals and overcome implementation challenges. Learn to create actionable roadmaps for sustainable growth.
8. **Applied AI for Practitioners:** Equip yourself with frameworks and tools to initiate and scale AI projects. Gain insights from real-world AI success stories.
9. **AI Beyond Productivity:** Harness AI for innovation by developing new products, markets, and business models. Transform your approach to growth with cutting-edge AI strategies.
10. **AI for the Board and C-Suite:** Navigate AI opportunities and risks with tools for governance and strategy. Lead smarter and confidently in the AI age.

Further details and flyers are available [here](#).