

Manufacturing and Operations Practices

How mining companies reach the operational excellence gold standard

Creating a culture of operational excellence is allowing the mining industry to reach new heights in sustained improvement in productivity, efficiency, safety, and sustainability.

This article is a collaborative effort by Xavier Costantini, William Fookes, Patrick Neise, Ferran Pujol, Bernardo Rubinstein, and Guillem Sivecas, representing views from McKinsey's Manufacturing and Operations Practices.



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“It is impressive to see what is going on in several organizations in the basic materials [including mining] industry in South America in generating an operational excellence culture that is unlocking so much potential.” This is how a senior executive at the International Shingo Conference in Orlando in May reacted after hearing about the strides mining companies are making to drive and sustain operational excellence.

The enthusiasm is understandable given today’s increasingly challenging business environment, in which improvements in productivity and efficiency, as well as in safety and sustainability, are vital to remaining competitive. Even more important is the ability to sustain the pace of these improvements over time by fostering a culture of operational excellence.

Such cultures are the hallmark of leading companies worldwide, and are increasingly being adopted by players in the mining industry to enable them to realize the same levels of continuous improvement in productivity and efficiency as seen in top-performing companies in other sectors. Adopting

a culture of operational excellence can also enable strong improvements in safety and efficiency. These efforts are beginning to pay off—several mining companies are on track to receive the Shingo Prize for operational excellence, considered a gold standard for companies to aspire to.

Inspired by these successes, mining companies can seize the opportunity to unlock the benefits of continuous improvement. This article explores how adopting a culture of operational excellence could be the key to continuous and lasting improvement in the mining industry, and the steps mining companies can take to achieve a world-class culture of operational excellence.

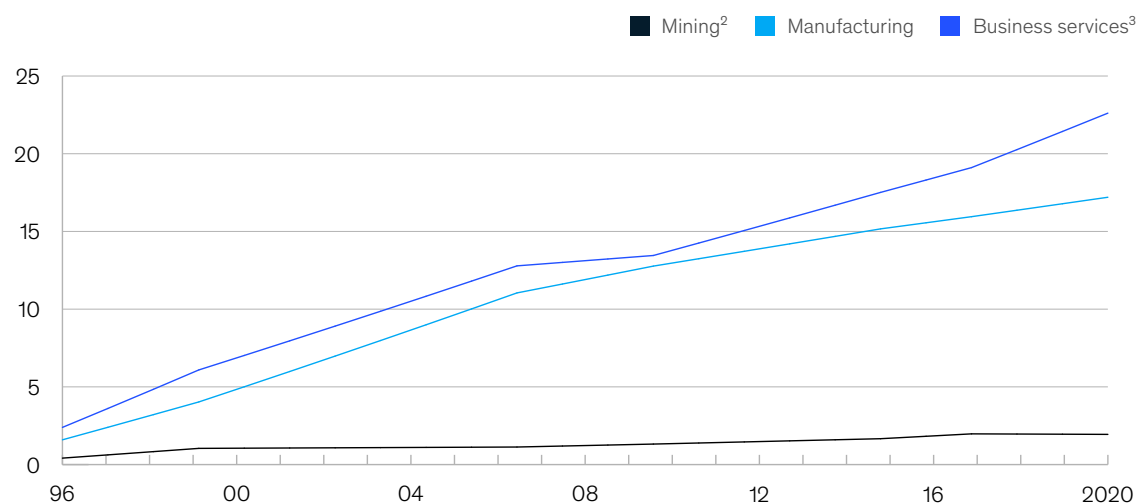
Why an operational excellence culture matters

Several industries, including manufacturing and business services, have experienced a steady improvement in productivity and efficiency over the last 25 years. This pace of improvement is, however, not seen in the mining industry, where productivity has largely remained steady (Exhibit 1).

Exhibit 1

The mining industry has not been able to improve productivity at the same rate as other industries.

Productivity index¹



¹Data calculated as a percentage point contribution at an annual rate, from ten of the largest countries’ economies in the materials industry. Labor productivity is measured as gross value added per hour worked.

²Includes utilities.

³Excludes real estate.

Source: OECD compendium of productivity Indicators

While the ten largest companies in the manufacturing and business services industries have seen their productivity index grow by around 15 percent and 25 percent respectively over the past 25 years, the ten largest companies in the mining industry have seen only marginal growth of around 1 percent over the same period.

Developing a culture focused on operational excellence may be the key to helping mining companies unlock similar benefits in productivity and efficiency to those seen in other industries, despite the unique conditions and challenges it faces. An operational excellence culture can also bring strong improvements in safety and sustainability, which are important for any business, and particularly for the mining industry.

Although mining companies are often able to improve productivity and efficiency in the short term, many face challenges in sustaining these increases in productivity or keeping up the pace of improvements over time.

For example, a mining company operating in Chile implemented a transformation initiative that yielded clear improvement over five quarters, with a 12 percent increase in productivity and a 12 percent decrease in costs per year. However, the company was unable to continue along this trajectory of rapid improvement. The subsequent four quarters saw only a 1 percent improvement in production, while costs increased by 9 percent per year over the period (Exhibit 2).

Challenges to continuous improvement

There are many possible reasons why companies struggle to continue the pace of improvements in the longer term. New practices introduced by transformation efforts may not be deployed fully, for example, and may lack elements essential to their long-term utility, such as adequate coaching or follow up initiatives.

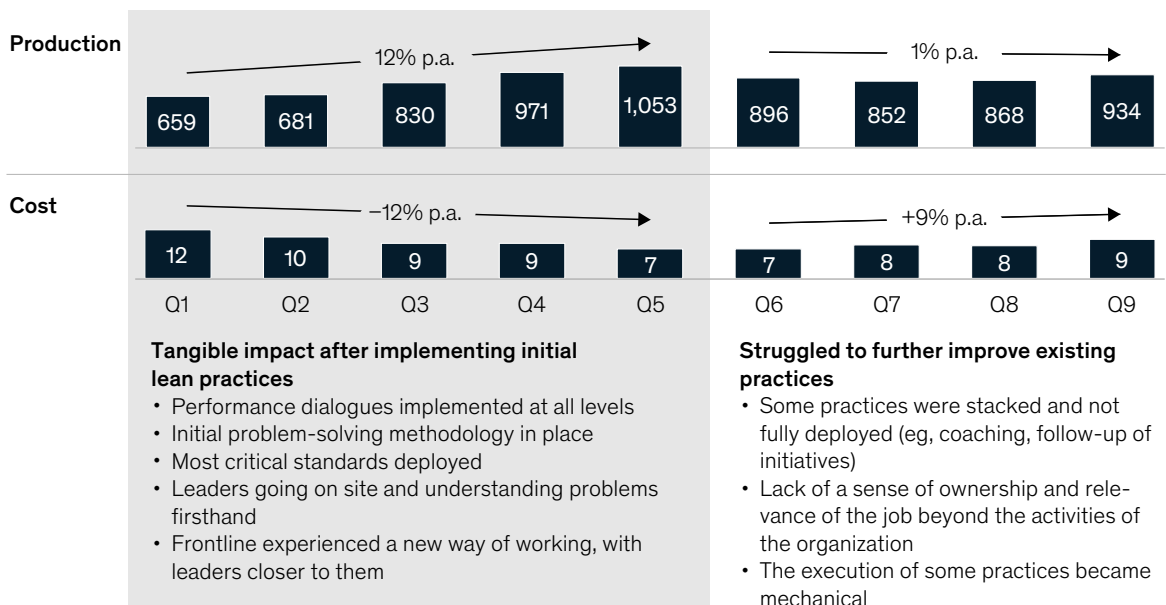
Some practices may also be simply added onto existing organizational practices without

Exhibit 2

An improved operational culture failed to last for one mining company.

Disguised client example

Mining player



fundamentally changing them, creating an often-unwieldy proliferation of practices and processes that can actually impair productivity. And even where new practices are successfully adopted, their execution can become mechanical over time, leading to a “checking the boxes” attitude rather than a deeper engagement.

Finally, employees may lack a sense of ownership and be unable to make the connection between the relevance of their jobs beyond the activities of the organization. The resulting lack of engagement and investment, which are essential to a continuous-improvement culture, can doom the changes’ long-term impact.

The mining industry also has several unique features that may help explain why a culture of operational excellence has not yet been widely adopted. Productivity in the sector is often constrained by physical factors, such as ore quality. The industry also has a heavy focus on technical elements and capital levers rather than organizational culture and processes, while its dispersed and fragmented nature creates barriers to sharing best practices.

Nevertheless, adopting a culture of operational excellence could bring substantial benefits to mining companies by promoting continuous and sustainable improvements in productivity, safety, sustainability, and efficiency, rather than the more transitory improvements that have been captured thus far.

Technological development will, of course, continue to be important in the mining industry. However, if productivity improvements are driven by advances in technology alone, the improvements are almost certain to plateau as the benefits of any given technological advance are fully realized. To reach the next frontier in productivity and efficiency improvements, and to be able to continuously sustain such improvements, mining companies can consider following the example of leading companies in other industries by fostering a culture of operational excellence.

Attaining the gold standard in operational excellence

The top-performing organizations in several industries have been able to sustain a long-term increase in productivity largely thanks to the maturity of their operational excellence culture. The improvements in productivity tend to go hand in hand with improvements in efficiency, sustainability, and safety. These organizations have become leaders in their fields by consistently outperforming their competitors, and have several common elements that set them apart.

A clear sense of purpose can provide the bedrock for such a culture. For example, a leading industrial manufacturer which was able to diversify beyond its initial pioneering invention achieved success driven by its unified purpose of saving lives. This focus on the company’s core vision allowed it to sustain the pace of improvement and remain the leader in its industry, with a market share that grew by 20 percent from 2010 to 2020 (Exhibit 3).

Many such top-performing institutions have received recognition from the Shingo Institute, in the form of the Shingo Prize, for successfully embedding a set of principles that help to nurture cultures of operational excellence and continuous improvement. Several mining companies are now on track to joining the ranks of the prize winners, after realizing substantial value from implementing these principles.

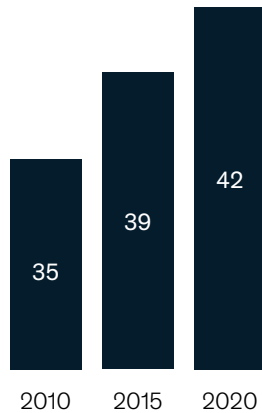
The Shingo principles are founded on the idea that ideal results for an organization are driven by ideal behaviors, and that these ideal behaviors are in turn informed by and aligned with principles for operational excellence. Such principles can help organizations identify and understand which behaviors are important to promote a continuous improvement culture, and how to foster those behaviors. There are ten Shingo principles, grouped into three broad categories:

Cultural enablers, which include principles that encourage respect, inclusivity, leading with

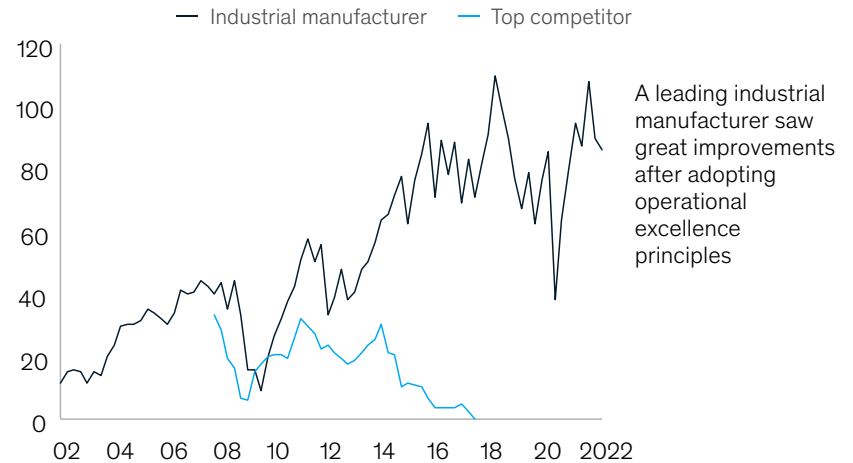
Exhibit 3

Industry leaders are able to sustain the pace of improvement through operational excellence.

Market share, %



Stock price compared to key competitor, \$



Source: Capital IQ database; company filings

humility, and employee development, training, and empowerment.

Continuous improvement, which includes principles that encourage scientific thinking, an aspiration for perfection, and a focus on process.

Enterprise alignment, which includes principles that encourage a unity of purpose within an organization, alignment with the organization's vision and purpose, systematic thinking, and emphasis on the importance of creating value for the customer.

To improve a company's organizational culture based on these principles, its operational maturity must first be measured. The most rigorous assessments are based on direct observations by experts and detailed analysis of data that have been shown to correlate with positive business outcomes. In assessing an organization's maturity,

systems that enable behaviors aligned with the Shingo principles weigh heavily in the results (Exhibit 4).

Top-performing companies with a strong culture of operational excellence tend to be strongly aligned to the Shingo principles, with the result that they have a clear view and purpose in the organization. Importantly, employees understand how they contribute to achieving the vision and are emotionally connected with the purpose. These organizations also tend to have leaders who lead by example, empowered teams with decision-making capabilities, responsibility dispersed throughout the organization, a focus on skills development, and an emphasis on the role of leaders in nurturing a continuous improvement culture.

Select mining companies have already begun their continuous improvement journey by applying these principles. Those that are focusing on operational

Exhibit 4

A number of mining players are on the journey to operational excellence through the Shingo principles.

OEI score



¹Estimated values for Shingo recognition corresponding to Prize, Silver, and Bronze.
Source: McKinsey OEI database

excellence are seeing improvements in business results, with uplifts in production ranging from 1 to 16 percent and a reduction of safety incidents by 5 to 23 percent per annum (Exhibit 5).

Steps to adopting a culture of operational excellence in the mining industry

The first step to unlocking value through operational excellence is to embed a clear purpose and clearly defined systems to support cultural enablers, continuous improvement, and enterprise alignment.

Mining companies can consider the following actions in five focus areas as a way to drive sustained, long-term gains in productivity, efficiency, sustainability, and safety. Actions in these five areas have helped a number of mining companies create

positive change for customers, employees, finances and operations, social and environmental issues, and internal capabilities.

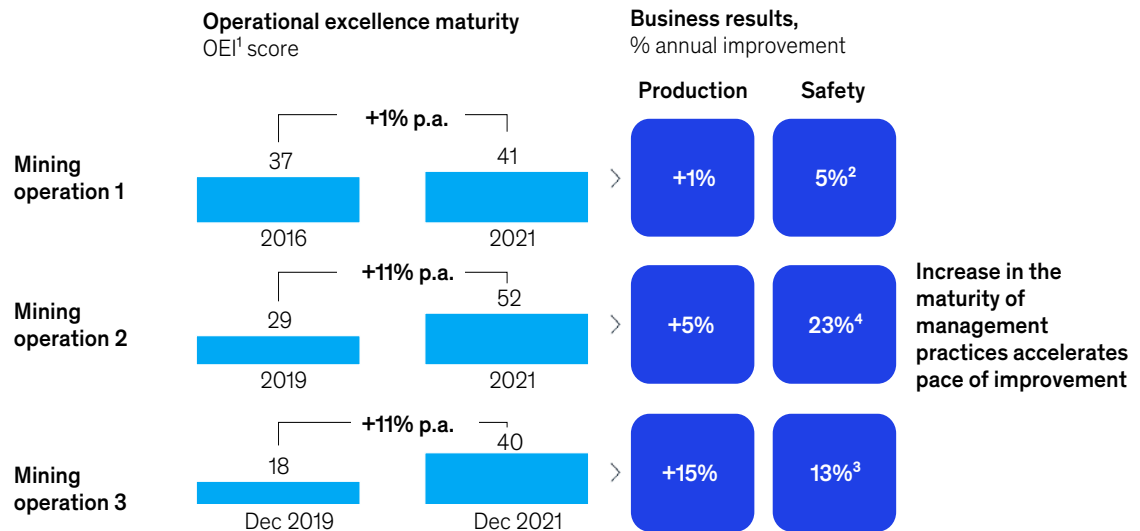
Customer impact: Focusing on delivering a quality product to the customer, even if there is no competition for market share, and striving to meet and exceed customer expectations can create additional value for the customer.

This focus recently enabled a South American mining company in the process of implementing operational excellence principles to reduce the number of inconformity claims (which are issued when quality does not meet customer expectations) to zero within only a few years.

Employee impact: Fostering an environment in which employees can thrive by promoting employee

Exhibit 5

There is a clear correlation between operational excellence maturity and business results in the mining industry.



¹OEI: Operational excellence index; measures in a standardized way the maturity of management systems and maturity of an operational excellence culture.

²Yearly reduction in accidents.

³Frequency index of high potential incidents.

⁴TRIF (Total recordable injury frequency).

professional growth and development, well-being, equity, diversity and inclusion, and safety can create more trusting and collaborative workplaces.

By encouraging diverse and inclusive teams, a global mining company has increased employee engagement, as measured by an employee engagement and perception survey, from 75 percent to 95 percent over four years. These inclusive teams were also safer and more productive, as members felt confident enough to share their ideas and concerns, making problem solving and decision making more collaborative and effective.

At this same global mining player, the site leaders also applied the lean principle of going to the “gemba walk” (meaning to go and see the problem on site). This empowered the operations team

to identify and resolve problems themselves, rather than relying on a top-down approach. This resulted in a near-eradication of risk, with incidents per million hours reducing by half.

Financial and operational impact: Ensuring employees are empowered, aligned behind, and emotionally invested in a common purpose can drive continuous improvements to reach aspirational goals. This can be achieved through good management practices.

An employee of the aforementioned South American mining company reported that the general manager’s Monday routine used to be called the “caravan of death”—focused on finding deviations. Now he fosters continuous improvement, achieving great results and increasing employee satisfaction.

‘Training in management practices led him to a more humble leadership style. He’s now seen as a down-to-earth leader whose constant presence on the ground inspires others in their journeys.’

Social and environmental impact: Establishing a deep connection with communities and the environment can improve organizational health. This can be achieved through a meaningful social and environmental purpose, including concrete goals to work toward.

The South American mining company made it a goal to reduce their environmental impact on local communities. Guided by this ambition, the company managed to increase its recycled waste by 120 percent. Also in this area, the global mining player was able to reduce energy consumption by more than 10 percent by tracking real-time energy consumption, visualizing deviations from planned consumption on an aggregated level, implementing a machine learning tool to apply a set of business rules to minimize consumption, and adjusting key Standard Operating Procedures (for example, standardizing washing times).

Capability impact: By recognizing their role as facilitators for employees, leaders can adopt a mindset of leading with humility, as well as promote learning and training to develop people in the organization.

The South American mining company increased its investment into employee training by increasing the number of hours spent training each employee by 75 percent over five years, embedding a culture of continuous learning across all levels of the organization.

By improving in these areas, mining companies can follow the example of emerging leaders in the industry and strive toward the levels of continuous improvement experienced in top-performing companies in other sectors.

While many mining companies have unlocked significant value from technological improvements and application of Industry 4.0, focusing on continuous improvements may prove to be the next frontier in improvements in productivity, efficiency, sustainability, and safety—enabling them to maintain the pace of change and sustain their gains into the future.

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