THE FOURTH WAVE OF PRODUCTIVITY
A
dopting technology and the latest innovations alone
is not the key to long-term success in the mining
industry. Put simply, technology enables those with
deep domain knowledge to derive more insights than were
previously possible and therefore, deliver more value back
to the business.

Since the economic downturn, there have been three
waves of cost reductions. Despite the improvements
stemming from these changes, corporate head offices and
shareholders are still demanding more.

Enter the ‘fourth wave of productivity’ – which
RPMGlobal views as a combination of deep domain
knowledge and the most efficient technology solutions the
market has to offer. This wave is nominally over a longer
period of time in the transition between current state and a
future state where mining companies can reap significant
rewards from more integrated enterprise frameworks and
autonomous environments.

However, in order to achieve the sustainable
improvements that the fourth wave of productivity
promises, the industry will need to invest wisely in finding
the most relevant deep domain knowledge and technology
available. This will assist in building sustainable
improvement ahead of the next cycle when it inevitably
arrives.

The steps being taken towards ‘mine optimisation’ that
often involve disconnected systems, solutions and
departments will not be sufficient in the future. Central to
the transformational agenda, mining companies are
experiencing right now is the ability to build digital
platforms across the business that enable visibility, insight
and control across the entire business.

To fulfil the potential that the digital mine offers, the
industry must prepare and embrace the fourth wave of
productivity.

Simon Askey-Doran, RPMGlobal, Australia, details a new cost-cutting
custom which combines deep domain knowledge and the most
efficient technology on the market to optimise success in the mining industry.
Deep domain knowledge

As a concept, ‘deep domain knowledge’ is knowledge, recognised by peers as being of a significant and useful level to solve industry problems. This article will focus on domain areas which are core to RPMGlobal’s business.

Mine planning and scheduling at all levels of detail, maintenance planning and systematic execution represent the core of the mining operation. Within each, and through the integration of both, a large opportunity is provided for value creation, efficiency and productivity. When combined with economic analysis and forecasting, we have the core of operational design.

It is in the processes and platforms deployed to manage these core processes – delivering and executing the mine schedule, and the integration with maintenance processes that opportunities for industry leading excellence are created. These will be achieved through better allocation of capital and resources, driving efficiency and creating visibility of mining operations.

Companies have previously, and will continue to, search for increased productivity in these activities to deliver lower costs, in turn, delivering improved project margins and greater return to shareholders.

Whilst there is potential to leverage the existing domain knowledge present, it can also be enhanced by engaging with the appropriate external experts where there are identifiable gaps present. To effectively engage with these experts requires not only research, but also for the redefinition of the company’s strategy for the future and to understand the best way to utilise the knowledge they already have available towards achieving their redefined strategic goal. The types of investments made need to be directly linked to particular value drivers throughout this period.

In some cases, the company has identified a particular sole practitioner who may bring outstanding domain knowledge but they lack linkages to the level of processes required to operationalise the advice for potential solutions. In other cases, information companies who have the systems and processes are light on the holistic domain knowledge, which is critical in delivering insights and value back to the business.

In larger management consulting companies, some of the complexity which is inherent to mining operations and the interdependencies present are not able to be fully explored. Whilst management consultants still have a place and specific improvement skills, the magnitude of the industry’s current challenges requires an increased level of deep domain knowledge.

Getting the ‘whole picture’ at the level of detail needed to move through the next level of productivity improvement is challenging and requires sustainable management commitment before moving into a new paradigm of operational management within one or more operations in a portfolio.

RPMGlobal’s systems and deep domain knowledge are both used to help global organisations take advantage of the data they already have and create benchmarks across multiple operations to allow companies to identify potential pockets of value. Both data that is turned into valuable information and deep domain knowledge are required to unlock the value at this stage of the mining industry’s evolution.

As outlined in the introduction, RPMGlobal has noted that many mining organisations have undergone three waves of cost reduction processes in the last five years, which are not always in the previously mentioned order but are consistently driven by the need to restore profitability through a downturn.

In the first wave, companies targeted the ‘low hanging fruit’, cutting the most expendable staff and contractors. Costs which could be reinstated in better times. Survival mode behaviour.

Secondly, a high impact procurement process was often implemented, where management used their business as a bargaining tool to share some of the pain and take a price cut. Companies who engaged well were provided with additional market share, whilst others perished under the pressure.

In the third wave, operators were required to work with management consultants or other internal improvement teams to take additional costs out of the business. Often, this decision was cash-driven and critical for survival. This wave typically included a further cut of resources along with other short-term cash generation initiatives, which could include high grading pits and delaying fleet replacement. One manager reported to RPMGlobal that he had to make some ‘smart dumb’ decisions during this time. At the time, the manager was having to forego some mining reserve to mine for cash to help ensure banking covenants were not breached.

Since 2016/2017, many of the obvious cost-cutting options have been completed and the industry continues to search for new ways to reduce costs. However, the reduction of costs needs to be sustainable to ensure ongoing longer-term reduction and value accretion.
The digital mine and enterprise integration

IDC's FutureScape 'Worldwide Mining 2018 Predictions' report claims that "companies that prioritise digital transformation at the executive level by 2019 will deliver productivity, efficiency and/or revenue gains of up to 25%.”

While this may be true, for those companies who do prioritise digital transformation the technology must be supported by the deep domain knowledge discussed previously but most importantly, must be integrated throughout the mining value chain.

Too often, the mining industry is subject to endless exhortations preaching the digital mining transformation with a great deal of hype in the industry surrounding artificial intelligence, automation and data analytics. However, in the transitional period before these systems are fully implemented, it is the combination of both deep domain knowledge and technology which presents the industry with its greatest opportunity.

It is critical to note that for some companies, with shorter mine lives and perhaps operating in global environments where an automation approach is likely to be a generation later in implementation, a fourth wave approach is still beneficial but the level of technology will be of an earlier generation.

Those that dismiss enterprise integration in the future will pay the price with IDC’s report also predicting that “by 2020, 30% of mining industry leaders will have defined and implemented platform strategies to create integrated environments across equipment, integrating maintenance, planning and scheduling, and execution.”

Recently, RPMGlobal presented at a major industry conference and outlined a range of new products in this field and the progress made towards complete solution integration.

A major company acknowledged that whilst RPMGlobal had invested countercyclically and are now helping to shape the digital mine ecosystem, others are stuck in the ‘arm waving’ phase and are still unsure how to proceed to the next step where the real work begins.

Companies realise they need major horsepower, but choosing a supplier to seamlessly access their growing quantity of data whilst ensuring adequate deep domain knowledge which link these processes remains a challenge. RPMGlobal is aware that each level of an organisation has different needs for an enterprise framework. Figure 2 outlines RPMGlobal’s view of how this manifests across the various levels in a company and how their technology roadmap and advisory product strategies are developed.

It remains critical that solutions address the needs of each level within a company or corporation. In RPMGlobal’s view, one of the building blocks to enterprise integration includes support and development of ISA-95 standards. This enables data to be consumed and exchanged from multiple sources across the mining value chain. This ultimately enables just one version of the truth and eliminates the reliance on departmental point solutions.

RPMGlobal’s Enterprise Planning Framework, developed under ISA-95 standards, is a strategic platform that consumes and exchanges data from multiple sources across the mining value chain. This enables data to be delivered in a manner that is meaningful to decision-makers and appropriate for their specific needs and objectives.

Removing the silos

During the commodity boom, mines wanted to get as many tonnes out as possible to maximise production-driven margin. The focus was on anything that drove production at that time, rather than the long-term sustainable value in the future. As widely reported by PWC and others, costs increased and mining productivity and capital effectiveness declined.

Figure 2. Enterprise Planning Framework.

Figure 3. Data silos prevent mining companies from capturing additional value.
From the outside, there was perceived to be a reduction in cross-functional communication between departments and their technology in what can be referred to as ‘the integration gap’. This meant that critical business information remained trapped in isolated systems and those with the deep domain knowledge across processes were unable to derive insights or value from the data.

The outcome of this was a need to reinvest in those processes to optimise the whole.

By breaking down these data silos, those with deep domain knowledge are able to leverage the data being made available through powerful technology and turn it into real information that can be used in decision-making to improve operational productivity, efficiency and safety.

RPMGlobal has been engaged by both large and small companies to apply this approach to their organisations in various programmes, often starting from a specific opportunity, business risk or pain point.

Culture change

Once deep domain knowledge and an enterprise approach towards technology has been implemented, the work is not quite over.

While it may be convenient to examine this from a practical or systems point of view, we often observe a cultural issue which cannot be ignored. Providing platforms that bring visibility to the whole process is a major step in the right direction, but without support from all areas of the business the sustainable cost reduction promised in the fourth wave of productivity will not eventuate. This will require culture change and people management.

Aspects which may need to be considered on a site-by-site basis could include:

- The current empowerment and level of autonomy given to site managers.
- The relative central vs decentralised operational decision processes.
- Cultural shifts towards a more holistic approach that continues to drive departmental and integrational performance linked to performance drivers to incentivise a change in some organisations.

By keeping this in mind, cross-functional collaboration will increase as each department becomes more aware of the deep domain knowledge and technology required to be successful in this competitive digital mining era.

Conclusion

The industry has emerged from survival mode and is in an extended fourth wave of productivity period where potential exists for operations of all levels of maturity to take steps towards the opportunity presented. By combining the most efficient technology platforms with deep domain knowledge, mining companies can create the sustainable change required to improve operational viability and shareholder returns for the long-term. GMR