

Restoring Data Confidence in the Mining Industry



There's a famous quote by Peter Drucker that goes, "If you can't measure it, you can't manage it". In other words, instinct alone does not make for good decisions.

Using technology to produce, store and analyse data has proven to help organisations become more successful, if implemented correctly. This is particularly true in the mining industry. From the introduction of the first Fleet Management System in the 1970's, mining companies have used an increasing number and type of technological systems to better manage operations in an attempt to improve productivity and lower costs. As the overall cost of technology has decreased in recent years, there has been a revival in the concept of digitalisation and data fuelled by the advances in artificial intelligence (AI) and machine learning technologies. This has brought about a new generation of ideas and products specifically for use in the mining industry. In highlighting this trend, Gartner recently said that by 2020, the number of data and analytics experts in business units would grow at three times the rate of IT experts.

Mining operations have a wide range of activities and typically each activity has its own specialised software or system – from planning to operations, maintenance to HR, survey to processing and more. This is not a bad thing as it means each system can focus on doing exactly what it needs to, and each area can choose the right tool to suit their particular business needs.

These disparate systems are usually supplied by different vendors, so they typically stand alone and don't communicate or integrate with each other. Understanding how to integrate all the data produced by these systems—and more importantly—make sense of it, can create a game changing competitive advantage. This sentiment is strongly echoed by professional services firm, Deloitte. In a 2018 report, Deloitte stated that the real value "comes from unlocking the insights within the data", achieved through the creation of an information layer that brings together data across the entire mining value chain to enhance decision making.

The best way to integrate all the various disparate systems and data is to use a specialised data integration and data warehouse platform. However, in order to get to this point, we first need to trust the data we have.

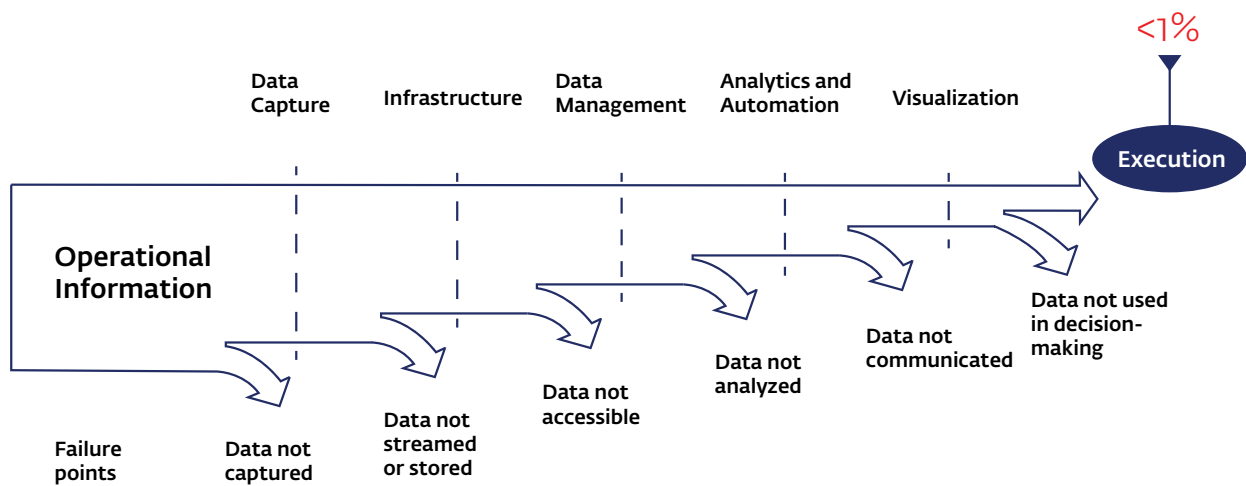
Industry Standard BI and Visualisation Platforms

Digitalisation, artificial intelligence and big data are major industry buzzwords. According to a 2017 report by Accenture, 82% of mining executives expected to increase investments in digital technology over the next three years. Part of the group of technology that has surged in popularity in recent years is the self-service Business Intelligence (BI) platform. Traditional BI platforms (such as Multi-Dimensional Cubes) have been around for a long time. However, these have typically been large, complicated systems designed to be used across a multitude of industries (and have therefore had varied levels of success in the mining industry), and have also relied heavily on IT departments to implement and maintain.

More recent developments have seen a rise in smaller and faster tools, such as Microsoft's Power BI. These newer self-service BI solutions make integrating data easier as they provide almost drag-and-drop functionality for connecting to and joining datasets. Whether it be a BI tool or nimble reporting solution, without a robust, consistent and systemised data validation process, they are ultimately still susceptible to the garbage-in and garbage-out principle.

Regardless of the solution in place, there can still be months or even years of development effort to create a coherent validation and integration layer, which is due to:

- a) There is usually few personnel in an organisation with the experience and know-how in connecting to operational systems.
- b) It is not typically a strength of the Information and communications technology (ICT) department to understand the mining domain and the data within these systems.
- c) The differing operational systems, the format which it is recorded, the types of data quality issues that can occur and the differing data models.



Many miners fail to gather actionable insights from their data; McKinsey & Company.

The Right Tool for the Wrong Job

Despite all these new systems, products and technology, Microsoft Excel is perhaps still the single most used piece of software in the mining industry.

As such, Excel becomes the all-in-one tool used to integrate the data from operational systems and create visualisations from that data. In other words, the spreadsheet is used as a combined database, reporting tool and BI solution which comes with its own set of issues.

It's an inherently manual process: Data is manually exported from a report, numbers are read from a screen and some scripts are run that produce a CSV file. All of which are then copy/pasted into some master spreadsheet, which leads to increased risk of inaccurate data due to transfer errors.

It becomes difficult or even impossible to trace the data back to the source: Unless there is a very well defined and understood process, the data that is entered into the spreadsheet becomes untraceable. Even then, sometimes emails are lost, reports can change over time and scripts can break. This was highlighted in a 2015 report from McKinsey & Company, with the consultancy firm noting that in some cases, miners use less than 1 percent of the data collected from their equipment, as shown in the figure at the top of the page.

The data is not secure: With any manual data process, the data can be manipulated and modified at any step in the process, usually without any kind of change tracking. If the data is modified between the source and the spreadsheet, or even inside the spreadsheet, it is impossible to know for sure who made the change and why.

Data silos: Files can be copied and multiple versions are made. Perhaps someone takes their own copy and makes a slight change to the formula or a change is made to one version but not propagated through the other versions. Data silos are often an unknown consequence of digital solutions and transformations, leading to no one source of truth on a mine site. Recent analysis by Ernst & Young found that while digital solutions are being increasingly adopted by mining companies, they are being undertaken as "siloed solutions", meaning data remains trapped within each department, and even within teams in the same department.

While there are certainly ways to mitigate all of these risks, they often rely heavily on having well-defined, understood and followed processes, which is not always sustainable—and if you are using Excel for this process, it is also unlikely.

What is the Alternative?

On one hand is manual data handling using spreadsheets, and on the other is development of a full custom BI solution. Neither of which is an ideal solution for most mining organisations.

There is a third option – an off-the-shelf specialised data intelligence platform that collects, validates, augments and normalises data for the end user to consume in whatever format they require the data. This is available through RPMGlobal's MinVu Mining Management Solution.

MinVu has been deployed across a variety of mines globally to optimise systems, processes, platforms, resources and decision-making. MinVu takes data from many individual sources then pools, validates, standardises and integrates the multiple feeds of data. It then provides all this information in data streams that can be used by any system across the operation be it a data warehouse, reporting solution, planning tool or any other system that needs access to trusted, reliable data.

MinVu is a mature, well developed and effective data validation and integration solution that has been designed specifically for the mining industry. MinVu solves the garbage-in and garbage-out dilemma by providing validated and normalised data from the source.

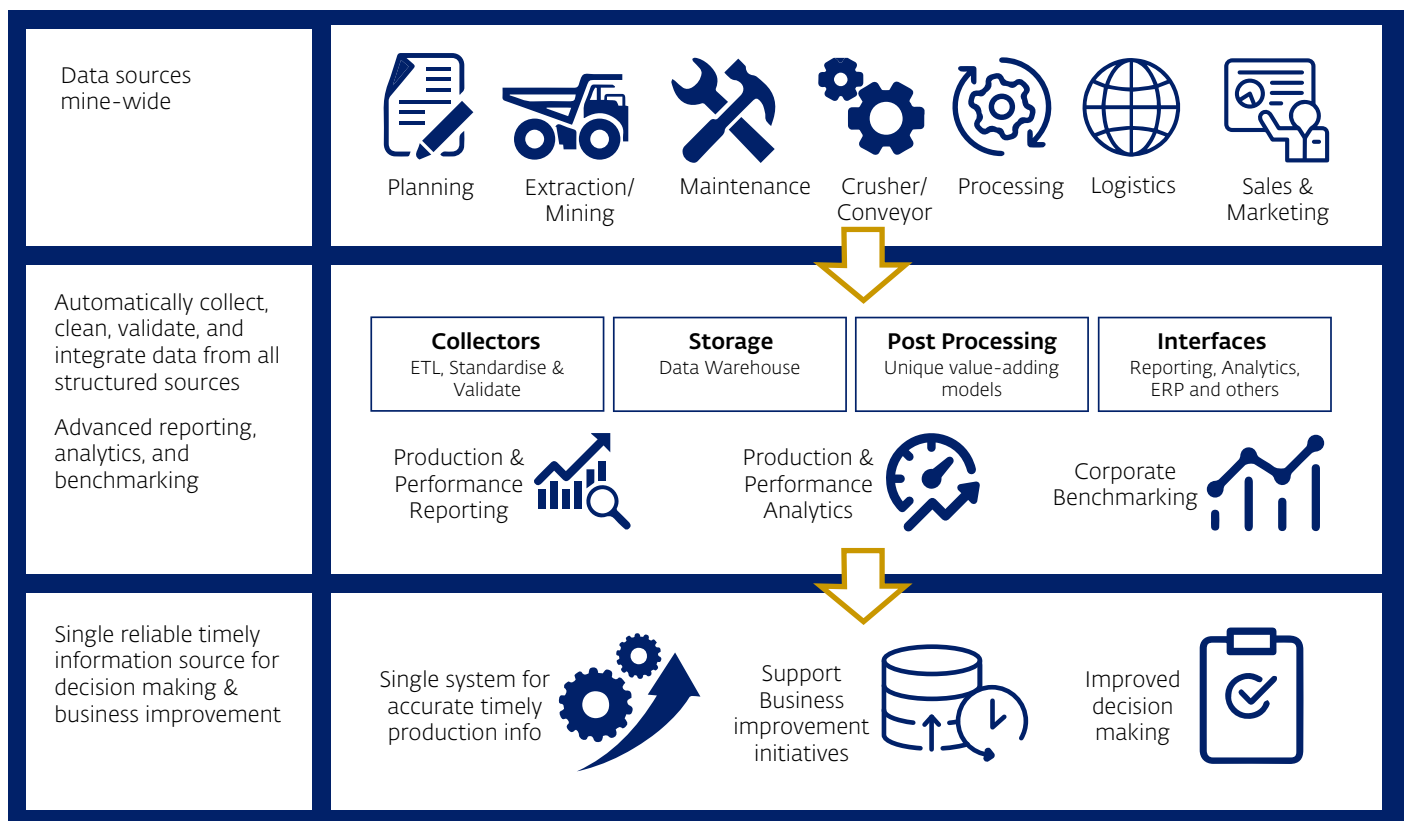
As a specialised solution developed for the mining industry, MinVu has the following characteristics:

Mining Industry Specific

MinVu has data structures and tools that suit the particular idiosyncrasies of the mining industry. Concepts such as loads, dumps, dragline cycles, time utilisation models and even shift rosters are built as native to the solution. As specialised mining software providers, RPMGlobal has personnel that understand mining industry jargon, concepts and terminology. This is not a standard offering provided by a multi-industry solution.



Examples of the data & systems integration that MinVu would provide from a haul truck.



MinVu helps companies transform the raw data locked up in operational systems into reliable and timely information.

System Agnostic

The solution is able to integrate with any mining operational system, without showing any prejudice or bias towards one system or another. As a robust data integration solution, MinVu is able to connect to any type of data storage technology – whether it be cloud-based, a traditional on premise relational database, OPC historian data, or even flat files. This means MinVu can connect to the many individual silos across the organisation.

Validation Engine

Source systems are not perfect, so any data integration solution must be able to have multiple validation and cleansing processes across all data types. MinVu's validation tools have been built over 30 years and on mining intelligence that looks at every packet of data collected, while removing, and sometimes even fixing, data that is invalid, erroneous or incorrect according to configurable data quality requirements. In addition, the ability to augment and normalise data from many systems eliminates the need for personnel to manage and sort through multiple data feeds.

Flexibility and Modularity

The mining landscape changes regularly and this extends to the systems used. Internal configuration can change often but even entire systems can be changed out or upgraded to something else. One of MinVu's core strengths is being able to handle changes to source systems over time. MinVu also has storage capability, meaning the information from the decommissioned systems is not lost. A seamless transition, with historical analysis, is still possible regardless of the vendors providing each system. In addition, each data point in MinVu can be sourced from multiple systems independently. For example, drill hole data might be from one system, however equipment activity hours might come from both the fleet management system and the drill system. Plugging in an additional data source requires very little effort.

Standardised Model

The entire purpose of having an integrated platform is to be able to join data from multiple independent systems together to seamlessly measure and manage the operation as a whole. According to McKinsey & Company, a single, state-of-the-art data platform is a necessity for miners as such a platform acts as a central repository

for all data. An effective technique for doing this is to translate all the data from the source operational systems into a single, standardised data model. Because of this standardised model, an organisation with multiple sites and multiple fleet management systems can then use MinVu to reliably benchmark the equipment and operations across a unified corporate viewpoint.

Automated and Monitored

Once configured, any data collection, translation and validation processes can be run with minimal user intervention. This gives technical personnel (engineers, business improvement etc.) the freedom to analyse the data rather than spending time collating the data in spreadsheets. Your people should spend their time using the data, not manipulating its format.

Any data loads, refreshes, validation processes and value-adding processes are also able to happen automatically and on a regular schedule. Due to the nature of the changing systems, all processes can be logged and therefore are able to be monitored, both by the solution vendor and by personnel within the mining organisation, with any issues or alerts raised accordingly.

Data Storage

By their very nature, operational systems are typically designed for real-time or short-term operations management, which means they are much slower when trying to extract data for longer term or historical analysis. MinVu is a robust data intelligence platform that can provide warehouse capability. It therefore overcomes this issues with data extraction by designing the data structures in a way that are optimal for both long-term and near-real-time extraction. Data is normalised and stored in a way that is easily accessible by any solution that requires the output.

Conclusion

In summary, by automatically collecting, validating and integrating operational data, it is possible for information to become trusted, accessible and used to amplify decision making across the organisation. Whether that be a single operation or a number of operations consolidated to a corporate level, MinVu can provide a solution. In addition, selecting an existing, mature product from an experienced vendor to supply this data integration solution ensures a

successful outcome, for both implementation of the product itself, but also more importantly for ongoing productivity improvements.

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- How digital innovation can improve mining productivity, McKinsey & Company, 2015

If you would like further information on this topic, or to learn more about how MinVu can help you and your mining organisation restore data confidence, please contact us on: info@rpmglobal.com



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RPMGlobal Holdings Limited (ASX: RUL) [RPM®] was listed on the Australian Securities Exchange on 27 May 2008 and is a global leader in the provision and development of mining software solutions, advisory services and professional development to the mining industry.

With history stretching back to 1968, RPM has been trusted by mining companies of all sizes and commodities to support their growth. Our global expertise has been achieved over the past 50 years through our work in over 125 countries and our approach to the business of mining being strongly grounded in economic principles.