The Stages of Digital Transformation

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ABSTRACT

The fact that the minerals processing sector needs digital transformation is a given. Many operators have tried. Some have succeeded, and many have failed.

In this paper, the author discusses the distinct phases of digital transformation in the mining and mineral processing sector. Whilst discussing the defining characteristics of each phase, the author also highlights the importance of machine learning and artificial intelligence in optimising plant performance and that with the right data-led systems in place, return on investment can be rapid. The author also hypothesises that the industry currently under-achieves in digital transformation because most operators don't have the right systems in place and aren't utilising data sufficiently or in the right way.

When it comes to governance, the mineral processing industry is unique in the sense that there is currently no detailed or legislated framework for the reporting of plant performance. The author suggests that currently, the majority of plant reporting is done manually, using ad-hoc systems or processes. This poses a problem in terms of compliance, and also means that individual operators are missing a huge opportunity to optimise their plant performance, as well as to improve outputs and revenue. While engineers and metallurgists are well-accustomed to applying science and mathematics to develop economical solutions to technical problems, the modern plant needs to go beyond manual analysis. For true, lasting digital transformation to occur, there is a need for robust, powerful, AI-led technology that can provide operators with a reliable 'digital twin' of their plant, and function as a 'single source of truth'.

DISCUSSION

The author postulates that there are essentially six stages of digital transformation:

Stage 1 – We can do that ourselves!
This is a euphoric stage, where operators embark on a digital transformation initiative with a great sense of ownership and ambition. The biggest risk in this phase is over-optimism, and a lack of appreciation of the challenges. Developing great software takes time and requires very careful planning and insight. Operators need to consider third party solutions and seeking expert assistance from those who have succeeded.

Stage 2 - Failure
In this phase, the euphoria has subsided and the time to deliver on initial expectations has arrived (or passed), with minimal progress. The situation can become dire and culturally toxic very quickly. Budgets are often depleted, and numerous extensions to the project timeline have yielded less than promised. Bonuses are at risk. There is a need to revisit options and gauge achievement versus prediction. In many cases, the root of the problem is having the wrong KPIs. If a stakeholder's bonus is linked to an outcome, irrespective of cost and schedule, they will throw away as much of the organisation's money as is required to get their bonus. Motivation to achieve a bonus often comes ahead of pragmatism.

Stage 3 - A New Hope
In this phase, stakeholders will realise that there *is* a path forward, having gained an understanding of the work that is required and identified the right people to provide expert assistance. In this phase, there is an understanding that one can't be an expert at everything, and a readiness to accept strengths and failures. Work begins again, but this time with no fanfare, and quiet progress is made. There are small wins and rewards for the work. This stage of the transformation is still optimistic, but measured with hope and resolve cemented in the realisation that when it comes to digital transformation, there is plenty of low hanging fruit.

Stage 4 - Resistance and Conflict
According to the author, there is no way to sugar coat this stage: this is where opponents will emerge. Digital transformation is often referred to as a contact sport, and in mineral processing plants, transparency is often not a popular concept. When it comes to reporting of plant performance within this sector, there are no reliable governance frameworks in place. Reports are often compiled by the very people whose performance is measured against the results, and there is often no easy way to verify the results. Trust is important, but there can be no trust without transparency. The keys to overcoming resistance are strong leadership, and forcing detractors to justify their claims. Data-led findings should be assumed correct unless proved otherwise.

Stage 5 - Learning
In this phase wounds are healing, resistant stakeholders have retreated, and strong leadership (holding people accountable) has emerged to maintain the plant's wider focus. It is important to maintain reasonable expectations as to how long it takes to learn something new.

Stage 6 - Growth
This is where the big wins can be had. Data can now be used to identify areas that can be improved. The cycle time between idea, investigation, identification, testing, implementation and review is reduced. To achieve lasting success, according to the author, ongoing review is essential. After a project is complete, it's imperative that results are measured, and any less-than-optimal findings are actioned and resolved.

CONCLUSION

To achieve lasting success, mineral processing plant operators need to put a solid plan in place and have a commitment to data from the beginning.

To continue to improve, operators have to start using data to make decisions in a real way – and this data needs to be accessible, transparent and in context. Before this foundation is put in place, it's impossible for operators to start using advanced digital technologies such as machine learning and artificial intelligence.

Perhaps most importantly, operators must realise that solutions already exist that deliver on all of these requirements. To achieve rapid gains, it's worth leveraging the proven work of others, rather than launching into a long-term transformative project – which can be high risk and costly.