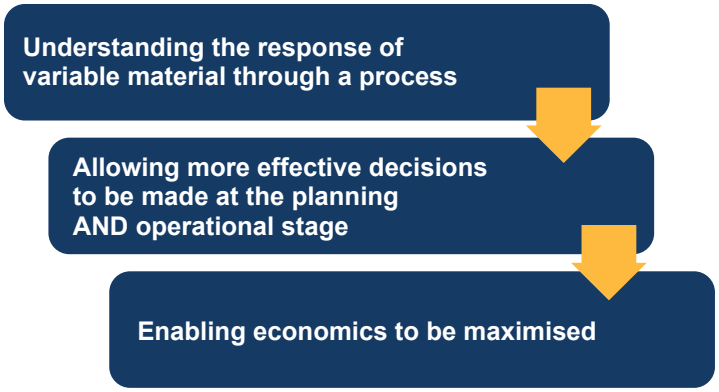
MARKET ANALYSIS TOOL

Capability Statement Market Analysis Economic Tool

Using geological, geometallurgical, metallurgical, process plant layout, throughput, capex and opex, as well as mining information in various phases of a project or existing operation is of utmost importance to improve your mine value chain. These parameters can be used to describe limitations in achieving optimum process parameters during studies and in existing operations. The purpose of this capability statement is to describe the use of these various design parameters in the decision making processes in the mine value chain, and at various phases in a process and/or operation (see figure below).



For example most mining companies (especially juniors and mid-tiers) select an optimum grind size during the various project phases purely on the metallurgical recoveries of the valuable metal in question. Very little emphasis is placed on the financial implications of such a decision in the value chain. Mintrex developed a market analysis economic tool which uses optimum parameters such as optimum grind size for the selection of the appropriate subsequent comminution circuit design. The relationships developed can then be used in geometallurgical modelling of the reserve to enable the economics of the project to be maximised via financial analysis.

The costs of conducting metallurgical testwork during study phases (scoping, pre-feasibility and feasibility) are high. However, these testwork programme costs are very small in comparison to the implications of an incorrect decision in the capital and operating costs in the long term as well as mining sequence and schedule. One of the common mistakes made during the flowsheet development of a project in the study phases is to select design parameters and optimum process parameters for process design, optimisation, modelling (financial and technical) and further testwork purely on testwork results and the metallurgical recoveries achieved. Mintrex uses the approach in their work to focus on the selection of appropriate process parameters for a project flowsheet during feasibility stages not purely based on metallurgical results and recoveries, but on the mining and processing capabilities as well as economics of the project. This approach has shown that if economic factors are used, better and more informed decisions can be made during flowsheet development, mine scheduling, resource and reserve optimisation for the benefit of the company, shareholders and overall the long term viability of the project.

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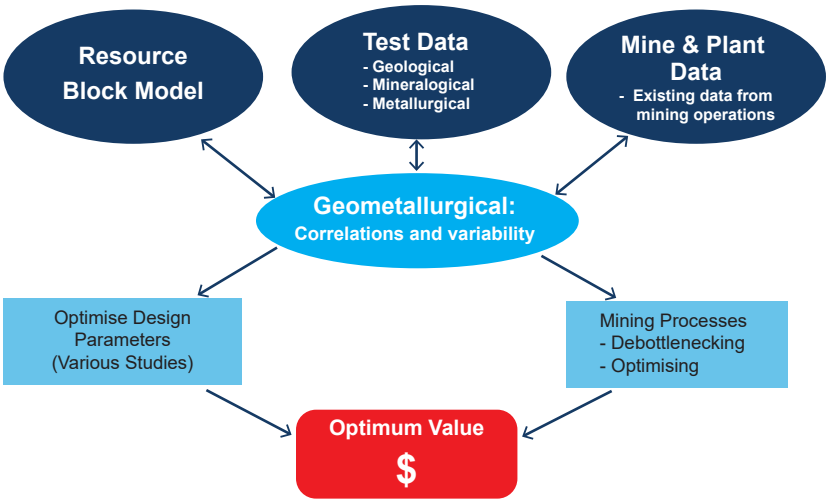
The Value Proposition



It is of utmost importance to understand the response of variables throughout the process. This can be achieved by a market analysis economic tool which predicts the performance of a processing plant even at scoping level. Using relationships between these variables, mining models as well as economic models allow the project owners to make effective decisions at both a planning and operational stage. That enables Mintrex's clients to maximise economics and thus, the viability of the project at any stage of the project.

The results from a well-designed geometallurgical programme can thus be used for:

- Better flowsheet design (more flexible);
- Better use of algorithms for throughput and recovery in resource and reserve models;
- Better use of the mining schedule to optimise plant performance;
- Better plant and equipment design and sizing;
- Optimise plant performance and forecasting;
- Reduce risk in subsequent phases; and,
- Enable economics to be maximised.

Why do we want to model the process?

- Identify or test opportunities to optimise the process design without having to physically change the process
- Review potential impact of proposed changes on:
  - o Product purity
  - o Process safety
  - o Capital Costs
  - o Operating Costs
- Metallurgical Accounting
- Cost Saving – expensive testwork

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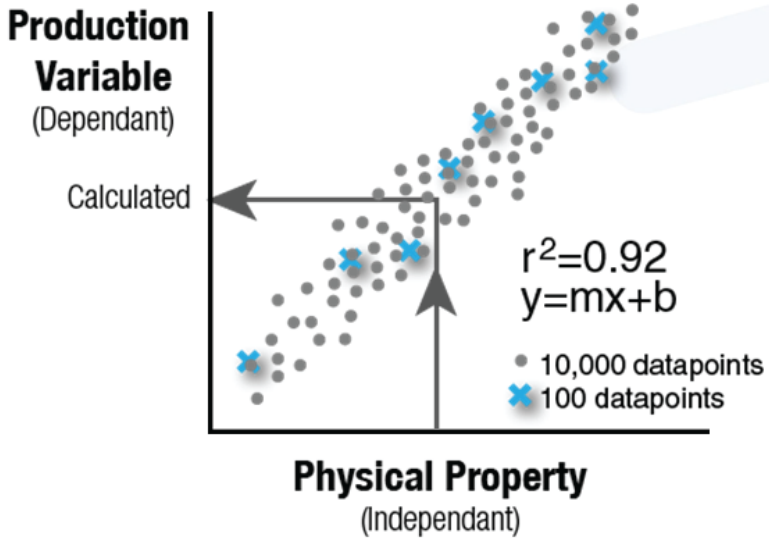
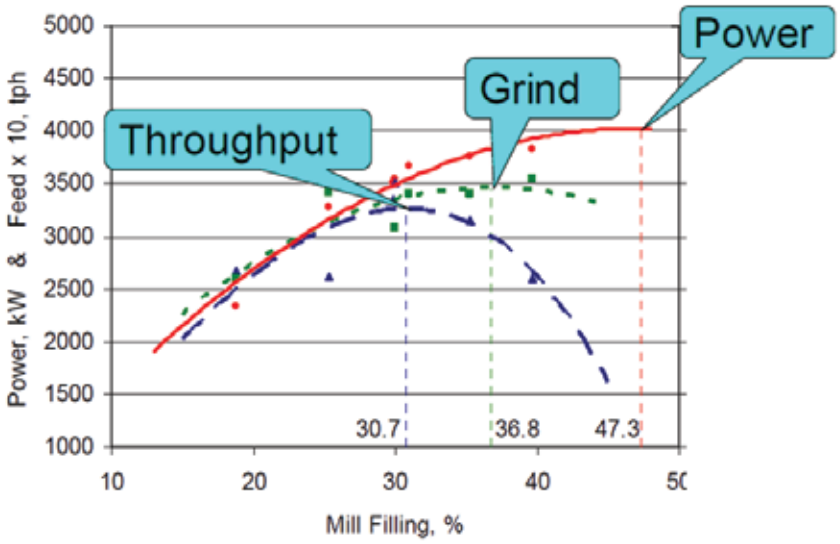
How do we understand relationships?

- By developing correlations between a small number of measurable physical properties and process parameters and use these relationships to calculate many other data

Tools:

- Test results and multivariate statistics





- In the above graph the data indicates that the mill efficiency drops off if it is overfilled.

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