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# *Effective use of digital technology and big data in mining*

## Austmine, Brisbane 2015

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***WA Consulting Mining Leader***

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# *Agenda*

1) What do we mean by technology in mining?
2) The evolution of data analytics
3) A new vision for enterprise optimisation
4) Breaking down the silos, the case for change

# *What do we mean by technology in mining?*

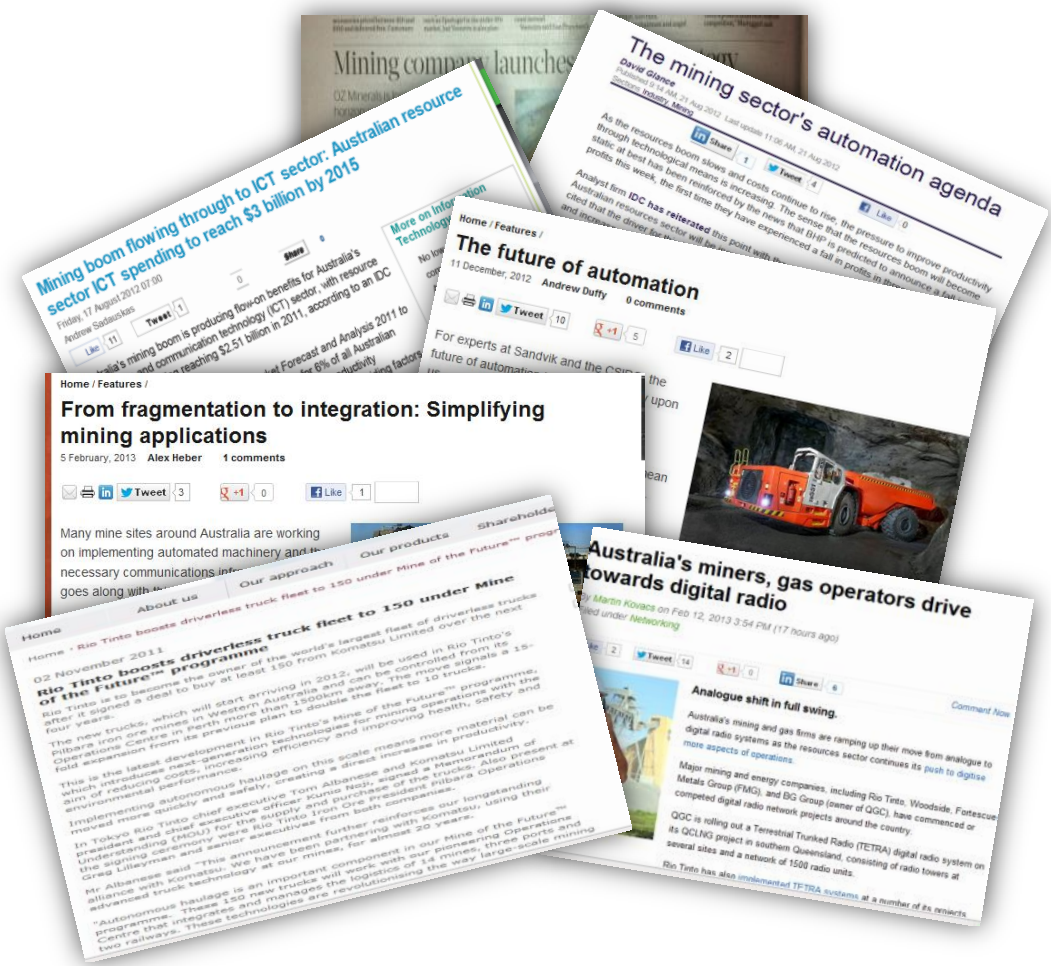
## Disruptive technologies

- Automation
- Internet of Things

## Big data

## Digital technologies & software

- Sensors
- Optimisation
- Simulation



# *Technology should be part of a strategic vision*

**Technology must enhance**

- Understanding of the value chain
- Mining productivity
- Mine planning
- Processing and logistics
- Mine safety

***New reporting methodologies***

***New analysis methodologies***

***New optimisation methodologies***

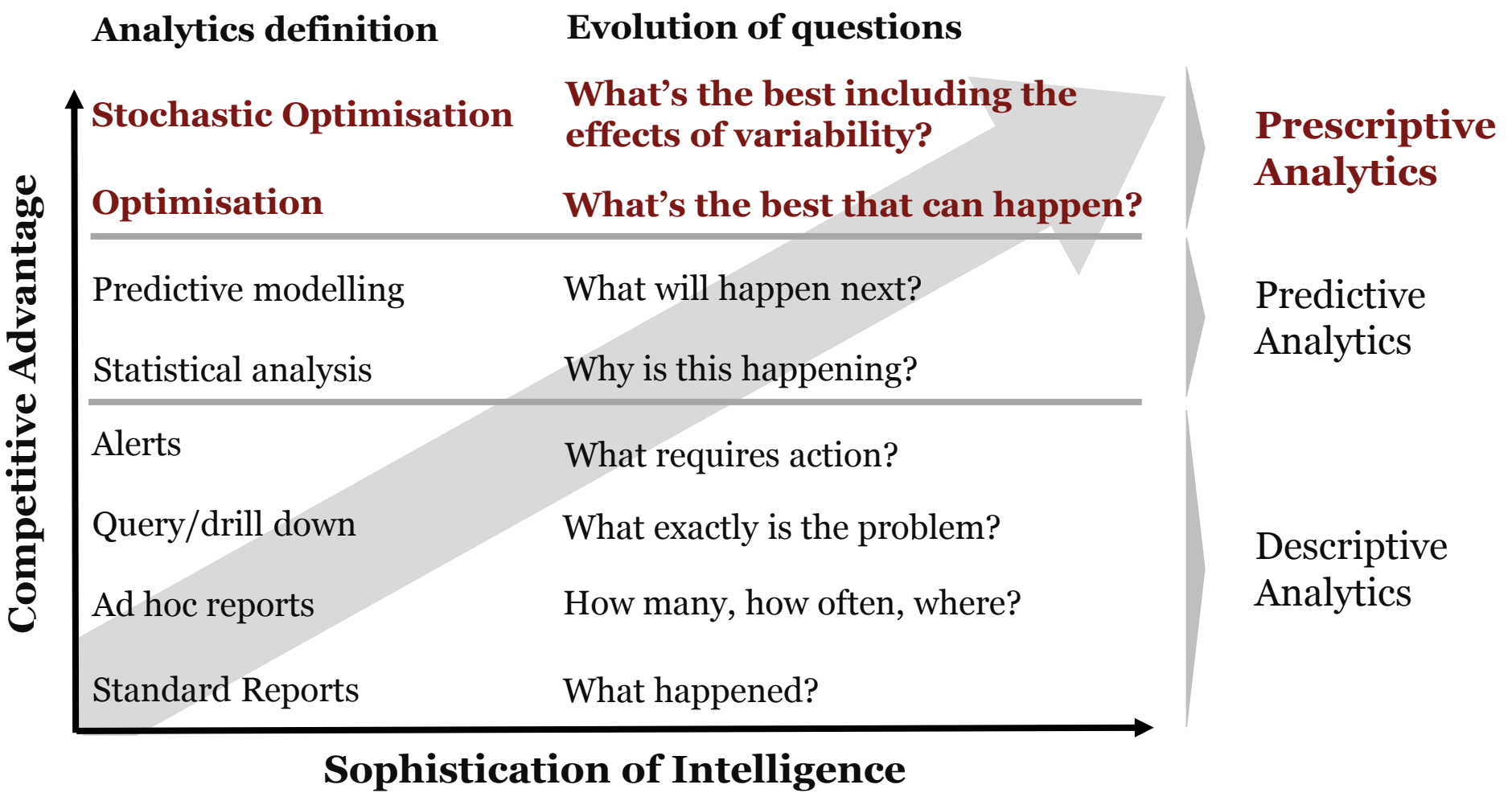
# *Big data, the power and the curse*

- Data acquisition vs. data usage
- Big data is overwhelming some miners leading to data fatigue
- Turning data to information is key to successfully raising mining productivity

***Mining companies that gather, analyse and use their data on a daily basis account for 92% of top-quartile equipment performance.***

**PwC – Mining for Efficiency (2014)**

# *The evolution of analytics capability*



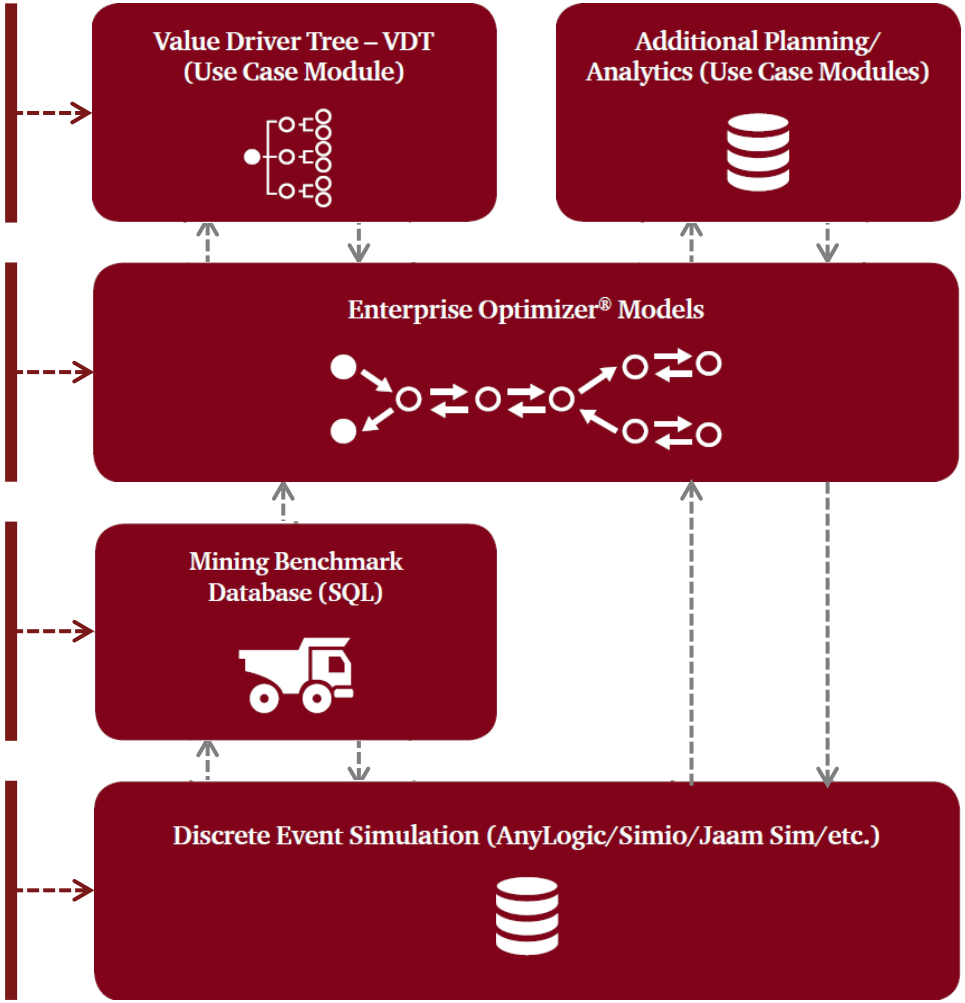

**Source: Competing on Analytics: The New Science of Winning (Davenport / Harris)**

# *Factors for mining productivity execution and success*

| | |
|---|---|
|  *Mine* | Define, plan, articulate and execute a clear mine strategy including expectations for specific equipment productivity |
|  *People* | Identify and recruit people with the right abilities for each job and provide proficiency based training to all levels within the mine |
|  *Data* | Develop an equipment-level performance data management process and use it to steer daily decision-making |

# *A new suite of data analysis tools*

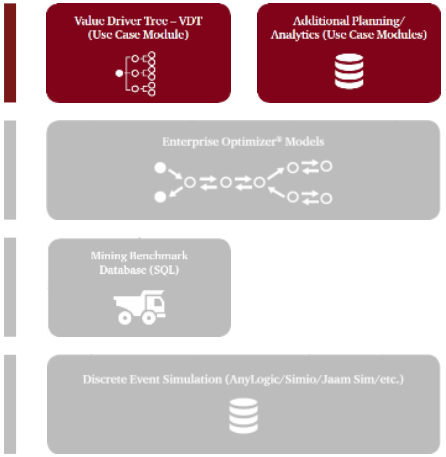
- How are the physical and financial drivers linked?
- What is mathematically optimal?
- What is possible in real world mining operations?
- Is this physically achievable?



# *First we link the financial and operational drivers*

## *Value driver tree & planning analytics*

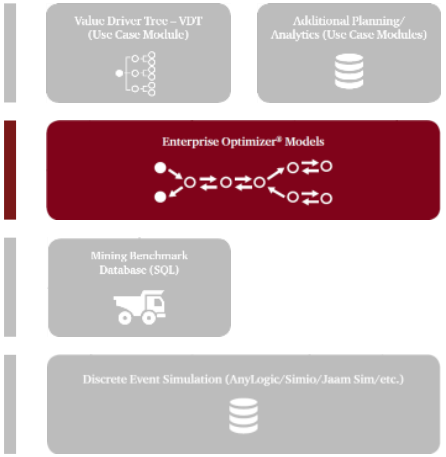
- Linking the financial to the physical drivers of the business
- Activity-based costing in an intuitive format
- Can be fully integrated with existing business ERP and analytics platforms



# *Then we calculate the mathematical optimum*

## *Enterprise Optimizer®*

- Outputs utilise activity-based costing in an intuitive format
- Allows management to fully understand operations performance and direct impact it has on financial results
- Constrained optimisation made simple
  - Holistic
  - Visual
  - Dynamic
  - Collaborative

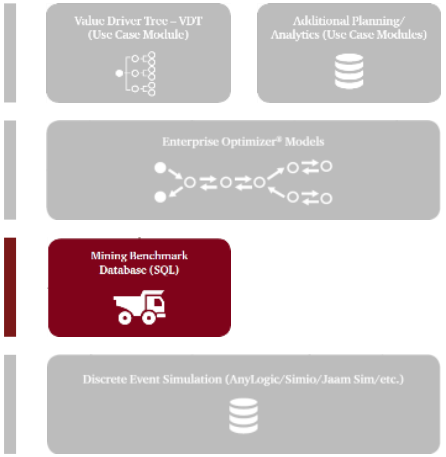


# *We ensure that assumptions are achievable*

## *Mining benchmarking database*

- Mobile plant equipment operating database:
  - 47M+ hours of operations
  - 308 makes and models
  - 136 mines
  - 5 continents

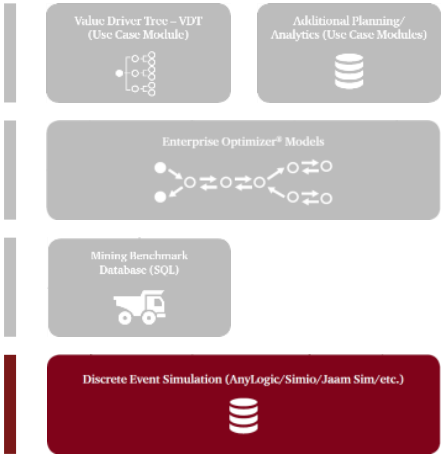
- Are assumptions achievable in real-world mining operations?
- How much room is there to improve?



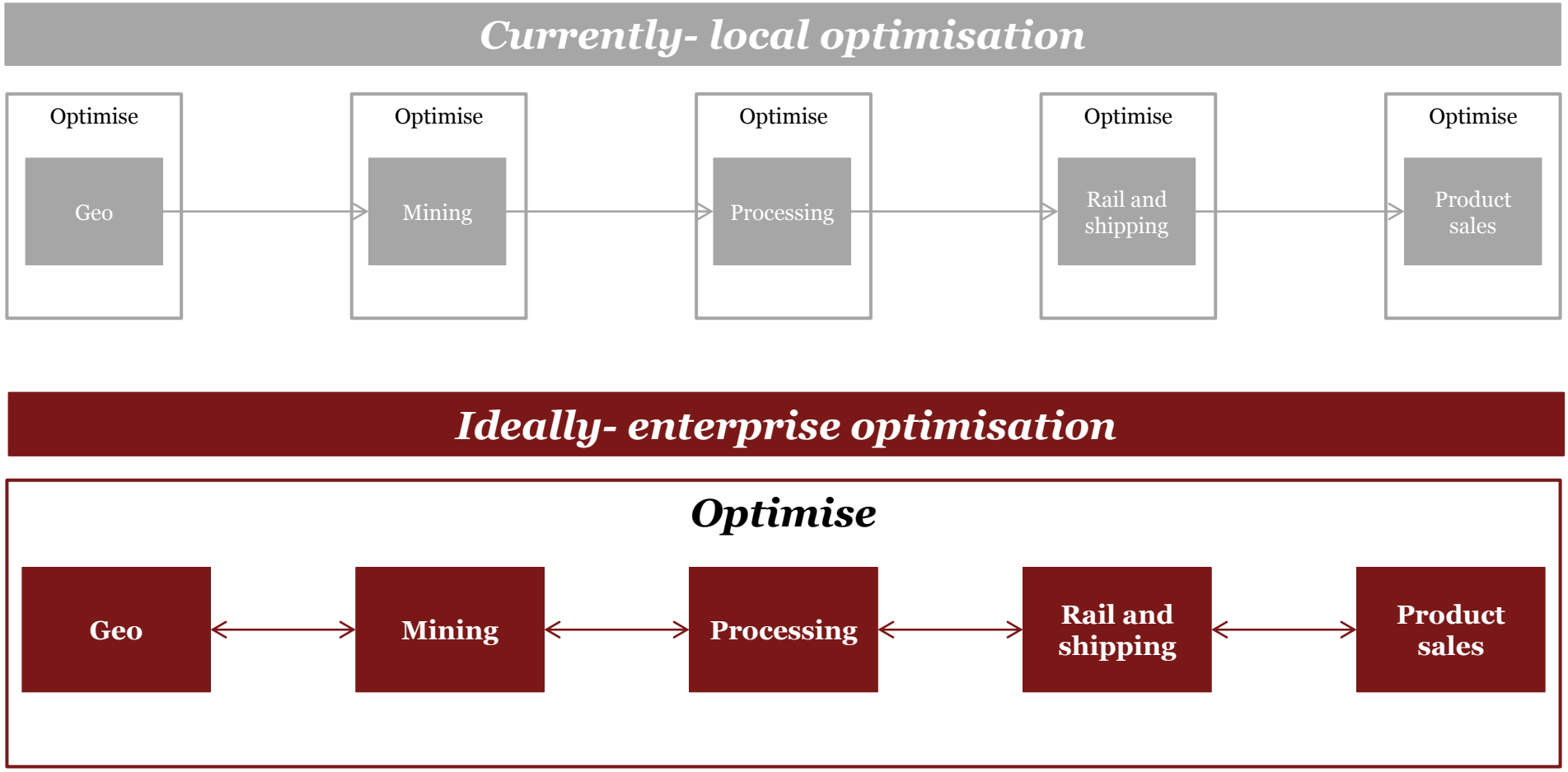
# *Financial and operations outputs are validated*

## *Discrete event simulation*

- Estimates process throughput and capacity as well as variation in predictions
- Validation that EO outputs can be physically achieved
- Fully accounts for physical interactions between equipment and product



# *It is essential to break down silos for us to improve*



# *Seizing the opportunity*

## *Optimised execution*

- Shared context
- Global vs. local optimisation
  - 1-5% profit increase
- Powerful change management
- Embedded collaboration

## *Optimised analysis*

- What-ifs measured in minutes not days
- Unlimited scenario analysis
- Quantify trade-offs financially and operationally
- Deeply understand value chain constraints

# *Thank you…*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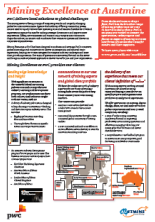


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