

+ Road Mapping the Digital Transformation

Where are the Most Impactful Changes to be Made?



Optimizing Mine Performance Through Digital Innovation Seminar, October 18, 2017

Thessygan Moodley, South African Regional Lead, Smart Industries



It's likely that you encounter many ideas for improvement ...

- Increase productivity in the mine!
- Better trucks!
- More computers!
- Better maintenance systems!
- Better handling!
- Improved recovery!
- More Capacity!
- Tailings dam lift!

...Assessing whether these generate real business value can be challenging



Digital buzzwords and catch phrases add more confusion ...

- Internet of Things
- Internet of Everything
- Fog Computing
- OT/IT Convergence
- Orchestration and Automation
- Industry 4.0
- Advanced Analytics
- Etc...etc...etc.

...implying that you have to “reframe” your digital “journey” by adopting a bit of “blue sky thinking”

The risk is a scatter gun approach applying point solutions that give incremental or no value ...

Solution Providers in Mining



Vendor bias



Upgrades



Perceived integration ease



Pockets of value

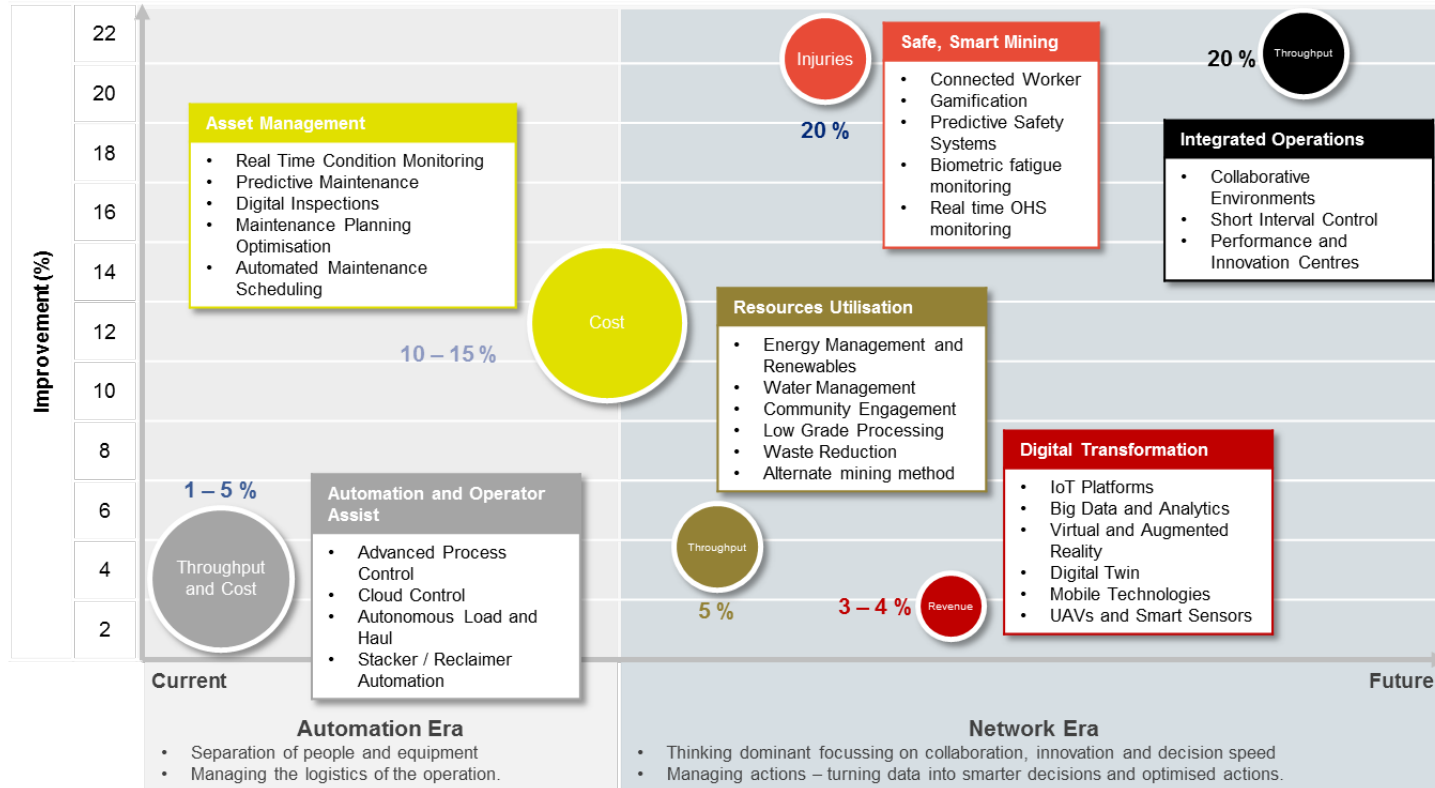


Shifting bottlenecks

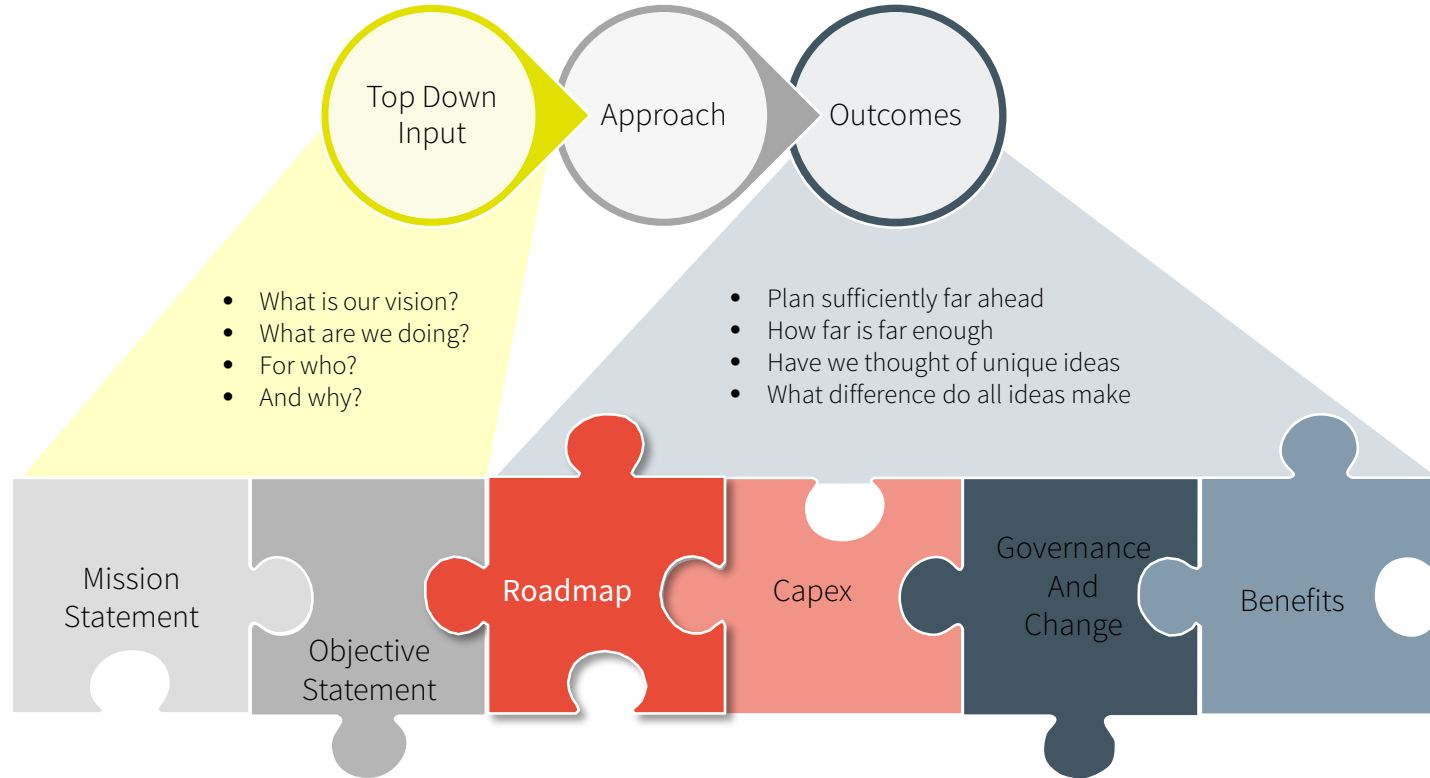


Temporary value

...Failing to capitalise on the full transformative power of technology



A digitalisation strategy can mitigate the risk by providing robust and practical direction



The approach benefits from bottom up - top down tension...



1 Bottom up consultation

- Value Drivers
- Gaps and opportunities
- Points of value chain integration

2 Benchmark study

- Technology Landscape in Mining
- Adjacent Industry Technologies
- Industry Themes

3 Past / Current Technology Roadmap

- Current technology roadmap
- Past initiatives
- Objectives and Mission

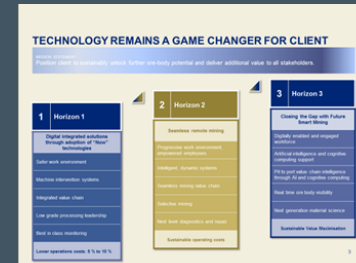


4 Validate with site and HQ stakeholders

5 Filter by strategic alignment

- ✓ Safety / compliance improvement
- ✓ Cost / production improvement
- ✓ Improved resource use

7 Roadmap and Strategy



6 Prioritise on

- ▲ Value add
- ▼ Capex
- ▲ Competency
- ▲ Site alignment
- ▲ Industry maturity

...Ensuring that the review is grounded in strategic and operational context.

Strategy development challenges are handled with flexibility and customisation of execution



Poorly defined vision



Model uncertainty and benefits modelling



Scheduling and time commitments



Benchmark and references data availability, ops info availability



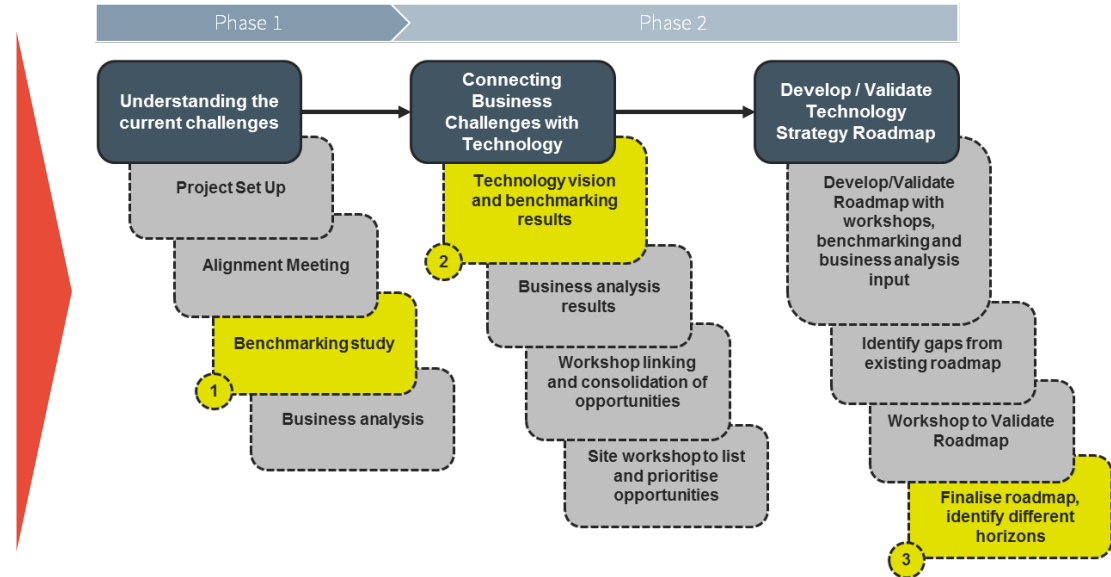
Stakeholder engagement, open mindedness and whinging



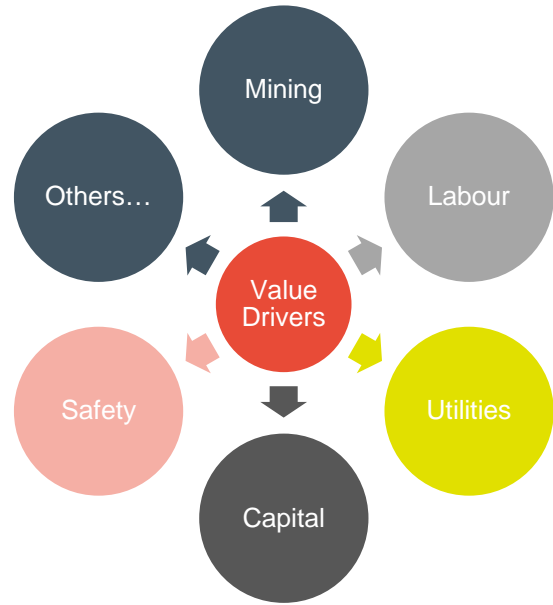
Complex existing systems landscape



Functional versus value chain focus



A consolidated list of challenges and opportunities should arise from the bottom up consultations



Consider

What are the **pain points, opportunities and gaps** – including value chain?

What is **out there**?

What does **our dream** look like?

How do **we get there**? Quick wins?

Who needs to be empowered?

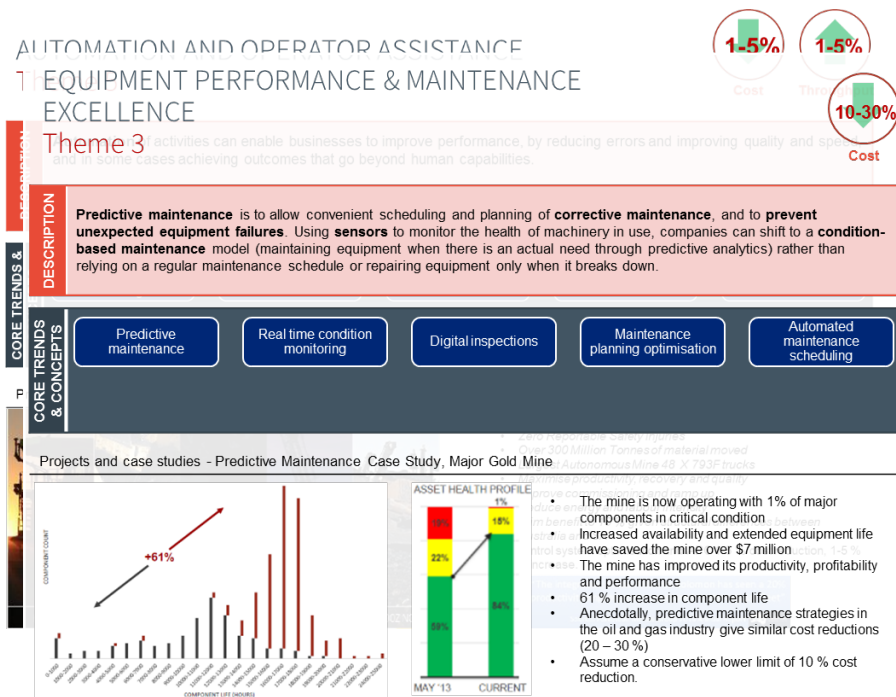
Case Study
Insights

130+

**Challenges
Opportunities
Gaps**

1. Large number of items identified with challenges not exclusively related to technology or digital
2. Served to promote greater buy in of road mapping process
3. Function focussed

Theme level benchmarks provide an early view on the potential size of the prize ...



Case Study Insights

4 Themes

2 Enablers

44 Concepts

1. An understanding of the broad themes relevant to an operation can effectively direct the benchmarking
2. Calibration for the local context must be done upfront
3. Coarse sizing and benchmarking needs to be combined with detailed operational context.

Synthesising the roadmap involves validation, consolidation and prioritisation of all study initiatives



Consultation
Opportunities
Value chain integration

Study

Landscape in Mining
Industry Technologies
Themes

Current Technology
Map

Current technology roadmap
Initiatives
Activities and Mission

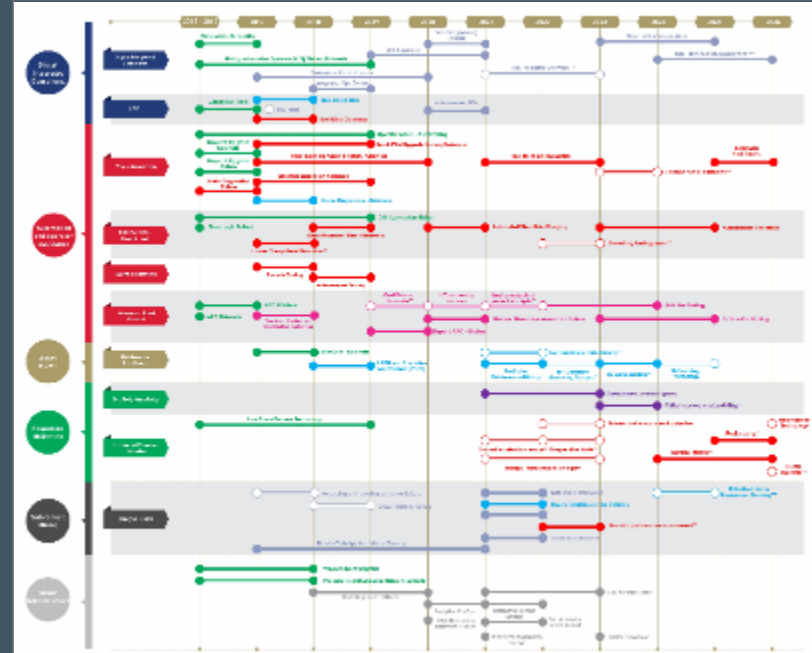
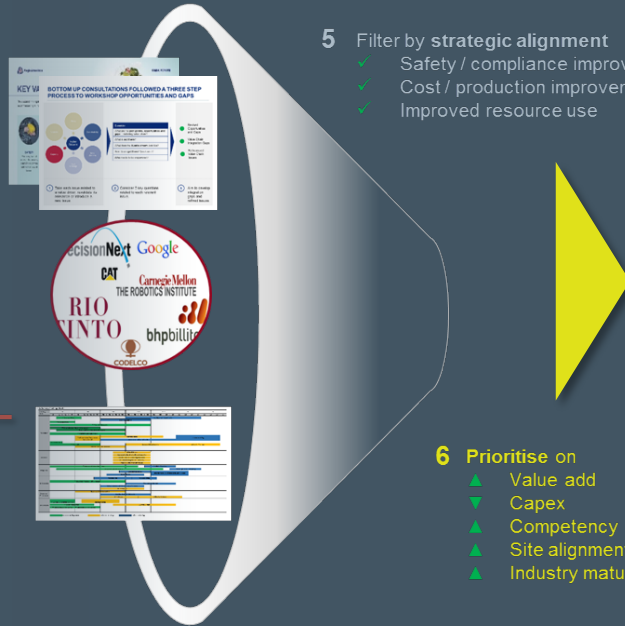
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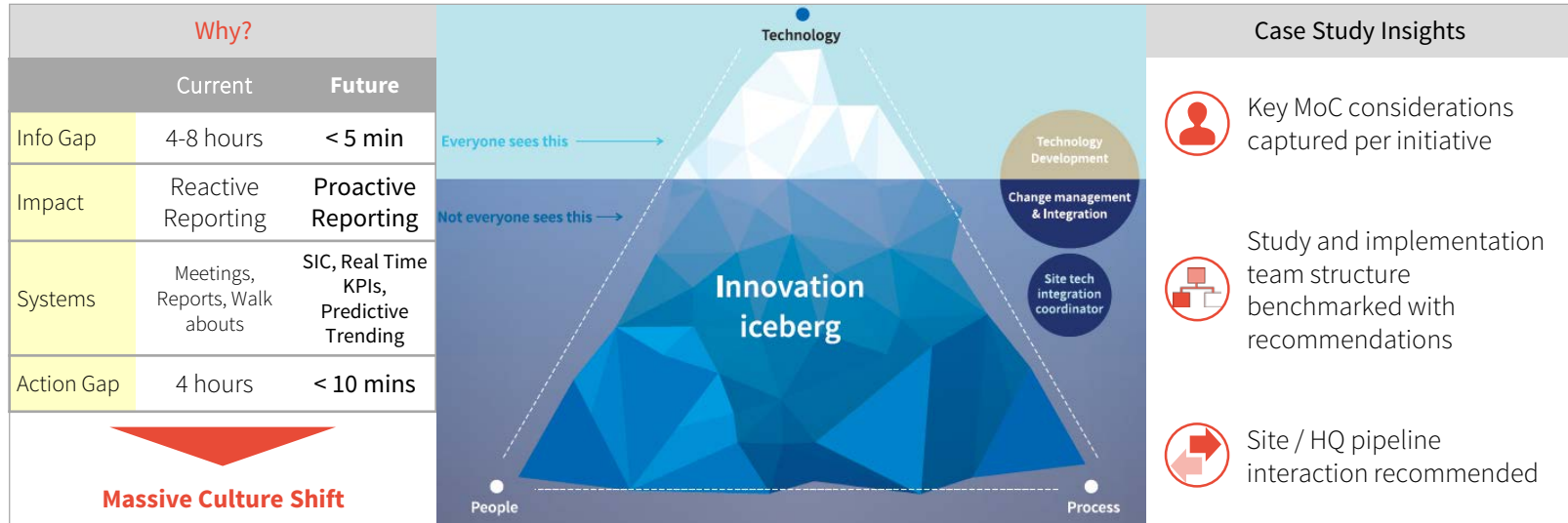
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- ▲ Industry maturity



Case Study Insights

- Programmes developed in themes to assign ownership
- Project dependencies especially around infrastructure
- Value chain integration - cross functional initiatives per theme.

Successfully implementing the roadmap needs robust change management and governance



- Clear definition of what digital is and isn't
- Management of digital technology pipeline from concept to implementation
- Encouraging handover and ongoing site ownership
- Awareness of operating procedure and standards changes
- Awareness of role changes and skills needed
- Digital project governance – programme steercoms, value measurement, funding
- Study and implementation team structuring
- Build versus buy

Quantifiable strategy development requires at least high level benefit and capex estimates ...

Quantifiable



Capex

- Database pricing
- Past projects
- Factorising
- Desktop Research



Benefits

- Modelled
- SME Estimate
- Known Deficiency Improvement
- Desktop Research

Unquantifiable



Operational Risks

- Operations risk registers
- Business risk registers



Safety

- Priority Safety Events
- Safety Incident History
- Safety risk registers



Thank you.

For more information,
please visit www.hatch.com
or contact Thessygan.Moodley@hatch.com