Mining Technology Innovation Systems: 
An Evaluation Framework

Innovation offers the mining sector the opportunity to address some of its most pressing issues.
Successful innovation depends on mining and METS firms carefully evaluating blocking and facilitating mechanisms and the relative importance of stakeholders involved.

Innovation Barriers
Innovation does not happen in a vacuum – it occurs within an intertwined ecosystem of mining suppliers, mining majors, investors, governments, researchers, communities and the like. Each of these groups has their own interests – sometimes competing with a new innovation. Some groups may be very powerful – because they control resources, govern regulations, or have the ability to affect the public opinion. This can create considerable obstacles for the diffusion of innovation. Sometimes barriers exist within a business – such as workforce resistance or a conservative organisational cultural opposing innovative changes.

Innovation Drivers
Innovation is a process - something which happens over time. Are stakeholders willing to experiment with a new technology? Do they openly exchange knowledge? Is it possible to mobilise resources for the innovation process? The creation of new knowledge, the allocation of resources and the sharing of knowledge can all help facilitate innovation.

Identifying stakeholders and their relative importance
Who are the stakeholders involved?
- Policy Makers · Government · Regulators
- Financial institutions · Investors · Shareholders
- Industry Associations · Entrepreneurs · Researchers
- Partners · Suppliers · Contractors
- Competitors · Customers
- Local Communities · Environmentalists
- Workforce · Unions · Health Advocates

How powerful are they?
How interested are they in blocking or supporting innovation?

Analysing drivers and barriers to the diffusion of innovation
Institutional / System Level
- Regulations & Policies
- Competitive environment
- Exemplars
- Stakeholder interactions
Firm Level
- Economic
- Managerial
- Operational
- Corporate Social Responsibility

Enablers of innovation
Experimentation
Resource mobilisation
Legitimacy
Knowledge development
Knowledge exchange
Guidance, alignment of resources
Market formation
Proposed interventions

Identifying stakeholders and their relative importance, analysing drivers and barriers to the diffusion of innovation, and assessing their impact on innovation functions equips mining and METS firms with valuable insights as to how to counteract bottlenecks within innovation systems.

A careful analysis assists with proposing interventions. These interventions can help to overcome barriers and to manage stakeholders – depending on their importance and power within a given innovation ecosystem.

Proposing Interventions

Communication Strategy

- Improve communication about a new technology and its effect on different groups and stakeholders
- Clarify potential misunderstandings which may cause negative opinions about an innovation and its impact on different groups and stakeholders
- Clearly communicate the benefits of an innovation
- Explain negative consequences if a new technology fails to be adopted

Workforce training

- Allow for sufficient training time during implementation to familiarise the workforce with a new technology and experience its advantages
- Involve workforce in the implementation phase, rather than dictating technology adoption as a management directive
- Actively listen to workforce concerns and seek solutions collaboratively

Technology modification

- Prepare for potential changes and modifications based on stakeholder requirements
- Understand innovation and technology adoption as a process which may change rather than as a steady act
- Integrate stakeholders into the adoption and modification processes to make it a collaborative effort

Test cases

- Create sufficient opportunities for relevant groups and people to experiment with an innovation and experience advantages first-hand
- Facilitate successful test cases which create legitimacy for a new technology
- Establish role models and archetypes that symbolise the successful implementation of a new technology

Resource allocation

- Allocate resources not only to R&D activities, but also to the implementation process of a new technology
- Provide internal funding for corporate and strategic entrepreneurial activities

Engagement strategy

- Be inclusive, transparent and responsive
- Engage stakeholders with workshops, forums, informal exchanges

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