

# 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



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## 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