



BRIEFING PAPER

KIN CATALYST BRAZIL 2012

THE MINING COMPANY OF THE FUTURE



THE MINING COMPANY OF THE FUTURE: OPPORTUNITIES CHALLENGES RESPONSIBILITIES

A joint program of the Kellogg Innovation Network and
Fundação Dom Cabral of Brazil



Belo Horizonte, Brazil

TOGETHER WE CAN BUILD A NEW VISION OF SUSTAINABLE PROSPERITY.

Welcome to the briefing paper for the KIN Catalyst: *The Mining Company of the Future*. The first meeting of its kind, the KIN Catalyst convened mining leaders for four days of robust and sometimes provocative dialogue that culminated in four priority initiatives to transform our industry.

The stage was set on the first day with powerful messages from visionary executives on the challenges, opportunities and responsibilities of resource companies. We then caught a glimpse of transformational open innovation from the oil & gas and aerospace industries. On day two and three delegates held frank, open and refreshing discussions that ultimately resulted in four initiatives for evolving the mining industry—from building the workforce of the future to mapping total lifecycle value.

Delegates not only chose action over inertia but realized and agreed that a new approach was needed to realize a more sustainable, broader-based prosperity. The first step is a shift in mindset, positioning resource companies as development partners in the middle of a multi-stakeholder model.

One of the consistent themes during our discussions was that resource companies need to become more proactive and design their own destinies—or someone else will. At the KIN Catalyst, delegates started boldly down that path.



PETER BRYANT
PARTNER
CLAREO PARTNERS
CO-CHAIR
KIN CATALYST—BRAZIL
KIN ADVISORY BOARD



MARK CUTIFANI
CEO
ANGLOGOLD ASHANTI
CO-CHAIR
KIN CATALYST—BRAZIL
KIN ADVISORY BOARD

THE MINING COMPANY OF THE FUTURE: OPPORTUNITIES CHALLENGES RESPONSIBILITIES

OVERVIEW

The Mining Industry is currently experiencing unprecedented growth and rising demand. Many hurdles stand in the way of expanding to meet this demand and do so in a way that maintains a mining company's license to operate. The traditional model with which companies have been operating, both at the mine level and its relationships with stakeholders, is not sustainable anymore—a new approach is needed.

Today, innovation in the mining industry is conducted at the margin. We need to create a new approach, or 'Industry Led Innovation', that involves cross-sector collaboration and open innovation to move the industry forward and create a model that is sustainable.

MISSION

The goal of this KIN Catalyst is to create the environment and the opportunity for leaders across the mining ecosystem—mining companies, contractors, suppliers, researchers, academia, and nonprofits—to discuss and discover new perspectives and ideas that will elevate the industry through a fresh approach to innovation and collaboration.

BRIEFING PAPER

This briefing paper provides a synthesis of the KIN Catalyst event that occurred in Belo Horizonte, Brazil to envision the Mining Company of the Future. It acts as a basis for starting new conversations at your organization and if you so desire, join a group of pioneers in your field and become a member of one of the four priority initiatives outlined at the end of this document.

PRIORITY CHALLENGES THE MINING INDUSTRY FACES AND THE OPPORTUNITIES FOR INNOVATION



ANDREW FORREST
CHAIRMAN
FORTESCUE METALS GROUP (FMG)

Andrew is a pioneer in the mining industry in Australia. He recorded a video to share insights into how to build and run a successful mining company.

Building a division or a major company from scratch

- Determine your goals. Aim high. What you now consider unrealistic might produce the greatest results.
- Hire the best people to build the steps to get there.
- Never give up.

Accelerating the time to bring a mine to production

- Utilize vendors as advisors.
- Challenge contractors to find the best solution.

Alleviating the manpower and skills shortage

- Empower local people with basic job skills.
- Build a loyal workforce through education.

Cultivate culture—a company's most important asset

- Determine the values you want everyone in your company to share.
- Adopt values that match your personality.
- When you communicate values to employees, beware of corporate speak. Be genuine.



VANIA SOMAVILLA
EXECUTIVE DIRECTOR HUMAN
RESOURCES AND CORPORATE
SERVICES
VALE

Vania started her presentation with a very bold statement that summarizes her view on the current situation of the industry, "Growth is not a problem, growth is the solution."

Then she outlined what she believes to be the main challenges this growing industry will face:

- Effective inclusion of broader stakeholders.
- Shortage of skilled manpower.
- The necessity of going to difficult areas.

Vania discussed in detail the approach Vale is taking to address these issues and the positioning Vale is taking to consolidate its operations as a global firm.



MARK CUTIFANI
CEO
ANGLOGOLD ASHANTI
CO-CHAIR
KIN CATALYST—BRAZIL
KIN ADVISORY BOARD

Mark opened his presentation remarking on the need for change that the industry faces. In his own words, “The mining industry has been left behind.”

He presented examples and figures to illustrate one of the main challenges the industry has currently, “The quality of mineral bodies is going down, while costs to mine them rise in turn.” According to projections, operating costs of mining companies will double in less than five years.

He then advocated for the start of a dialogue to address this issue in an innovative way, concentrating on working together to create holistic solutions rather than focus on causes.

Three key elements are needed:

- A ‘new voice’ to advocate for the industry.
- A sustainable approach to develop capacity of stakeholders (local government).
- A solution to the problem of rising delivery costs for materials that surpass what society can afford.

Finally, Mark stressed the fact that these issues are bigger than any single company and therefore have to be tackled as a cohesive industry, rather than with individual and uncoordinated attempts.

“There’s only one group of people who can change this—and that’s us.”

OPERATING PLATFORMS OF THE FUTURE FROM EXPLORATION TO RECLAMATION

PANELISTS:



ALAN BYE
CEO
COOPERATIVE RESEARCH CENTRE
FOR OPTIMIZING RESOURCE EXTRACTION



JOHN DISHAROON
VICE PRESIDENT—INDUSTRY RELATIONS
CATERPILLAR GLOBAL MINING (CRC ORE)



JOHN KLEPEC
CHIEF DEVELOPMENT OFFICER
HANCOCK PROSPECTING PTY LTD



MIKE MACFARLANE
SENIOR VICE PRESIDENT
TECHNOLOGY & INNOVATION
ANGLOGOLD ASHANTI



LUIZ STEINBERG
CEO
MODULAR MINING SYSTEMS

This session concentrated on opportunities and challenges to developing the operating platform of the future. The key considerations identified were:

Workforce Development

What skills will be needed in the future and how does the industry ensure it is going to get them? How is the industry going to attract talent?

Innovation & Collaboration

How to ramp up innovation through collaboration to reach the scale and impact required. Current innovation is mostly incremental, which will not meet current and future challenges.

Fresh Approach to R&D

How can the industry transform the current approach to R&D to make it a value deliverer instead of a marginal activity.

Reputation Management

What can be done to improve the industry's reputation. An improved reputation will facilitate talent acquisition and foster positive relationships with local government.

Reducing Footprint

How can the mining industry minimize the use of energy, manage water more effectively and reduce waste? How do we prepare for future regulations? These concerns are not only important for mining companies but the world as a whole. The mining industry has the opportunity to position itself as a leader in this area.

Cross-Industry Collaboration

How can we create an ecosystem of collaboration in the mining industry like was shown in the oil & gas and aerospace examples? We can learn from other industries to create a successful model for mining.

BUSINESS MODEL OF THE FUTURE

PANELISTS:



RICARDO VESCOVI
CEO
SAMARCO



RAY OFFENHEISER
PRESIDENT
OXFAM AMERICA



MARK PODLASLY
MEMBER
NLAKA'PAMUX TRIBE
FIRST NATION (CANADA)
SENIOR ASSOCIATE
HARVARD KENNEDY SCHOOL



MARK CUTIFANI
CEO
ANGLOGOLD ASHANTI
CO-CHAIR
KIN CATALYST—BRAZIL
KIN ADVISORY BOARD

This session concentrated on the Business Model of the Future. Four speakers shared their insights with the audience and then the delegates convened in the same four breakout groups to identify challenges and opportunities.

The breakout groups reported back on the top opportunities/challenges that they considered key to pursue. The following topics were raised as relevant:

Partnership Model

The mining industry needs to develop a new model that engages stakeholders beyond shareholders, competitors, suppliers and customers—expanding to include society, government, NGOs, etc. This new model will help mining companies interact at the regional level with all interested parties and take all of their interests into consideration.

New Industry Branding

Similarly to what was discussed in the Platforms panel, the need for a new industry image was brought up as an opportunity when thinking of the new business model. This new image has to help create credibility and partnerships with different stakeholders involved in the mining ecosystem. A proposal discussed called for a global public discourse abiding to global environmental standards (which do not exist today as such).

Integration with Academic and Research Partners

Value could be created for the industry if it integrates closely with partners in the academic and research world, creating new data sources and advocacy tools that could serve as a common platform to promote collaboration and information sharing. The development of a new tool called Total Lifecycle Value (TLV) was proposed as a starting point.

Educate and Train Stakeholders

The partnership model also involves educating and training a broad range of stakeholders. The first step is to communicate and promote a business model of shared interests between companies and communities. Part of building trust in this new model is actively engaging communities to educate them on the model, demonstrate transparency by sharing business goals and assess community needs.

Once needs are assessed, the company can actively assist in the development of local communities. Activities might involve local workforce training initiatives, assistance to local governments in basic services and co-creation of a plan for future development.

The goal is to create a sustainable community that reduces disruption of operations, improves health and satisfaction of employees and improves overall prosperity for the company and the community.

OPEN INNOVATION AND COLLABORATION TO DRIVE SIGNIFICANT VALUE CREATION— THE EXPERIENCE OF THE OIL & GAS AND AEROSPACE INDUSTRIES



ANDY LEONARD
VICE PRESIDENT
BP CAMBRIDGE



KAMEL BENNACEUR
PRESIDENT OF BRAZIL RESEARCH
AND GEOENGINEERING
CENTRE FOR SCHLUMBERGER



PAULO FRANKLIN
HEAD OF BUSINESS COLLABORATION
AND STRATEGY CORPORATE PLANNING
EMBRAER



ULISSES T. MELLO
ASSOCIATE DIRECTOR
IBM RESEARCH —BRAZIL

To exemplify how other industries have dealt with similar issues in the past, delegates from aerospace, oil & gas and IT shared their experiences and insights regarding value creation through innovation and collaboration. They discussed common areas of collaboration between companies, work with academia, risk-sharing partnership models and management of innovation and information sharing.

Representatives from the oil & gas industry stressed how important it is to correctly identify areas where collaboration is possible and can thrive. Also, a re-occurring theme was the shortage of talent the industry is facing. The importance of working with academic institutions to form the professionals of tomorrow was discussed.

In the case of the aerospace industry, the panel focused on reviewing stories of partnerships and collaboration with manufacturers. Paulo Franklin introduced the Risk Sharing Partnership Model used by Embraer to engage with their suppliers and the discussion focused on how similar efforts could be pursued in the mining industry.

Finally, the panel covered technology and research through the lens of the IBM Research experience and how the mining industry can learn from their partnerships and collaboration models.

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The KIN welcomes a broad range of experts and partners to explore and generate the needed step change in innovation in the resource industry. KIN enables and fosters cross-sector partnerships to maximize the power and scalability of solutions.

The KIN proudly thanks these KIN Catalyst—Brazil Sponsors and Partners for their commitment to collaboration and market transformation.

Program Partner



Academic Partners



FOUR PRIORITY INITIATIVES

The KIN Catalyst—Brazil was held to promote action. After four days of lively discussion and debate, the delegates selected four priority initiatives to build a path toward the mining company of the future.

If you would like to join one of these working groups contact:

**Peter Bryant
Co-Chair
KIN Catalyst—Brazil
pbryant@kinglobal.org
+1.303.807.3762**



“If you aren’t at the table, you might wind up on the menu.”

1. New Multi-Stakeholder Model: Development Partner

Working Group Lead:

Mark Cutifani

CEO

AngloGold Ashanti

Co-Chair

KIN Catalyst—Brazil

Successful mining operations and healthy communities go hand in hand. Mining companies are discovering the importance of ensuring long-term success through addressing social and environmental infrastructure priorities of surrounding communities. This requires a shift in mindset—from isolated actor to regional development partner. This working group, including leading NGOs, will begin to build this new model, creating a process for determining priorities, process and performance metrics.

As mining companies develop this new model/ approach, they will want to address the following considerations:

- Identifying key stakeholders from government, NGO, community, civil and private sectors.
- Creating a “trusted broker function,” either within or outside the company to work with these stakeholders.

- Forming a process for mapping development priorities.
- Executing on the proposed new model and make the new approach flow through the entire organization.
- Implementing industry standards regarding sustainability practices, human rights, and environmental performance.
- Communicating progress to key stakeholders.

The goal of this working group is to provide the industry with a framework that acts as a roadmap to success and helps companies maintain their license to operate by building stronger communities; healthy, skilled employees; a cleaner environment; a stronger, multi-layered local economy and improved government relations which will reduce the growing risks posed by nationalization and/or unilateral changes in mining policy.

2. Maximizing R&D

Working Group Lead:

David Bentley

Group Head of Technology Development
Anglo American

Increasing demand, reduced quality of reserves and impending regulation pressures make research and development critical. However, we not only need to increase research and development investment, we need to make it more effective and efficient.

Arguably, there has not been a transformational R&D breakthrough in mining in the last 20 years. And so the question remains “What is the disruptive model of R&D that will bring abrupt change to the industry?” This working group will develop a new R&D paradigm that can address and exceed the challenges of the future.

The group will work on these considerations:

- Opportunities to achieve results more quickly by compressing the R&D process.
- The ability to leverage the entire industry to find solutions (vs. individual solutions).
- Options for creating an effective platform for collaboration.

- The shift toward a more transparent and open innovation mindset.
- Focusing on customers throughout the R&D process.
- Quicker time from invention to commercialization.

The working group not only looks at how to improve R&D within a corporation, it looks at how to involve the entire mining ecosystem to develop solutions. This new collaborative paradigm will demand that corporations give up their current silo'd mindset—but they just might find that the benefits to both their company and to the world are worth the effort.

3. Recalibrating Education & Communications

Working Group Lead:

Nigel Middleton

SVP and Professor of Engineering
Colorado School of Mines

The complex mining ecosystem demands a new set of capabilities. As mining companies become aware of their interdependent role within society, the need grows for mining leaders to understand geopolitical, environmental, governmental, social and economic issues.

Successful mining companies need to ensure their leaders are receiving a holistic, multi-disciplinary education to help them navigate this multifaceted landscape. This working group will focus on envisioning an education platform that will produce employees who not only understand mining, they also understand how to identify opportunities and risks within the communities and countries where they operate.

A new model for education will provide current leaders with the training they need now and will prepare the next generation. Today's young adults do not see a future in the old fashioned and environmentally wasteful mining company of the past. Mining is still seen as 'helmet and tools.' The industry needs rebranding—a new message that communicates 'brain power' and a state-of-the-art technology industry. Young people want to work for companies that are innovative, high-tech and environmentally sustainable.

Offering a well-rounded curriculum will help redefine the industry and position it as attractive for young people. Mining will be seen as an evolving industry, built not only on manufacturing and engineering, but also IT, social responsibility and design.

The working team lead, Nigel Middleton, is currently investigating what new multi-disciplinary skills are required and developing a proposed curriculum that will provide the executive education needed to navigate complex ecosystem and also provides a graduate degree that elevates mining. This working group is redefining education that will prepare talent for the industry and promote a positive, forward-thinking image to society.

4.Total Lifecycle Value (TLV)

Working Group Lead:

Robert C. Wolcott

Executive Director

Kellogg Innovation Network

TLV is a tool that combines both quantitative and qualitative data. It provides a cost/benefit framework across the value chain or mining ecosystem.

Currently there's no such system in place for this industry. The purpose of creating a TLV map for the mining industry will be to:

- Develop a communication and advocacy tool through the generation of data that can be shared and communicated with stakeholders.
- Provide a comprehensive view of the current mining ecosystem in terms of its economics.
- Facilitate negotiations with governments and stakeholders through transparency and shared information.
- Improve the planning process.

In today's industry, several decisions are based on a limited view, which in turn sub-optimizes outcomes and increases the overall per company risk. The existence of this data source could create value by exposing a more thorough view of the industry and its drivers. However, it will be important that the implementation of such tool results in the creation of economic value—we need to show where the money fits in this story.

This working group will work on a first version of the framework and then share with the industry to iterate from there. The first phase is to have a Kellogg student team develop a broad outline for the TLV.

SIGN UP FOR ONE OF THE COMMITMENTS

Four Priority Initiatives Summary

1. New Multi-Stakeholder Model: Development Partner

Envision a new mindset whereby mining companies become development partners, working together with cross-sector stakeholders to build thriving communities where they operate.

2. Reinvigorated R&D

Build the disruptive model of R&D that will bring rapid change in the industry by incorporating collaboration, client focus and a redefinition of the business.

3. Recalibrating Workforce/Education

Determine a path for ensuring a qualified workforce, attract talent and retain top employees.

4. Total Lifecycle Value

Map the mining ecosystem to develop a communication tool, provide a comprehensive view of the economics of mining, facilitate government relations and improve the planning process.

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+1.303.807.3762