



Commentary Paper - 9 March 2012

ICT, Technology, Skills – Investing in the Fieldonomics of Mining Automation and Innovation

The Mackay Mining Round Table was presented with the support of



The Business/Higher Education Round Table (B-HERT), CSC and Central Qld University hosted a mining round table on 21 February 2012 in Mackay, Qld. This paper attempts to report on the discussions of the day and offer some derivative actions that the relevant stakeholders may wish to consider.

Progress ushers forth the transition from skilled tactile/sensory practitioners to information gathering/synthesizing technicians/managers. The drivers of this trend are globalization and ICT-enabled productivity on an industrial scale. Accompanying this is that miners seek a 'social license to operate'; such a license reflecting explicit corporate responsibilities re social, ethical and environmental considerations.

Indisputably one should recognise that the intersecting of business opportunities and emerging technologies offers tangible benefits to the sector and its supporting eco-system. However, it is a matter of concern that models of innovation like Open innovation are not yet embedded or at least considered on any significant level.

Automation ultimately creates more jobs because it keeps you competitive on the world scene... Innovation is a continual process because if you don't, someone will come up with the same product or technology.

Frank Seeley, Seeley International, BRW Feb 16-22, 2012 pg. 22

This topic is multi-layered in its dimensions, there is no simple turn-key solution and does not necessarily offer universality in application. Discussions highlighted the differentiation between automation and autonomy; competitive advantage and comparative advantage: competitive advantage relating to the economic return that may be generated through maintaining our comparative advantage in mining technology and services which are underpinned by robust knowledge, intellectual property development and practical application.

POTENTIAL

.... big data could change competition: by transforming processes, altering corporate ecosystems, and facilitating innovation.

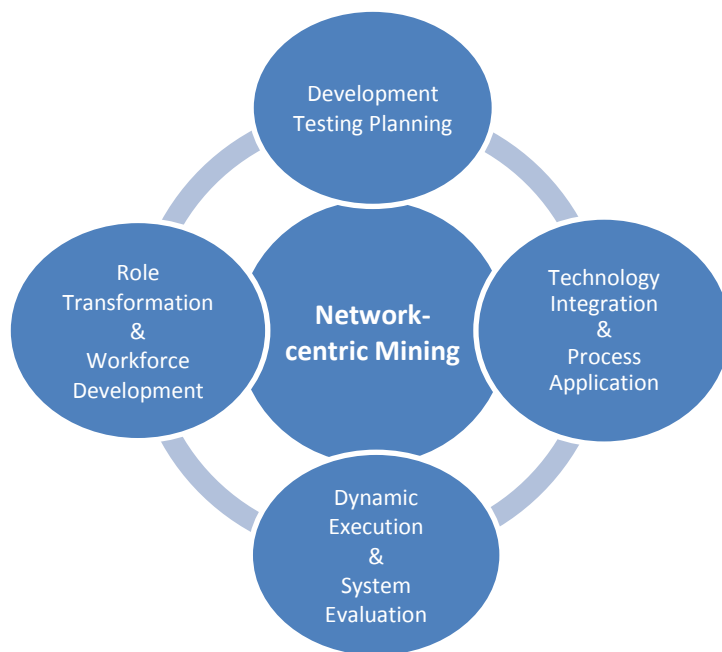
Are you ready for the era of 'big data? Brad Brown, Michael Chui & James Manyika, McKinsey Quarterly October 2011

What was clear from the discussions is that the integration of ICT may or does:

- present a sustainable value proposition in yield management, waste reduction and life extension of asset
- offset in-part, diminishing asset quality and resource accessibility
- deliver improved return on capital employed and reduces the risk on capital employed
- improve the OH&S profile of mining operations
- improve the environmental footprint, for example through reduced onsite workforce, mine site design and flexible infrastructure
- offer optionality in the business model and mine/project risk management
- bring an efficiency dividend to multiple points on the value chain

Accompanying the above is that consideration needs to be given to company priorities at the time. For example, it was offered that for one company their order of priorities, are:

1. the environment
2. mine-to-port logistics
3. workforce capabilities
4. technology/mining technique



VULNERABILITIES

There is reason to pause though given:

- the economic impact on less-skilled workers and an individual's right to a livelihood
- the availability of alternative employment and the potential economic/community impact on regional areas
- the ability of those affected to retrain/up-skill and indeed their motivation to do so
- ability of current IT architecture and infrastructure to protect/manage proprietary information

EXPOSURES

Reams of data....cascade in at unparalleled rates from new devices and multiple points along the value chain.... Emerging academic research suggests that companies that use data and business analytics to guide decision making are more productive and experience higher returns on equity than competitors that don't.... big data may well become a new type of corporate asset that will cut across business units.... representing a key basis for competition.... Success will demand.... new skills but also new perspectives on.... the widening circle of management practices it may affect and the foundation it represents for new, potentially disruptive business models.

Are you ready for the era of 'big data'? Brad Brown, Michael Chui & James Manyika, McKinsey Quarterly October 2011

1. With any dynamic change there is often dislocation between expectations, implementation and deliverables. It is understandable that companies are protective of their investments which may give them a competitive advantage. However, the profile of collateral issues (environmental, social, ethical) needs to be given due recognition and consideration by all stakeholders. What is the collaborative mechanism?
2. Structural change to mine operations and workforce – is there a problem? What template does the sector have for managing automation and ICT-centric operations as a primary enabler to maintaining a globally competitive industry? Should it be left to self-resolution?
3. There is an implied expectation of a 'social license to operate' between the mining sector, government and the community. What are the consequences for the mining sector of not acknowledging that expectation?

4. Open innovation – who do you cluster with? What protocols support a 'loop-in/loop-out' model? What is the opportunity cost in corralling/protecting IP as opposed to the possible multiplier effect generated by open-source/crowd sourcing improvements? This in relation to future economic rents if it is accepted that the value of IP lies in its application on a system/enterprise level rather than at a singular level.
5. Base-load impact on infrastructure be it communications, social or mine.
6. Disestablishing embedded management practices and overcoming organizational/sector inertia.
7. Removing barriers to developing a knowledge hub around a university.

OPPORTUNITIES

Whilst change can be disruptive it does by its nature offer opportunities for realigning the business model with market incentives. The network-centric mine presents many advantages including improved OH&S, reduced environmental impact, improved productivity, and a pathway to a sustainable mining industry in the global context.

- CQU's SMART Centre provides a platform for substantial development on a number of fronts, be it R&D, cluster development, knowledge exchange/governance, graduate skills and learning pathways.
- Regional universities have a leadership role to play in regional development. By developing the SMART Centre as a hub in a 'hub & spoke' model, there is the opportunity to support both specialized and integrated industry development.
- The SMART Centre 'hub & spoke' model would defray costs re infrastructure investment and provide a clear pathway to the appropriate knowledge/solution/project collaborator.
- The SMART Centre would provide an intermediary mechanism (eg. knowledge broker) so that sector participants don't necessarily pursue redundant opportunities or duplicate effort.
- The SMART Centre could play an important role in balancing the pull of the 'competitive differentiation in IP'¹ model by promoting an IP-free zone analogous to a trade-free zone.
- The Base-funding Review supports the idea of 'Flagship' courses. The SMART Centre may assist in elevating CQU's mining-related courses to such status if so desired.
- Business should view tertiary education providers as partners in the value chain: be it graduate skills/professional development through to beta testing/in-the-field solutions.

CONCLUSION

There are always obstacles to evolving an operational paradigm. Change is rarely self-imposed. Indisputably, the need for evolution in mine operations and the follow-on benefits were identified some time ago; be it the yield-to-cost curve, labour force design, or the competitive rising of low cost countries with large resource endowments and policy settings conducive to accelerated development. The levers of social and market incentives are increasing the velocity of this change in the development of automated mine operations. Such progress once initiated cannot be held back. Therefore, sector participants must regularly re-evaluate their value proposition and map their particular pathway to secure a 'dividend for action'. This is the challenge for the mining sector, tertiary education providers, government, and sector affiliates. Ongoing dialogue and engagement by these stakeholders will result in valid and tangible actions that should support sustainability in all its guises – economic, environmental, social and regional.

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¹ Managing the business risks of Open innovation, Oliver Alexy & Markus Reitzig, McKinsey Quarterly Jan 2012