E-BUSINESS, MINING AND STRATEGY

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HATCH BEDDOWS

E-Business, Mining, and Strategy

Abstract

E-business has received tremendous press coverage over the past year; pundits have made broad predictions of how it will revolutionize the way businesses interact with their customers and with other businesses, as well as creating new ways for business to add economic value. To-date Internet technologies have had the most impact on industries that have traditionally led in the adoption of new technology such as aerospace, automotive, and computing. In mining and metals applications to date have centred on metals exchanges for matching buyers and sellers for marketplace efficiencies. While the complete impact of the e-commerce revolution is still very unclear, we believe that companies must begin thinking through their e-business strategy. Businesses that do not prepare may forfeit certain competitive positions or fail to capitalize on significant opportunities.

In this paper we begin to create a business model for mining and metals in the context of e-business. In particular, we investigate how the perspective of the facility owner or operator can influence the approach. A physical asset proprietor perspective lends itself to a cost leadership strategy; a perspective of managing core competencies within a business opens other strategies.

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1. Introduction

The key strategic issue for any company in this world of rapidly changing technologies and business models is which of these should the company invest in, and which should the company leave to others to develop. Our intent in this paper is to propose some basic models and contexts that mining and metals companies can use to answer this question.

Our intent is to push a bit at the limits of present applications of e-business in mining, without straying too far from real applications, i.e., those already used elsewhere or clearly under development, to discuss how one might look ahead in this environment.

As will be explained in more detail shortly, this article is focused on those involved in mining, concentrating, smelting and refining. We have tried to include a few thoughts for those in exploration and development and those involved farther downstream, but we have not tackled these areas in any detail. The applications of e-business in both of those other areas warrant separate discussions.

To avoid disappointment – we will not be explaining the alchemy of transforming a mining company into a "dotcom" and achieving the associated price multiples. This discussion is aimed at those that are planning to remain in the (minerals) mining business and want to leverage the e-business world in the mining business.

2. What is "E-Business"

The term "E-business" is now commonly used – and abused – but what do we really mean by it? For the purpose of this discussion, we define e-business as "strategic and tactical responses to advances in information and communications technologies". The responses are to three fundamental technological trends:

- Decreasing cost of communications bandwidth;
- Decreasing cost of computing power;
- Increasing openness of architecture – allowing systems to be connected with increased ease.

While the visible impact of these three basic trends is evolving through rapid step-changes in applied business models, the direction is consistent.

A fourth area important in the concept of e-business is knowledge management. As the ability to store, retrieve and transfer information has increased, the discipline of management of knowledge as an intangible asset has matured.

Figure 1 attempts to represent the dynamics of the e-business response.

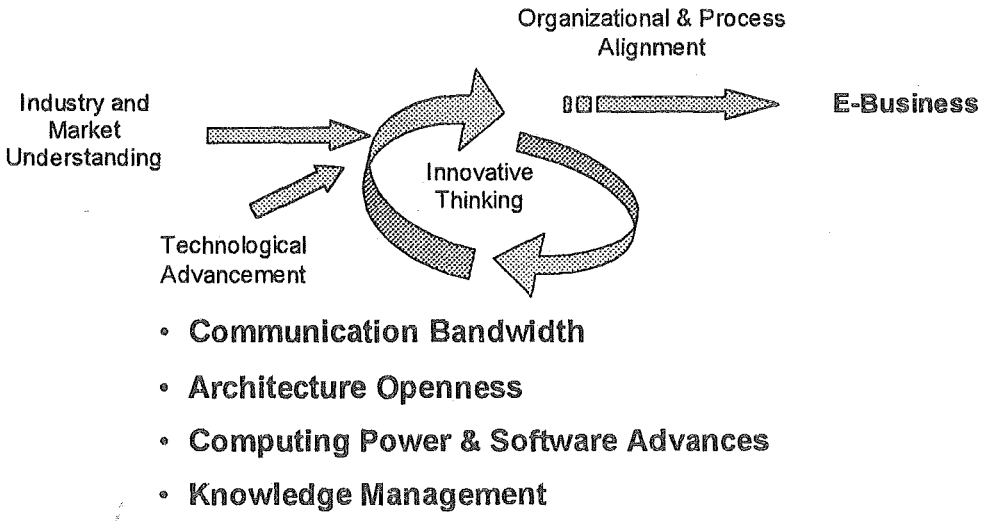

Figure 1: The e-business dynamic

The need for business to adapt to revolutions in information technology is not new. One can argue that e-business started with the invention of the telegraph in the mid-1800's. The telegraph led to new opportunities in the news business – to offer rapid electronic dissemination of news to subscribers.

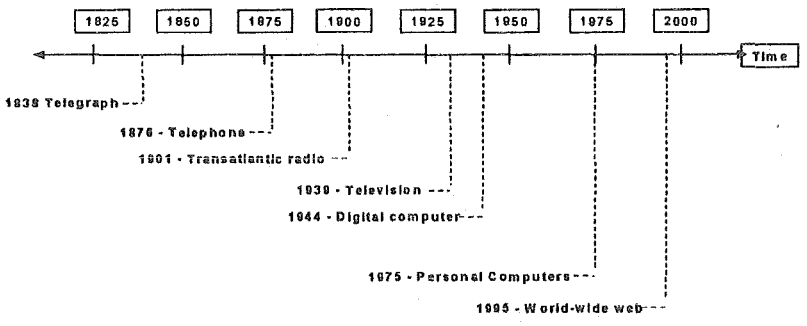

Figure 2: e-business is not a new phenomenon

What has changed today is that the pace or velocity of technological development has increased relentlessly. Also, presently, these three areas of technology have developed to a level that offers opportunities for step changes in how we use them..

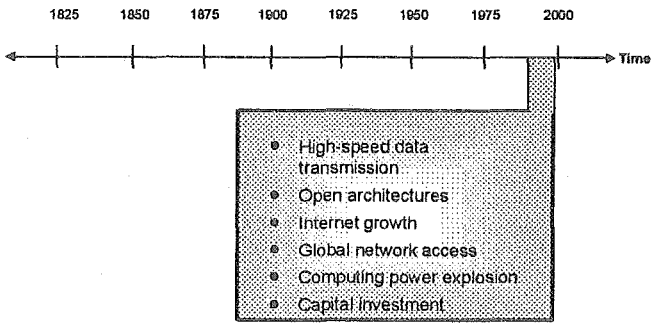

Figure 3: e innovation in the past 5 years

3. Looking at the mining industry in an e-business context

Understanding the potential impact of electronic tools on a particular company starts with understanding its value chain position and role. Figure proposes some of the basic steps in the mining and metals value chain.

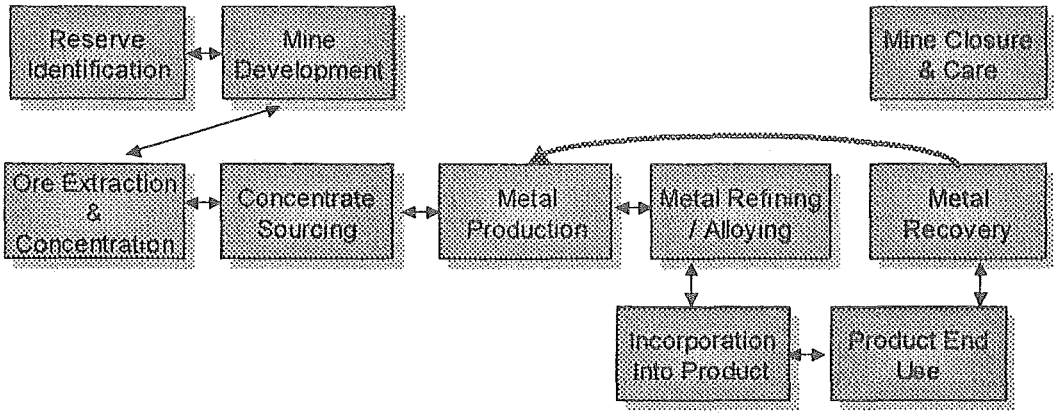

Figure 4: Overview of the Mining Industry Value Chain

Up until a couple of years ago, much of what had been talked about in the information systems revolution related to managing information on proprietary systems within companies. E-Business is driven by the dramatic improvements in the ease with which information can be shared between 3rd parties. In their book, "Blown to Bits", Evans and Wurster argue that one of the principal impacts of e-business is the separation of the economics of information from the economics of physical goods. This increasingly allows information-based processes to be separated from the physical processes that they support or augment. Understanding where the information value resides in a value chain and how that information value can be unlocked or preserved is the challenge.

To look at the mining industry from an e-business perspective therefore requires looking at the mining and metals value chain from the perspective of informational, rather than physical transformation. One of the challenges of e-business is to identify which information can be exploited to competitive advantage, versus information that is required simply to be in business but does not offer an opportunity to differentiate. While we will not undertake to present a complete information value chain, Figure represents some of our thinking about the types of information that can give a competitive advantage to one company over another ("differentiating information") at various stages of the value chain.

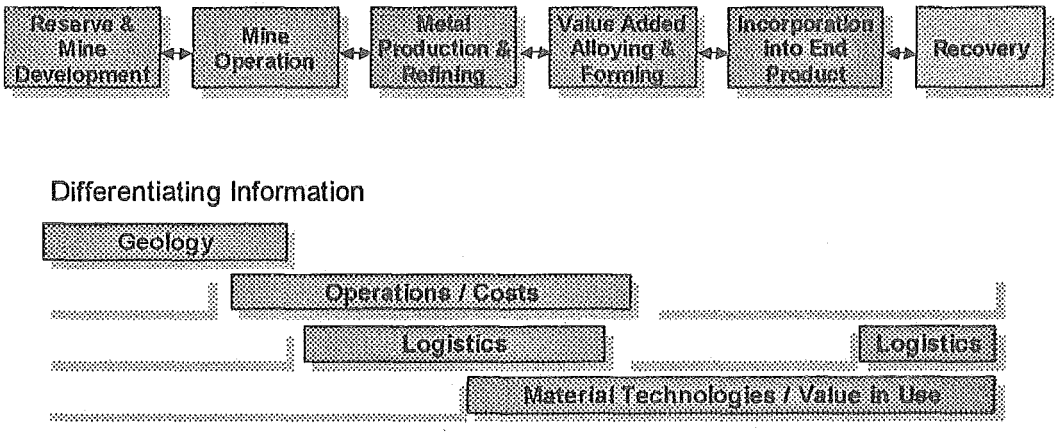

Figure 5: Physical versus Informational Value Chain

The point of this diagram is not to debate the relative importance of all information along the value chain, but to discuss what types of information can differentiate players at the different stages of the value chain. At the exploration stages it seems clear that, in general, the company with the better ability to gather and interpret information relating to geology will find more valuable reserves and resources. In the mining, concentrating and smelting stages, the company that is better able to leverage information on operations performance and costs and better able to manage logistics will be farther down the cost curve and therefore more profitable. To an ever-increasing degree, customer relationships and the company's ability to fulfil customer requirements on time, on specification is critical to company success. The ability to communicate with company stakeholders in all their forms is also very important. Information will never alleviate the need for competitive plant scale, processing technologies and locations, but it will determine the winner amongst those with competitive physical resources.

Investment on either company or industry specific e-business initiatives should focus on differentiating information. If information at some stage of the value chain is not differentiating then the focus should be on executing most efficiently - perhaps through outsourcing to an outside group that excels in that area.

However, the true scope of e-business expands beyond the "linear" value chain, to incorporate all the supporting businesses and organizations – which we refer to as the e-business ecosystem. Figure illustrates this concept in the mining industry. We cannot capture all the interrelationships in one diagram, but we have attempted to locate secondary players near the segments of the value chain where their relationship with the primary player is more important.

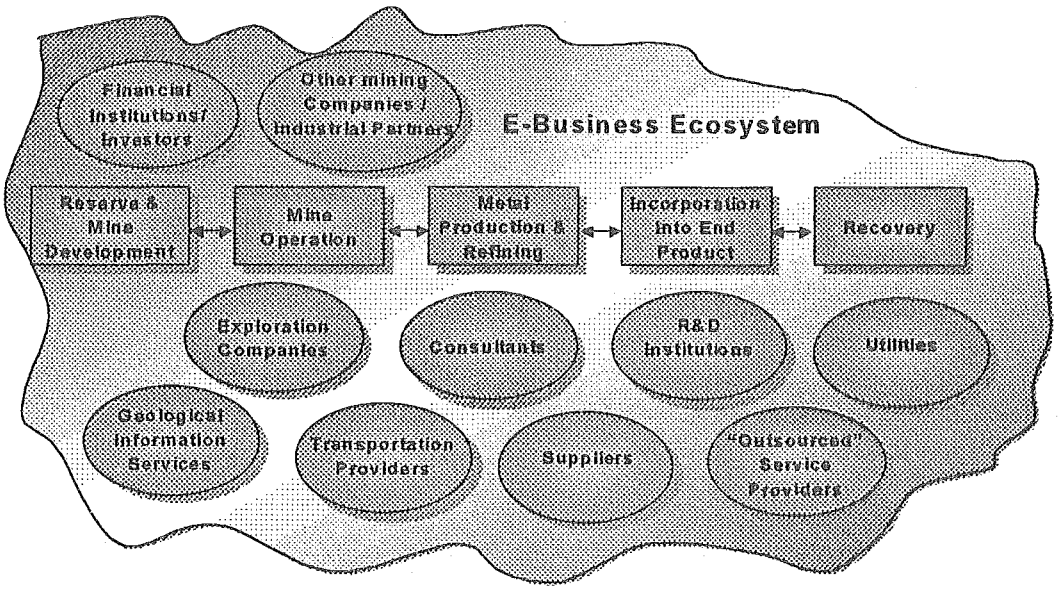

Figure 6: The e-business ecosystem

4. Strategic implications in the mining industry

As we explained earlier, our discussion of implications of e-business on the segment of the industry involved roughly from mining through to refinery operations. As proposed in Figure , this segment of the overall chain is generally focused on differentiation through cost efficiency, although the transition to value adding potential varies between specific metals and market segments (i.e. in smelting and refining there are some opportunities for value added purities and forms). The differentiating information at each stage (and further sub-divisions) will reflect the strategic focus at that stage, and should direct the e-business focus of players within each segment.

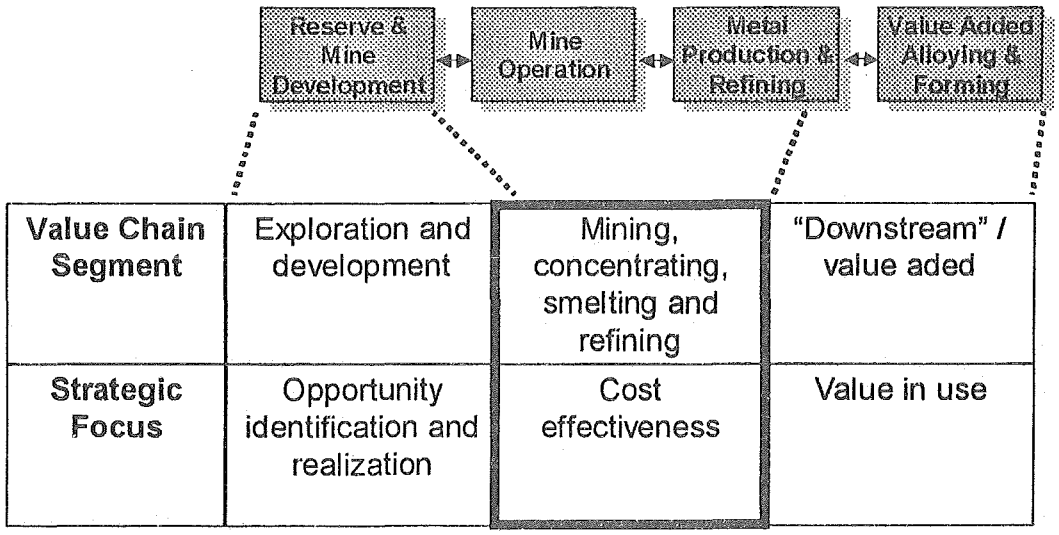

Figure 7: Value Chain Segmentation and Strategic Focus

We will explore some of the implications of e-business in the mining through refining segments, through discussion of four areas of impact, and how mining companies might respond.

4.1 Elimination of geographic and organizational distance limitations - "virtual operations integration"

Several capabilities are coming together that allow us to re-think who monitors and supports operations, and from where these activities take place. This could lead to a structure of operations depicted in Figure , with the following characteristics:

- Major equipment is linked to its supplier's central monitoring system, where the supplier tracks performance, notifies the operation of preventative maintenance requirements and actually performs or supports the maintenance activities.
- Plant drawings, manuals, specifications and parts lists are maintained by a central service from cradle to grave; this could be the original engineering company or another that has been contracted to maintain the operation's records.
- All maintained information is available on demand to anyone in the operation who requires it and is authorized to see it.
- Key resources (technical experts, maintenance experts, operations specialists, even management) can be more easily and cost effectively shared across multiple mines.
- Outside expertise can be included in collaborative work without needing to travel to the operations site.

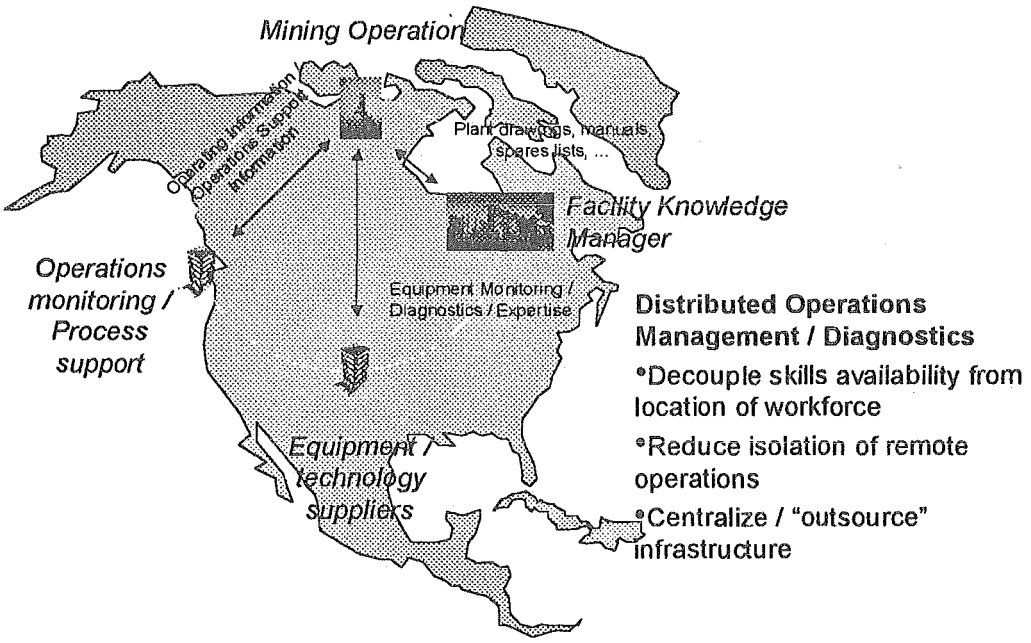

Figure 8: Virtual Operational Integration

This will allow the mine operator to be focused on the optimization of the production operation, with technical support for, and perhaps execution of plant maintenance issues and projects outsourced to companies focused on those areas. E-business allows direction of information to more specific technical resources while enhancing the operator's access to relevant information.

This will allow for increasing use of shared services, reduced site costs and outsourcing of non-core value added activities to suppliers.

4.2 Operations Community - "virtual economies of scale and scope"

The growth of the trade exchange concept and related organizational and commercial models can allow companies to pool resources or requirements in innovative ways. The direction this implies in partnerships between operations is outlined in Figure 9, which represents the following characteristics:

- All spares are listed in a central exchange, so that an individual mine manages its:
  - critical spares as part of a larger pool – reducing the spares carried by each mine, and yielding opportunities to recover value from obsolete spares;
  - operating spares through links to supplier warehouses for automatic inventory management, not just based on re-order levels, but also on electronic access to planned maintenance activities.
- All transportation of supplies and product is coordinated through a "virtual" transportation pool, that optimizes shipments to a community of industry in a geographic region.
- In remote areas, an industry community pools purchases through a "virtual" supply centre.
- By-products are "sold" through trading sites.
- All contractors used by a particular operation have electronic connection to all relevant information and communications from the operation, so they are able to plan work and respond to situations as if they were part of the operating organization.

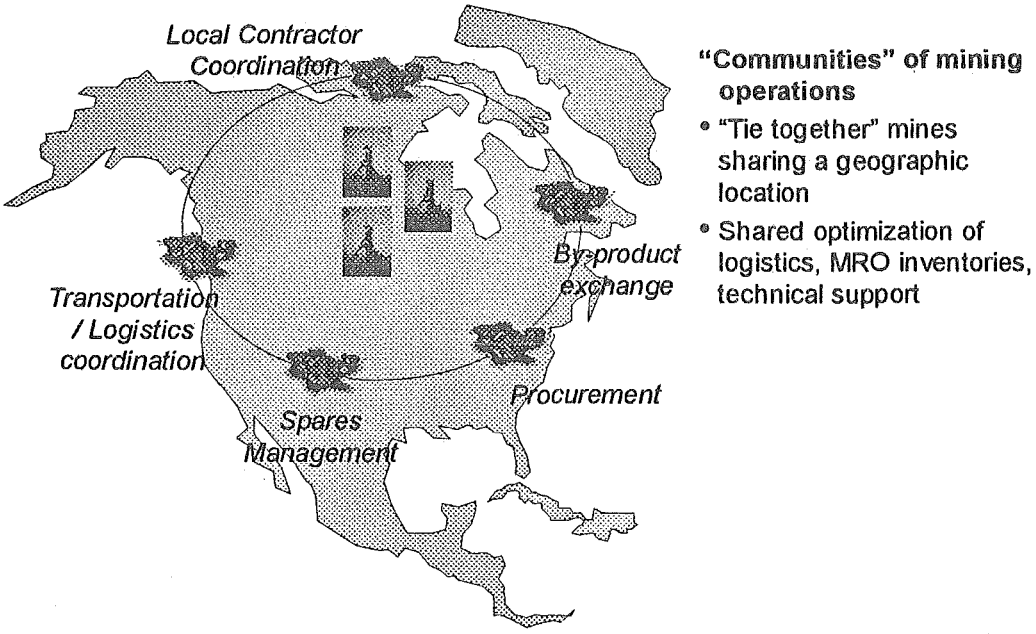

Figure 9: Virtual Economies of Scope and Scale

This means that mines have the opportunity to optimize the costs of supporting infrastructure through improved ability to coordinate third parties.

4.3 Value Chain Community- "virtual vertical integration"

One of the concepts presented by some trade exchanges is that of supply chain coordination, in addition to the transaction efficiency and pooling presumed in Section 4.2. The direction implied in this concept is outlined in Figure , with the following characteristics:

- Integrated information not only along the supply chain between mines, concentrators, smelters and refineries – to optimize inventory levels, manage feed qualities and ease reconciliation - but also between operators at various stages to optimize opportunities for geographic swaps and swaps to optimize impurity levels.
- Particularly at the refinery stage, integration with the plans of distributors and manufacturers, to optimize production at each stage in the chain
- More direct information exchange between refineries and downstream customers (potentially through to end-user), which may allow differentiated service opportunities.

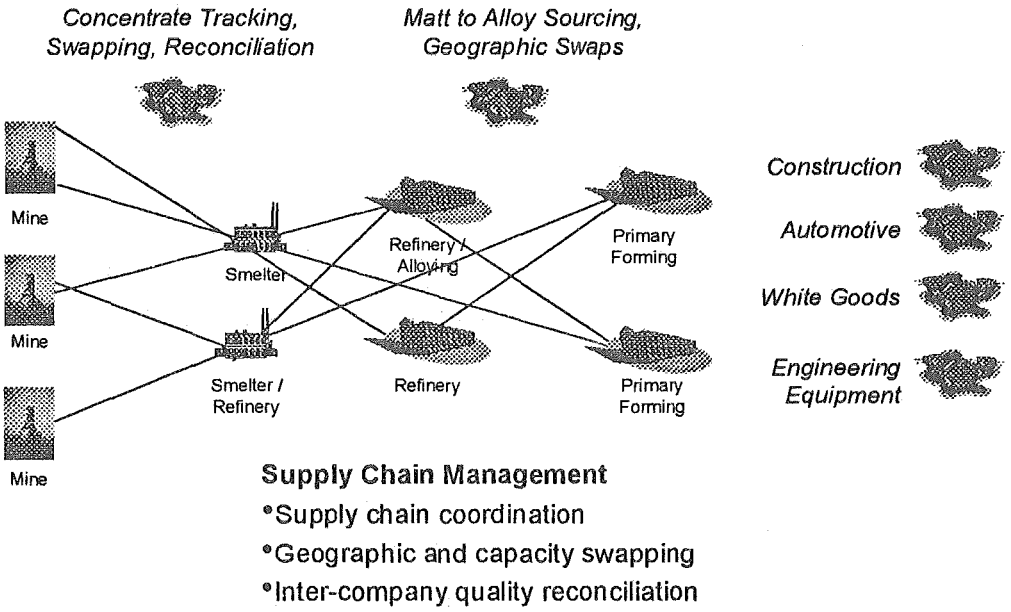

Figure 10: Virtual Vertical Integration

This means that smelters and refiners will have increasing opportunity to become involved in the optimization of the overall minerals and metals chain, rather than managers of individual facilities. Knowledge of facility capabilities and an accessible "inventory" of concentrate may allow the opportunity to optimize production output, transportation and operating costs. The counterpoint is that this increased value chain interconnectedness will drive rationalisation as inefficient or redundant components are removed.

4.4 Transaction and Communications Efficiency and Effectiveness

Our discussion has focused on a limited number of e-business developments that we believe will impact the structure and focus of mining companies, and therefore require an organizational response from

mining companies. There are a great number of other opportunities to take advantage of improved information and communications technologies within an existing organizational context. These include areas such as:

- Using e-procurement, at its most basic level, to reduce the cost of procurement transactions and optimizing order and inventory management. This really fits in a combination of elimination of geographic and organisational distance limitations and value chain interconnectedness.
- Making a great range of corporate data available across an organization, or within the value chain.
- Developing knowledge management initiatives to harness the intellectual capital of an organization – whether it is transferring best practices across operations, or better capturing customer or market information from its disparate locations around the company.
- Enhancing communications with the public, whether about current or planned operations.

While these may not imply rethinking of structure and strategy, these are opportunities that should be explored by any company.

5. Strategic approaches for mining companies

The good news for mining companies, in fact for all producers of basic goods, is that someone still has to produce the physical goods. We believe there are potential rewards for companies that learn how to use e-business to reduce costs and increase value, and this discussion is focused on that result. However, in addition to the e-enabling response described above, Figure proposes two additional responses to the e-business world which should be considered by any existing organization. A second response is to look to generate value through a new venture that may leverage some of the existing knowledge, expertise, or core competency of the current organization, but which has a different value proposition. E-ventures typically require a different business model.

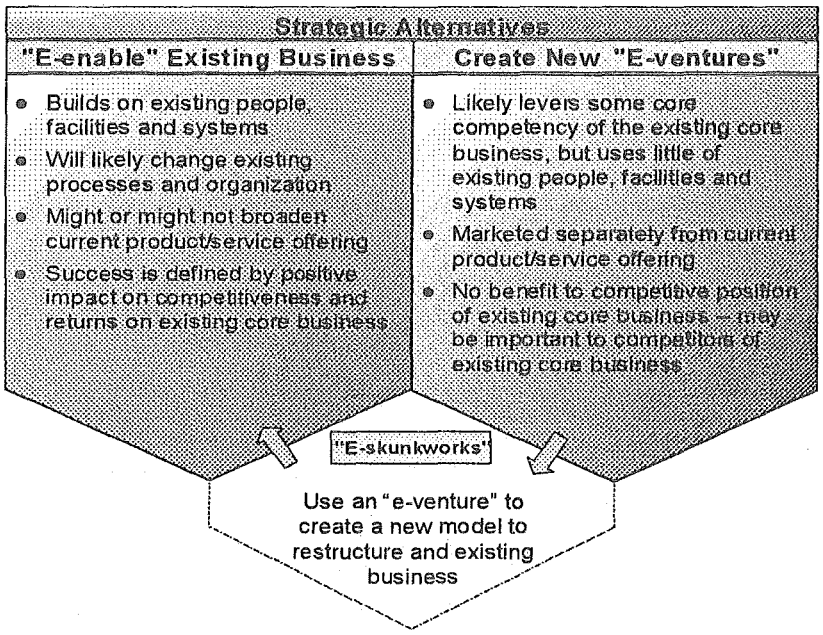

Figure 11: E-business Response Alternatives

The third option, at the bottom of the figure, is an important variant. Some companies are using the e-venture concept to create a "road map" for their existing operations to move into the e-business world. In this case, the e-venture may parallel the existing company's business in an "e" context.

Figure outlines three categories in which to map the existing operations and assets of a business, focusing on the intangible assets of business processes and knowledge, against the opportunities to make the business e-centric or to create e-ventures.

Category	Core operating assets	Outsourcing opportunities	E-venture opportunities
Description	Establish the competitive advantage of the current business	Required but not differentiating for the core operation	More value if levered in a broader context
Approach	Focus on proprietary e-applications to further enhance these assets + use of 3rd party e-tools	"Outsource" using e-business of others	Spin-off as e-businesses
Speed	Paced change to make processes "e-centric"	Strategic / opportunistic outsourcing or spin-off	Rapidly evolve in e-space

Figure 12: Asset Categories by e-Business Response

In considering this categorization, consider some of the following questions.

- What are the key business competencies and where do they add value? – Is it an operations company, a management company or a knowledge company ?
- What business processes or information could likely provide more cost effective contribution to the business if they were pooled with similar processes or information from others or performed by groups with broader based skill sets ?
- What information does the company generate that is of value to other participants in the value chain or the ecosystem ?
- Are any knowledge areas sufficiently differentiated to represent an opportunity to package them in an e-venture ?
    - Are technical capabilities differentiated ?
    - Are logistics differentiated ?
    - Are abilities to coordinate the value chain differentiated?

While there will not be clear answers to most of these questions, and no company will map neatly into a single category, only those that can articulate a clear, targeted e-business vision will gain significant advantage in the e-business world.

6. Conclusion

The e-business world will offer opportunities to both physical goods producers and those with knowledge assets. The key to winning along either path is to understand key competencies and competitive advantages in the information value chain.