

Journal Comment

National Planning Strategies

*'If you are planning for one year, grow rice.
If you are planning for 20 years grow trees.
If you are planning for centuries, grow men'*
- Chinese Proverb

There is no pre-designated theme for the contributions in this issue. Apart from one review paper, they are research contributions from a range of specialists, and it is impossible to comment in detail on all of them. Very pleasingly, apart from the local contributors, there are papers from Iran, Australia, Canada, and China. It was the latter paper that reminded me of an appropriate Chinese proverb which enabled me to at least tenuously link five of the contributions to a common theme.

Two of the papers relate to strategic planning using computer technology, which has been the emphasis of many APCOM conferences. The remaining three papers can be related to future medium- and long-term large ventures, even though they are in embryonic conceptual form. It is on this tenuous association that I introduce some comments on job creation, a well-worn subject, but worthy of overwhelming attention by way of integrated strategic planning.

The paper by authors from Canada and Australia, (M.W.A. Asad and E. Topal), was specifically developed for open pit mining, in which the authors evaluate the option of mining additional or sub-marginal grade ore to build up a stockpile for future exploitation if the economic risk factors appear to be favourable.

Obviously risk factors are paramount in the discounted cash flow (DCF) calculations and the algorithms incorporated to include these are a vital component. While the paper is specifically directed at a single final product, it surely could be made applicable to resources containing additional potentially saleable materials.

The second paper on evaluation models by authors from Pretoria University, (S.A. Aye and P.S. Heyns), is similar in using the standard discounted cash flow techniques for NPV and RoI (return on investment) calculations. It includes the risk factors and their impact on the outcomes as important parameters. Although the author uses three selected arbitrary levels for the risk and impact values, I imagine there would be no difficulty in extending the range if this was an important consideration, such as might be the case in research or portfolio evaluations.

These two examples suggest that the time is ripe to extend such computerized risk models to more complex situations and ventures, particularly those leading to creation of jobs by establishing cluster industries.

A new mining venture, for example, by itself may not have a large impact employment-wise, but if associated with a cluster of industries, with the families of direct employees, and all the implication of multiplication factors in the form of schooling, training, energy, water, land, farming, tourism, and outsourcing, the impact can be many times larger. This introduces added dimensions in complexity and statistical uncertainty, but not beyond the scope of computer-based modelling methods if given priority attention.

The first example where strategic planning is essential is the review paper on titanium by S.J. Oosthuizen, compiled with the support of the Department of Industry and the Department of Science and Technology with the job creation outcome in view.

Titanium was the wonder metal in the 1950s but the bubble burst rapidly when the difficulties in fabrication, chemical reactivity at high temperatures, and fatigue failures became apparent. For the past six decades the main saleable form of the element has been in the form of the oxide as white pigment (95%), and South Africa had its fair share of the market produced from the beach sands along our coastline. Innovative new

methods of producing titanium metal and oxides using complex fluoride chemistry have been demonstrated on a laboratory scale, (the patented Peruke process), and it is proposed that this process might be operated at lower cost than the well known Kroll and Sorel processes used predominantly for treating ilmenite. The Peruke process has features which indicate special alloys and improved fabrication techniques are possible. Work has been done at the CSIR on the production of exotic alloys of titanium which can be used for sports equipment and other demanding industrial applications, as well as for medical purposes.

The bulk of the ilmenite resources in South Africa have been exploited, and the remaining producers have tied up with an American company to form a dominant global pigment producer. However, there are alternate raw materials in the form of waste by-products and co-products of the titaniferous magninites, although mining and production is in its infancy.

There is clearly exciting development work possible, but the potential for job creation potential cannot be realized in the short-term. The main reason is that the jobs envisaged have still to be defined precisely in terms of specialized qualifications and skills, and this will be done only when pilot scale plants have been constructed to produce the marketable products and the expertise built not only in processing and manufacturing but also in marketing to a wide range of global customers.

I know of no project in the mining and metallurgical arena more deserving and demanding of strategic risk evaluation. I am sure that this will have to be done with international participation.

Another project that might be commented on is inspired by the paper by H. Zhang *et al.* relating to improvement in the power consumption of aluminium plants by improving the AR factor. We in South Africa are conscious of our fall from grace as the premier low-cost electric power producer. Now we have a situation of job preservation and improving power efficiency. Also of importance is the potential of developing a local source of cell-grade alumina to replace imports. There are potentially billions of tons of alumina in waste coal fines which could also respond to fluoride metallurgy. But once again, because the employment factor is large, a risk venture strategic evaluation on a national basis involving co-generation of power would be obligatory.

Similarly, the improvements reported in the two-part paper on zinc sulphide roasting could contribute to justifying the mining of previously sub-marginal resources remaining in the Black Mountain/Gamsberg deposits in Namaqualand.

The papers in this issue are among many that could form a national portfolio of R&D projects, in addition to the contribution from the mining industry, which have a potential for developing cluster industries offering employment and many others involving advanced imported technologies.

It would be tempting to call on imported specialist expertise. But indigenous employment would be sacrificed if we failed to place the highest priority on upgrading school and tertiary training.

I have previously published an attempt to undertake a DCF analysis on just this challenge. The results were promising, but if the currently available computer advances were to be applied as indicated in this issue, I suspect the returns on such an investment would be spectacular.

The Chinese proverb has an undeniable basic truth as a pattern for the development of impoverished societies, although in symbolic form, and is most relevant today. ♦

R.E. Robinson