

CHAPTER 1

BACKGROUND AND THE RESEARCH PROBLEM

1.1 INTRODUCTION

The mining industry in South Africa makes a major contribution to the economy of the country, but its very economic strength also contributes to massive pollution effects. Revenue totalling R65 billion was generated in 1997, 79% of which was in the form of foreign exchange (Financial Mail 1998 Nov:46). According to estimates, this industry added 7,8% directly to the gross domestic product (GDP) as well as 15% indirectly by means of multiplier effects. About 10,5% of all people employed in the non-agricultural formal sectors of the economy are still employed by the mining industry despite sharp production decreases during the past decade.

While the mining industry does make an enormous contribution to the economy of the country, it also has quite a number of negative environmental impacts owing to pollution. These impacts range from the contamination of soil, air and water to negative influences on the agricultural, cultural and visual environments. A large portion of the waste generated is in the form of waste water, and high environmental risks are involved when releasing waste into the aquatic systems.

The health and safety of employees and people in communities situated close to mining operations are important concerns for this industry. An example of this is found in the legacy of asbestos mining in the country which caused extensive ill health for decades after the closure of these mines (Koch et al 1990:3).

In this introductory chapter the background to the study is discussed. The problem to be investigated is formulated and the purpose and importance of the study are explained. The parameters of the study are set out in accordance with the defined problem. The methodology followed and the research method are described. The programme of the study is then set out in the form of a review of the chapters. For the sake of clarity concerning the use of relevant terminology, a number of definitions are added in a glossary.

1.2 THE PROBLEM AND PURPOSE OF THE STUDY

1.2.1 Inadequate allocation

Accounting and management accounting procedures traditionally do not take into account the principle of “polluter pays”. This inadequate allocation of environmental costs forms part of a global trend where the present environmental costs of pollution to the atmosphere, hydrosphere and lithosphere are externalised to be paid for by future generations. In this regard Porritt (1989:19) quotes the opinion of the former Secretary of State that

pollution, like fraud, is something you impose on others against their will so that you can gain financial advantage.

Rehabilitation and environmental costs are inadequately allocated because environmental costs are not collected, classified, assessed and disclosed properly, and all interested and affected groups are not taken into account.

1.2.2 Invisible environmental costs

Environmental and rehabilitation costs are hidden in the form of environmental damage, to be paid for in financial and non-financial terms in years to come. In traditional accounting systems environmental costs are not separated from other costs and overheads, which results in a lack of awareness of the extent of these costs. Remediation liabilities exist both for rehabilitation pertaining to current mining activities and for ecological damage inherited from previous generations. The operation of the free market does not, however, immediately provide an automatic solution for this problem.

The lack of regular assessments of environmental and rehabilitation failure and control costs perpetuates the traditional approach of hiding the costs associated with the minimising of negative environmental impacts. Since these costs are kept invisible, adequate provision cannot be made for their prevention in the rehabilitation and environmental budgets.

1.2.3 Traditional values, beliefs and mindsets

Experts differ on the interpretation of rehabilitation and environmental costs. According to more traditional values, beliefs and mindsets, the costs incurred for remediating environmental damage and preserving natural habitats are regarded as unnecessary. This attitude is also found in poor countries in respect of uncontrolled small-scale mining operations where compulsory remediation actions at present would lower the standard of living for millions of people.

When the importance of environmental expenditure is recognised, the motivation is only to comply with environmental legislation in order to avoid and reduce excessive environmental failure costs. The values, beliefs and mindsets of management need to be developed to the following phase, where rehabilitation and environmental costs are managed in an environment with a strategic orientation and with the capitalisation of environmental know-how.

1.2.4 Evaluation in financial terms only

The approach in management accounting has traditionally been that input and results should be measured in financial and monetary terms only, resulting in a culture where preference is given to the short-term financial manipulation of data. The traditional systems do not make adequate provision for the measurement of non-financial input and results. In rehabilitation and environmental management, however, the assessment of pollution levels and comparison with previous levels, as well as with recommended levels, forms the basis for calculations and for decision making.

Society is becoming more informed and aware of environmental matters and increasingly demands information on environmental damage caused by mining activities as well as on the corrective measures taken. Present public relations officers do not have the right type of information available to communicate to the public and stakeholders, as only a small percentage of the population is conversant with complex tables made up of financial figures.

1.2.5 Purpose of the study

The major purpose of the research is to develop a comprehensive management accounting strategy to be implemented for the rehabilitation of damaged areas after excavations by mining enterprises. Secondary purposes are to design bases for quality rehabilitation management accounting and for decision making that would include identifiable rehabilitation and environmental gains and losses, in both financial and non-financial terms. Decision making as a result of these information structures would reflect changed cultural and behavioural patterns which differ from the traditional ecological views.

1.3 IMPORTANCE OF THE STUDY

There is therefore a need to find and develop a comprehensive management accounting strategy for rehabilitation and environmental management in South Africa. Rehabilitation and environmental management should integrate and acknowledge all elements of the environment which are linked and interrelated. It should take into account the effects of all decisions on all aspects of the natural environment and of the people in that environment. The best practicable ecological option should be selected from the available, relevant information.

This study will increase awareness of the importance of implementing adequate management accounting principles in respect of rehabilitation and environmental management in the mining industry. Both the financial and the non-financial implications of the management of costs and input are considered during all the stages from impact assessment to rehabilitation costs during operations, followed by costs during closure and ending with maintenance expenditure after closure. This awareness of the implications of rehabilitation costs, which includes the identification and classification of environmental costs and the application of both financial and non-financial evaluations, should influence the behaviour of the management team in the direction of developing more appropriate methods for the allocation of these costs.

Since each individual mining company has its own particular rehabilitation and environmental difficulties and problems, adjustments should be made for differing and changing circumstances within the broader guidelines of the framework. Each individual mining site needs a tailor-made comprehensive strategy for the management of

rehabilitation expenditure and inputs. The rehabilitation and environmental management team which includes the management accountant, should be able to prepare an adequate management accounting system based on a holistic approach in order to include all relevant information for decision-making purposes.

The development of formal rehabilitation and environmental policies based on adequate information provided by management accountants would enhance the position of mining companies regarding international recognition. Competition in the international arena has the potential to improve the economic position of the mining company as well as that of the country as a whole.

In principle the costs of pollution should be paid by those responsible for ecological damage, and not by the taxpayer where the original mining company has not made provision for remediation expenditure. Interested and affected groups in the extended enterprise that would benefit by improved rehabilitation management accounting systems include the providers of money, workers, future generations, the natural environment, the state, suppliers, debtors, customers and people living in the communities surrounding mines and in the whole of Africa. For each one of these stakeholders an equilibrium position should be determined in terms of gains and losses. The equilibrium position is one where interested and affected groups would gain by not putting others in a worse position. In accordance with the Bill of Rights of the Constitution (Act 108/96), section 24 (quoted in Environmental Affairs and Tourism 1998:17)

everyone has the right (a) to an environment that is not harmful to their health or well-being;...

The comprehensive contribution of this study is to add quality of life to stakeholders in the form of long-term survival and sustainable living through the protection and rehabilitation of the natural environment. This can be achieved through the utilisation and development of adequate management accounting approaches and strategic management accounting. Strategic management accounting has the dimensions of quality, cost and time and provides information to link daily actions with strategic objectives, involves the extended enterprise, and includes long-term strategies and actions (Ansari, Bell, Klammer & Lawrence 1997c:SMA-6).

This study set out to combine aspects of existing fragmented research on rehabilitation management accounting into a proposed holistic and comprehensive strategy.

1.4 METHODOLOGY AND RESEARCH METHOD

Information for the research in this study was obtained through a comprehensive literature study, as well as by means of empirical investigations.

The literature study examined the economic and financial environment for rehabilitation programmes for worked-out mines or sections of mines. The influence of historical developments on the present situation regarding rehabilitation management and the accompanying management accounting perceptions were investigated. The South African position in comparison with that of the rest of Africa was researched. Possible methods of alleviation the present South African rehabilitation management problems were sought in developed countries through this literature study. Various management accounting approaches and techniques, with total quality environmental management as the basis, were researched in the process to develop a comprehensive rehabilitation and environmental strategy for mining operations.

Empirical information was obtained through visits to mining rehabilitation sites, and by means of questionnaires sent to environmental and rehabilitation managers in the major mining sectors in South Africa. In Chapter 3 the design and methodology of the empirical research are discussed in detail. This acquired information forms the basis for deductions on the present opinions of environmental and rehabilitation managers in the country.

1.5 DELIMITATION OF THE STUDY

The mining industry was selected for this study because of the enormous volume of waste that is generated during mining operations. According to estimates (Institute for International Research (IIR) quoting Engineering News, 1997 Oct. 24-30), 466 million tons of waste are produced in South Africa each year. The mining industry alone is responsible for 377 million tons (81%) of this waste. Of the total of 2 million tons of hazardous waste in the country, the mining industry generates 1,05 million tons (52%).

Although the mining industry creates large-scale employment opportunities and generates

much-needed foreign exchange, it also has to set the example of adequate rehabilitation and environmental management policies to preserve the biophysical environment for future generations.

Within the mining industry the researcher concentrated on the mining of gold, coal, asbestos, chromium, vanadium and iron ore. The excavation and other mining operations associated with these commodities have the potential to cause extensive ecological damage. The mining of other commodities such as diamonds, which also yields large amounts of foreign exchange, directly causes most damage in the form of soil erosion rather than massive pollution to the natural environment. Indirectly, however, the accumulation of people and industries in the vicinities of these diamond mining activities also leads to pollution of the air, soil and water.

Within the broad holistic spectrum, background information is amalgamated with management accounting views and developments to form a comprehensive strategy for rehabilitation management in South Africa. This long-term strategy needs to be adapted according to individual preferences.

1.6 PROGRAMME FOR THE STUDY

Scattered existing research findings on various related issues are combined to form a holistic strategy to be implemented in respect of rehabilitation and environmental management accounting in the mining industry.

This study on management accounting approaches to environmental rehabilitation in the mining sector begins in Chapter 1 with an orientation towards the field of research. The background is supplied and the problem and purpose explained. The methodology, research method and delimitations are outlined. The importance and objectives of the study are emphasised. In addition, a glossary of subject terminology peculiar to this field of study is provided.

Since the local situation in respect of management accounting for rehabilitation management in the mining industry is the most relevant for the purposes of this study, the South African situation is investigated in the next three chapters. In Chapter 2 a historical overview is given because present physical ecological damage, as well as experience,

perceptions (Gouws 1999:17) and attitudes regarding the repair of damage have been inherited from previous generations. Developments during the past 15 years in particular are explored. Environmental disclosure practices are analysed briefly.

In Chapter 3 the method and approach for the empirical study are developed. A questionnaire is designed. (This questionnaire was subsequently sent to all rehabilitation and environmental managers in the gold, coal, asbestos, chromium, vanadium and iron mining industries in South Africa.)

In Chapter 4 the collected opinions are grouped together and statistically analysed. Limitations and problems as well as benefits arising from the empirical study are identified. A list is compiled of items that should be included in a management accounting strategy for rehabilitation management.

Since South Africa plays such a strategic role in Africa, the situation in the rest of Africa is analysed briefly in Chapter 5. The evolution and development of rehabilitation are investigated because these would form the basis for present inherited approaches towards rehabilitation management accounting procedures. In particular, difficulties encountered with rehabilitation are looked at. The positive influences of successful rehabilitation cost management policies are emphasised.

In Chapter 6 rehabilitation management in Canada, the United Kingdom and the United States of America is investigated. In each of these, the most highly developed countries in the world, substantial management accounting contributions have been made towards environmental and rehabilitation management systems, the measuring and reporting of environmental rehabilitation efforts and the role of authorities.

In Chapters 7 and 8 the information from the previous chapters is utilised to design a comprehensive plan for total quality rehabilitation management accounting. In Chapter 7 major and notable factors that influence a strategy for total quality rehabilitation management accounting are investigated. Included in these substrategies are the role of background knowledge and a holistic approach, cost reduction policies, the role of authorities, total quality environmental management, research and development, and ethics. In Chapter 8 the role of management, performance evaluation, reporting, feedback, the improvement of strategies, and the finding of an equilibrium position are analysed in

terms of a strategy for total quality rehabilitation management accounting.

In the final chapter conclusions and recommendations are summarised on the design of a proposed strategy to include the role of background information, a holistic view, cost reduction policies, the role of authorities, total quality environmental management, research and development, education and training, ethics, the role of management, performance evaluation, reporting, feedback, the improvement of strategies and the finding of an equilibrium position.

1.7 GLOSSARY

The following terms and their definitions are given in alphabetical order in the sense in which they are used in this study.

accreditation: the procedure by which an authoritative body formally recognises that another body is competent to carry out specific tasks

balance (balance matrix): a combination of factors compiled to find a balancing position where all the stakeholders from the community, environment and industry would benefit

benchmarking: “The process of investigating and identifying ‘best practices’ and using them as a standard to improve one’s own processes and activities.” (Ansari et al 1997c:SMA-17.)

continuous improvement: “a program to improve the strategic variables of quality, cost or time in small incremental steps on a continuous basis” (Ansari et al 1997b:MMEC-20.)

cross-functional teams: a group of internal and external experts which includes botanists, chemical and civil engineers, actuaries, geologists, hydrologists, and community leaders

ecosystem (natural environment): “a dynamic system of plant, animal and micro-organism communities and their non-living environment interacting in a functional unit” (Act 107/1998:8)

environmental costs: “the costs incurred to control, assess, prevent, and correct failures from actions that potentially have an adverse impact on human, animal, or plant life. It includes pollutants in the air, soil, and water.” (Ansari et al 1997b:MMEC-1.)

environmental impact: an environmental change, or outcome of an action, caused by some human action, whether desirable or undesirable

interested and affected parties: They are individuals or groups concerned with or affected by activities and their consequences. Included are investors, customers, authorities, local communities, the labour force, environmental interest groups, the general public and future generations.

ISO9000: international standards on quality management issued by the International Standards Organisation (ISO)

ISO14000: international standards on environmental management issued by the International Standards Organisation (ISO)

life-cycle cost: "a system that tracks and accumulates the actual costs and revenues attributable to each product from inception to abandonment" (Drury 1996:845)

non-financial indicators: other than financial indicators which are measured in monetary terms only, these include factors such as time, health, safety, pollution levels, technology employed, customer and community satisfaction, quality, behaviour and attitudes

pollution: “any change in the environment caused by substances; radio-active or other waves; or noise, odours, dust or heat, emitted from any activity, ... where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future” (Act 107/98:10)

strategy: “a particular long-term plan for success ... in business” (McLeod & Makins 1993:1163), consisting of both long-term and short-term plans and ways to implement these plans. “The way that an organization positions and differentiates itself from its competitors. Positioning refers to the selection of target customers. Distinctions typically

are made on the dimensions of quality, cost, and time.” (Ansari et al 1997c: SMA-18.)

tailings: finely divided residues that remain after the valuable minerals have been extracted from the ore

true profits: profits are recognised only when none of the stakeholders incur losses from the process of profit generation (refer to Pareto optimum in par 7.9.5)

value-added activity: "an activity that customers perceive as adding usefulness to the product or service" (Drury 1996:517)

[non-value-added activity: "an activity where there is an opportunity for cost reduction without reducing the product's service potential to the customer" (Drury 1996:517)]