

Linkages of Sustainability and Environmental Management Accounting

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1. Background and Purpose:

The aim of this paper is to provoke thought leadership and challenge the implementation of Environmental Management Accounting (EMA) in South Africa as a tool for sustainability by investigating how companies in South Africa account for and manages environmental costs. EMA practice is still in its beginning stages in developing countries, compared to developed countries where research and implementation of EMA has steadily increased over the last two decades, involving universities, industries and governments (Ambe, 2007).

Sustainability is defined as "*forms of progress that meet the needs of the present without compromising the ability of future generations to meet their needs.*" Meeting the needs of the future generation depends on how well interconnected economic, social, and environmental objectives of sustainability, are balanced during current decision-making process. Environmental Management Accounting (EMA) incorporates and integrates two of the three building blocks of sustainability - environment and economics - as they relate to an organization's internal decision-making, and EMA provides the economic rationale for organisational involvement in sustainable development (Burrit, 2004; Schaltegger & Wagner, 2006).

EMA is broadly defined as the identification, collection, analysis, and use of two types of information for internal decision-making:

- physical information on the use, flows, and fates of energy, water, and materials (including wastes) *and*
- monetary information on environment-related costs, earnings, and savings (Jasch, 2008:7).

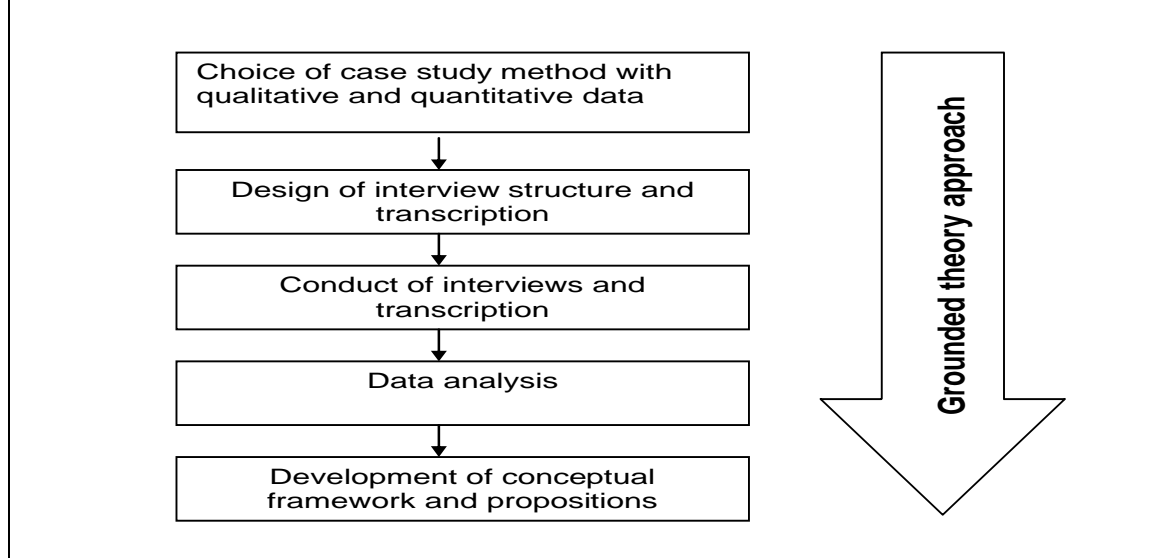
The following research questions were used for this study:

- **Research question 1:** To what extent do South African companies identify, collect and analyse; (i) physical information on the use, flows and destinies of energy, water and materials?
- **Research question 2:** To what extent do South African companies identify, collect and analyse; (ii) monetary information on environment-related costs, earnings and savings?

2. Methodological Framework:

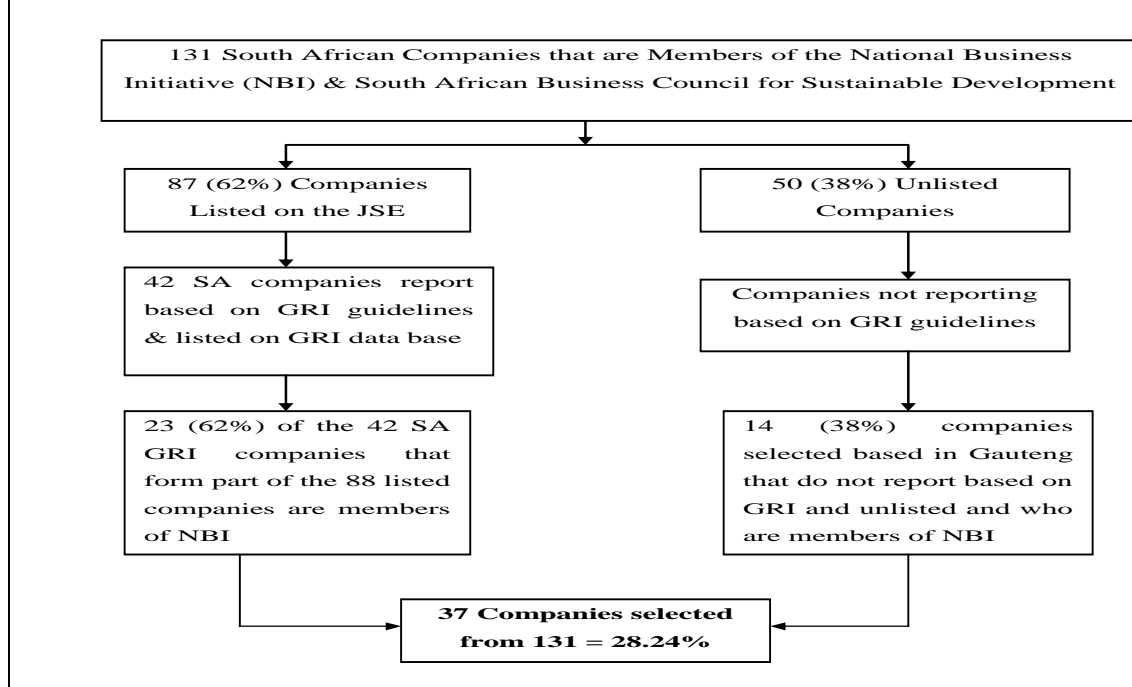
A grounded theory approach employing an exploratory qualitative technique was used for this study. Grounded theory is a qualitative research analysis technique whereby theory is generated from the collected data (Locke, 2001), as illustrated in figure 1.

Figure 1 Overview of research method



Thirty-seven personal interviews were conducted with environmental managers, SHE managers and financial personnel from three industry sectors (mining and petrochemicals; manufacturing and industrial; and services sectors). Interview data was triangulated with an examination of sustainable development (annual reports) and other documentation of the case companies and industry data to validate the findings. The sample for the case study (as depicted in Figure 2 below) was made up by 62% of companies listed in the Johannesburg Securities Exchange (JSE) and producing sustainability reports based on the Global Reporting Initiative (GRI). 38% were composed of companies not listed (on the JSE) and who do not report based on GRI guidelines.

Figure 2: Selection of sample for the case study



3. Findings:

The study demonstrates strong evidence of physical information on environmental management accounting (high to extremely high) as reflected in the summary table 1 below, by companies in the case study. The extent of generation and recording of physical quantities of material and energy input, material flows, products, waste and emissions for internal decision-making are driven by legislative conventions and the drive towards sustainability reporting.

Conversely, monetary information of environmental management accounting detailing environment-related costs, earnings and savings are found to be mixed (low to somewhat high - see Table 2 below). Monetary environmental management accounting (MEMA) especially in the mining and petrochemicals industry is driven by legislative requirements with respect to environmental rehabilitation provision, decommissioning costs, restoration costs and producer environmental trust. While there is some significant evidence of environmental cost being accumulated and recorded, there is little evidence of an established monetary environmental management accounting system.

Table 1: The generation and recording of physical environmental information; where, (1) is extremely low, (2) low, (3) somewhat high, (4) high and (5) extremely high.

	1	2	3	4	5	6	Total	Total %
Raw & Auxiliary Materials	11.1%	8.3%	16.7%	19.4%	44.4%	0%	36	100%
Packaging Materials	13.9%	19.4%	11.1%	30.6%	22.2%	2.8%	36	100%
Merchandise	16.7%	19.4%	19.4%	22.2%	16.7%	5.6%	36	100%
Operating Materials	5.6%	2.8%	36.1%	27.7%	27.7%	0%	36	100%
Water	2.8%	2.8%	16.7%	36.1%	41.7%	0%	36	100%
Energy	0%	2.8%	8.3%	30.6%	58.3%	0%	36	100%
Products	11.1%	11.1%	22.2%	22.2%	33.3%	0%	36	100%
By-products	16.7%	19.4%	30.6%	16.7%	13.9%	2.8%	36	100%
Solid Waste	8.3%	13.9%	36.1%	16.7%	24.3%	0%	36	100%
Hazardous Waste	19.4%	8.3%	33.3%	13.9%	22.2%	2.9%	36	100%
Wastewater	19.4%	8.3%	27.7%	19.5%	22.3%	2.8%	36	100%
Air Emissions	16.7%	19.4%	24.3%	13.9%	22.2%	2.8%	36	100%

Note: One respondent was unsure of the facts of his company on these questions

Table 2: The generation, record and accounting for monetary environmental information; where, (1) is extremely low, (2) low, (3) somewhat high, (4) high and (5) extremely high.

	1	2	3	4	5	6	Total	Total %
Material Costs of Product Outputs	8.1%	21.6%	16.2%	24.3%	24.3%	5.4%	37	100%
Material Costs of Non-Product Outputs	8.1%	35.1%	18.9%	13.5%	18.9%	5.4%	37	100%
Waste & Emission Control Costs	18.9%	24.3%	16.2%	8.1%	24.3%	8.1%	37	100%
Prevention and other Environmental Management Costs	16.2%	27.0%	21.6%	10.8%	21.6%	2.7%	37	100%
Research & Development Costs	16.2%	13.5%	40.5%	8.1%	21.6%	0%	37	100%
Less Tangible Costs	35.1%	21.6%	16.2%	5.4%	16.2%	2.7%	37	100%
Environmental operating expenditures independently of other operating expenditures	13.5%	32.4%	16.2%	10.8%	18.9%	8.1%	37	100%
Environmental capital expenditures tracked independently of capital expenditures	5.4%	35.1%	21.6%	13.5%	13.5%	10.8%	37	100%

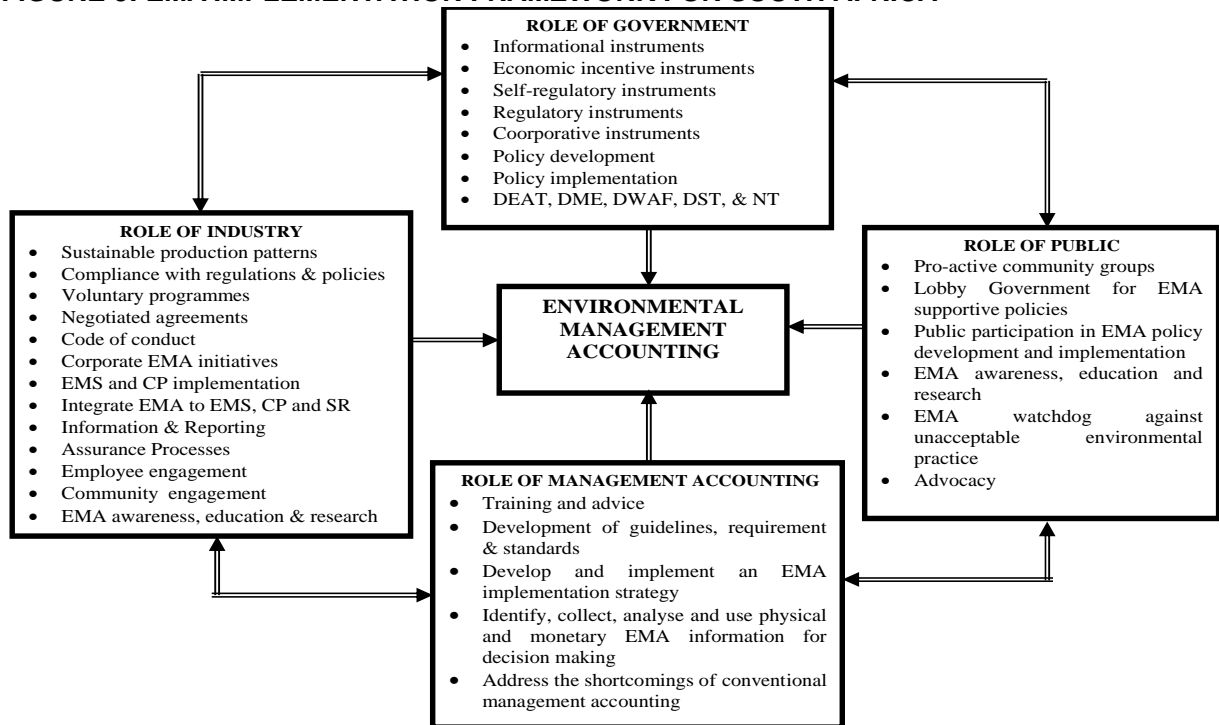
Based on the above findings, Figure 3 presents a conceptual framework for the implementation of environmental management accounting in South Africa to attain sustainability.

The EMA framework is developed around four background framework:

- **Framework 1- Developing vs. developed country:** South Africa has large world class companies with developed country characteristics including environmental impacts that the developing country cannot cope with.
- **Framework 2-Government:** There are various world class environmental legislations and initiatives but with little capacity and resources for enforcement.
- **Framework 3-Industry:** Because of poor enforcement of legislation, companies take the easy way out (such as litigation) for short term gains that undermine sustainable environmental practices.
- **Framework - Public:** Civil society is unaware of environmental or EMA issues and can not advocate against unacceptable environmental practices, and they do not have the resources to buy environmentally friendly products.

The framework depicts that any successful implementation of EMA will require: government, industry, accountants and the public playing important roles. This model provides additional guidelines and action plans for implementation for each of the role players for the implementation of EMA in South Africa. The paper further suggests a greater integration of EMA to other environmental management systems, enforcement of legislations, training and the introduction of tax and other incentives to promote EMA to achieve sustainability.

FIGURE 3: EMA IMPLEMENTATION FRAMEWORK FOR SOUTH AFRICA



4. Conclusion:

Based on the findings in Section 3, the following propositions can be stated in relation to the practice of EMA in South Africa:

- South African companies identify, collect and analyse physical information on the use, flows and destinations of energy, water and materials. However, these may be due to the application of other sustainability management tools, and not from an EMA system.
- The extent of identification, collection and analysis of monetary information on environment-related costs, earnings and savings is mixed (low to somewhat high) with high environmental sensitive industry MEMA being driven by legislative requirements on environmental rehabilitation provision, decommissioning costs, restoration costs and producer's environmental trust.
- A framework for the implementation of environmental management accounting in South Africa will enhance the practice of EMA within an integrated approach with other environmental tools.

While the study included only thirty-seven companies, it consisted of the full population of companies that subscribe to the South African Business Council for Sustainable Development and also reported based on the GRI guidelines, and are sensitive to environmental issues. Therefore, the study, while not generally conclusive on the South Africa situation provides an indication of the direction of the practice of EMA in South Africa and the suggested framework and action plans are applicable and can be adapted by all sectors and industries in South Africa and other developing countries.

The findings of the study increase our understanding of environmental management accounting issues in South Africa and the extent of EMA applications. The conceptual framework for EMA implementation will inform policy pathways for the promotion of EMA and hence sustainability.

When applied correctly, EMA can lead to environmental cost savings, cost avoidance, liability reductions and other significant financial benefits. EMA will produce the most benefits when it is integrated with other environmental management tools. In particular, EMA will increase the advantages that a company may gain through the implementation of environmental management systems (EMS). Linking EMA with cleaner production and environmental reporting will show the financial gain that can be achieved by applying these tools, since contingent liabilities represent major environmental, business and financial risks for companies. EMA is also excellent for supplementing risk management programmes.

Corporate sustainability requires responsible management decisions and action (CSR), Management decisions supporting corporate sustainability require good a information basis (including relevant environmental and social information).The company's central information system is accounting (management accounting). The core question is: What kind of information does management need to improve corporate sustainability?

5. References

Ambe, CM. (2007). *Perspective of Environmental Management Accounting in South Africa. Southern African Journal of Accountability and Auditing (SAJAAR)*, vol. 7, pp. 59-66

Burritt, LR. (2004). Environmental Management Accounting: Roadblocks on the way to the Green and Pleasant Land. *Business Strategy and the Environment*. vol. 13 pp 13-32.

Jacsh, C. (2008). *Environmental and Material Flow Cost Accounting: Principles and Procedures*. The Netherlands, Springer.

Locke, K. (2001). *Grounded Theory in Management Research*, SAGE Publications, London, Thousand Oaks, New Delhi.

Schaltegger S, and Wagner M. (2006). Integrative management of sustainability performance, measurement and reporting. *International Journal of Auditing and Performance Evaluation*. vol. 3, No. 1, pp1-19.

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