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Analyzing external environmental costs reporting in platinum mining companies

Abstract

The purpose of the study is to determine the extent to which environmental costs are currently disclosed in the voluntary corporate social responsibility reports and the compulsory financial statements of platinum mining companies listed on the Johannesburg Stock Exchange (JSE) of South Africa. A case study protocol is firstly followed at a single mine to determine the different environmental costs applicable to platinum mining companies. Thereafter, all the JSE-listed platinum mining companies (11) are included as a sample where the published annual reports (financial statements, notes to the financial statements and corporate social responsibility reports/sustainability reports) of the companies are reviewed and coded to confirm whether they report on environmental costs. The study finds that the mining companies are currently only semi-compliant with all of the required measurable items with regard to voluntary and compulsory disclosures. The study extends the body of knowledge by indicating where refinements are needed in guidelines and standards that focus on environmental costs and the reporting thereof in published annual reports.

Keywords: corporate social reporting initiatives, environmental costs, external reporting, International Accounting Standards, platinum mine, South Africa.

JEL Classification: M48, Q56.

Introduction

This article forms part of a greater research project regarding the measuring and reporting of environmental costs of the platinum mining industry in South Africa. The project includes a case study investigating the measuring and *internal* reporting of environmental costs at a Johannesburg Stock Exchange (JSE)-listed platinum mine. This part of the study focuses on the *external* environmental cost reporting by South African JSE-listed platinum mining companies. The importance of the study is that shareholders and other stakeholders are increasingly demanding reliable environmental disclosures as part of the company's annual reports. From previous studies, it is evident that mining companies and their shareholders value the information reported on sustainability issues (Raar, 2002; Hubbard, 2009). For these disclosures to be reliable, they need to be obligatory and regulated either by legislation or by accounting standards. This will require current regulators to change their standing on environmental reporting (De Villiers and Van Staden, 2011; Kolk, 2008) and to set certain standards to meet compliance – especially the accounting standards (compliance with International Financial Reporting Standards (IFRS) and International Accounting Standards (IAS is obligatory for companies listed on the JSE).

For an informed decision to be made on investing activities, a potential shareholder should have data

readily available relating to the company's environmental activities and costs. For this reason, the corporate social responsibility (CSR) reports have to include the environmental aspects of the company. This report is published as part of the annual financial statements (Institute of Directors (KING III), 2009) as an integrated report. Integrated reporting entails more than merely stating that a company has considered the environmental and social implications of the organization and should therefore be able to link sustainable performance and economic performance (Institute of Directors (KING III), 2009; Montalván and Chang, 2006). This is currently being done through the application of the sustainability reporting framework as developed by the Global Reporting Initiative (GRI). The framework assists stakeholders and possible future investors in assessing the quality of the integrated report published through the rating of the content of the report (GRI, 2013). This rating allows investors to compare various companies' performances in relation to corporate social responsibility through the setting of guidelines for reporting. These guidelines represent internal and external stakeholder accountability and their goals to achieve sustainable development (Du Toit and Buys, 2013).

Corporate social responsibility initiatives such as King III (Institute of Directors, 2009), the Global Reporting Initiative (GRI, 2013), International Federation of Accountants (IFAC, 2005), International Organization for Standardization, Environmental management – ISO 14000 (ISO, 2009) and International Organization for Standardization, social responsibility – ISO 26000 (ISO, 2010) all encourage companies to adhere to the guidelines set out in their publications. The problem is that currently this is

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not the case as completeness, transparency (Mau-bane et al., 2014) and environmental cost information is lacking most of the time (Jasch, 2009). The consequence of this is failure to recognize the economic value of natural resources, material and energy efficiency improvements as well as the financial value of good environmental performance (Jasch, 2009). Therefore, despite these initiatives, this study questions the significance of reporting on environmental costs in the financial statements as part of triple bottom line reporting. Triple bottom line reporting (a company's success measures based on economic, social and environmental performance (Gray and Milne, 2002)) is widely discussed and criticized as not adding any value to the company or its shareholders (Norman and MacDonald, 2004), while there is enough research to prove the opposite (Raar, 2002; Hacking and Guthrie, 2008; Buys et al., 2009).

There needs to be a link between the corporate social responsibility initiatives and the accounting standards to allow the monetary reporting of environmental costs to be standardized. This will allow the comparability of information and will force companies to disclose important environmental information to the stakeholders in a format that they are already comfortable with.

The purpose of the study is to determine the extent to which environmental costs are currently disclosed in (1) the corporate social responsibility reports and (2) the financial statements, according to the International Accounting Standards, of platinum mining companies. To fulfil this purpose, a literature study is firstly conducted to explain the relevance and the conceptual scope against which the empirical results are measured; this is followed by a literature study on the reporting of environmental costs. Secondly, a case study protocol was followed at a single mine to determine the different environmental costs applicable to platinum mining companies. Finally, with the case study results available, all the JSE-listed platinum mining companies (11) are included as a sample in this study where the published annual reports (financial statements, notes to the financial statements and corporate social responsibility reports/sustainability reports) of the companies for 2013 were reviewed and coded to confirm whether they report on environmental costs and, if so, a content analysis was done to determine the extent to which these platinum mines report on environmental costs.

1. Literature review

1.1. Relevance of the study. Mining is considered a major source of income for economies such as South Africa – it ensures employment and encourages transactions between supplier and buyer, thereby stimulating economic growth (Chamber of Mines

(South Africa), 2011). In South Africa, mines are still owned by the private sector, which ensures growth opportunities and competitive advantages internationally. To preserve this economic source of power, mines in South Africa need to extend their current lifespans in order to sustain profitability for a longer period of time. Improved mining practices will contribute to sustainable mining. 'Going green' involves more than implementing recycling projects and industries working late at night to disguise toxic fumes released from their towering chimneys. It is becoming increasingly important for investors to ensure that the environmental footsteps that are left behind by mining activities will provide the opportunity for future generations to still benefit from mining (Schaltegger and Figge, 2000). Therefore, the financial and non-financial aspects, which have an interdependent relationship, indicate to stakeholders that a company has the ability to create and sustain value (Hindley, 2012).

The White Paper on Environmental Management Policy for South Africa (SA, 1998), published in the Government Gazette on 15 May 1998, has set out some goals in relation to environmental costs. In order for the government to reach their goals, industry needs to support the same values and should strive to realise the same goals. Platinum Group Metals (PGM) mining in South Africa possesses over 80 percent of the world's Platinum Group Metals reserves. Mining in total accounts for 20 percent of South Africa's gross domestic product (GDP), of which the biggest contributors are gold and platinum mining (Projects IQ, 2011). Considering these facts, platinum and gold mines especially need to adhere to these goals in order for the government to ensure the full accomplishment of the goals set out above.

1.2. Conceptual scope. In order to measure the extent of environmental cost reporting within the mining companies, a comparison is done between the application of corporate social reporting initiatives and the compliance to the mandatory requirements as set out in the International Accounting Standards.

(1) Corporate social reporting initiatives

As mentioned, the guidelines for reporting environmental costs and activities are provided by initiatives such as ISO 14000, ISO 26000, King III, GRI and IFAC. These guidelines are used in this study to determine the extent to which the sample companies adhere to these guidelines. In other words, these guidelines form the conceptual scope against which the findings regarding the sample companies are compared. Therefore, these initiatives should be explained to indicate how they can support environmental issues.

The new legislation, Directive 2014/95/EU, published by the European Union enforces certain large companies, within the member countries of the EU, to report on non-financial and diversity information as from 2017. This legislation will address the current issues experienced in Corporate Social Reporting with set guidelines on what to report and how to compile these reports (guidelines will only be available in 2016), to ensure that the information reported on is comparable and meets the needs of investors, other stakeholders and the public (Directive 2014/95/EU).

The Sustainability Accounting Standards Board (SASB) was founded in order to provide sustainability accounting standards for use by listed companies in the United States. The standards were designed to assist listed companies to adhere to mandatory disclosures required by the Securities and Exchange Commission (SEC). The provisional standard for the mining and metals industry, Sustainability Industry Clarification System (SICS) #NR0302 published in June 2014, guides mining companies to adhere to all aspects with regard to sustainable accounting. The scope of the standard in relation to environmental aspects includes guidance on greenhouse gas emissions, air quality, energy management, water management, waste and hazardous materials management and biodiversity impacts. The accounting required on the topics covered should only include measurements on the quantitative values as well as discussions and analyses of the topic. This standard assists in detail physical accounting, but does not provide guidelines on the recognition of the monetary accounting that accompanies these items. The guidelines set by the SASB were not used in the evaluation of reporting on environmental costs as the guidelines were only published in 2014 and the information used was based up to 2013. It is, however, necessary to be aware of this new development as this can improve the reporting of environmental costs through standardization.

The International Organization for Standardization has developed several standards that address key issues within a company. There are especially two standards that we need to consider for this study: ISO 26000, which refers to sustainability issues and the online ISO 14000 range, which addresses all the environmental issues. These two standards address the manner in which a company should address certain key issues and does not only focus on reporting alone – it is also the manner in which the day-to-day business should be conducted within a company (ISO, 2009; ISO, 2010). These guidelines are extremely helpful to understand how a company can adjust and improve its environmental footprint as well as its sustainability standing; however, it does not guide the company on any form of monetary accounting that should be included in order to achieve this.

The KING III (Institute of Directors, 2009) report was published in order to address corporate governance issues. Some of the key issues that the report addresses include guidance on: effective leadership; sustainability as a primary moral and economic imperative; transition to sustainability through innovation, fairness and collaboration; and social transformation. The report specifically requires companies to focus their annual integrated report on the impact it has on three areas – economic, environmental and social. The problem, however, is that this guidance document can be applied through the discretion of the company board of directors. If they do not apply the framework and adopt a different practice, they need to explain why and they would still be consistent with the principles of KING III. The framework is therefore principle-based, which means a company is encouraged to tailor the principles of the code as appropriate. This leaves a great deal for comparative reporting with regard to governance issues such as sustainability and environmental impacts.

The GRI guidelines are only recommendations that a company can use to report on environmental issues, but these can improve the quality of reports published (Ambe, 2007), thereby addressing the growing need for shareholder information requirements. Various stock exchanges around the world require that corporate social responsibility reports be included in their financial statements that are published each term and, with the Kyoto Protocol as discussed during COP 17 (UNCCC, 2011) in Durban, companies will have to adhere to the stricter application of environmental policies. Thousands of companies are compiling their own corporate social responsibility reports using the Global Reporting Initiative's framework (Corporate-Register.com, 2012). However, these reports do take on various forms. The reason for this is two-fold: one being the fact that various and differing industries and sectors have different impacts on the environment and society and, therefore, need to address these different issues in their reports; and the second being the lack of available standards with which to measure these reports, because the Global Reporting Initiative is only a guideline (Hindley, 2012). A study done by Hindley and Buys (2012) concluded that the majority of the South African mining industry only reports on positive non-financial performances, the reason for this being the lack of a clear indication of what is considered to be acceptable reasons for non-disclosure.

The Global Reporting Initiative promotes the use of sustainable reporting in assisting companies globally to become more sustainable and contributes to sustainable development. They have created sustainability reporting guidelines (GRI, 2013) that are internationally used by companies from various

sectors. These guidelines assist companies to be more transparent in their reporting to shareholders and allow them to take accountability for their actions. The sustainability reporting guidelines include economic, environmental and social aspects. Companies can use these guidelines as part of their strategic planning and especially when considering sensitive issues such as social and environmental aspects.

The sustainability reporting guidelines (GRI, 2013) have created several performance indicators, of which G4 is the latest version, published in May 2013, which companies can implement in order to assist them in compiling their sustainability reports. The environmental dimension of sustainability (which is important for this study) includes a company's impact on living and non-living natural systems, including land, air, water and ecosystems. This category includes inputs (material, energy and water) and outputs (emissions, effluents and waste). It also includes biodiversity, transport and product- and service-related impacts as well as environmental compliance and expenditures. These guidelines, however, only assist companies in reporting on actual usages in environmental aspects, but do not guide companies on how to report on these aspects in *monetary* terms.

The International Federation of Accountants is an organization that develops high quality standards and guidance to ensure high quality accounting practices around the world. They promote and enforce internationally recognised standards by supporting independent standard-setting boards, which include: International Auditing and Assurance Standards Board, International Accounting Education Standards Board, International Ethics Standards Board for Accountants and the International Public Sector Accounting Standards Board. As the need for reporting on environmental issues increased, the International Federation of Accountants compiled an international guidance document, Environmental Management Accounting (IFAC, 2005). This document is not a standard with defined requirements, but rather fills the gap currently left between regulatory requirements, standards and pure information that relates to environmental issues.

The International Federation of Accountants document on Environmental Management Accounting promotes the reporting of physical and monetary values with regard to environmental aspects. Currently, mostly data relating to rehabilitation costs are reported (as provisions under International Accounting Standards (IAS) 37 regulation). Further investigation will determine where and whether other environmental costs are recorded and reported on in cost

terms. The Environmental Management Accounting workbook (Japan MOE, 2002) identifies several methods with which the value of environmental costs can be calculated, where each method mentioned refers to a different scope in the business process. This allows for the supposition that more than one method of measurement can be applied throughout the whole business process.

(2) *International Accounting Standards*

The International Accounting Standard Committee (IASC) was first founded in 1973, from where the International Accounting Standards (IAS) were developed. The IASC was replaced with the International Accounting Standards Board in 2001; all the standards developed after this date are referred to as the International Financial Reporting Standards (IFRS). IAS and IFRS together form the base of the accounting standards followed internationally (ICAEW, 2015).

Examining IFRS from an environmental perspective indicates that the conceptual framework and a few of the standards provide grounds for measuring and monitoring environmental assets, liabilities and expenditures. The standards and interpretations relate to environmental and resource accounting and were researched in a study by Negash (2009), which investigated the relationship between IFRS and environmental accounting that indicated that the International Accounting Standards Board (IASB) already has a base on which environmental costs can be reported on a corporate level. Negash (2009) concluded her study by proposing a separate statement on Environmental Assets and Liabilities. The proposed statement for Environmental Assets and Liabilities was constructed with the use of IFRS; however, it still does not allow for any day-to-day reporting of costs applicable to the environment. These costs have a large impact on a company's profit margins (Castro and Chousa, 2006) and should be included as part of the statement of comprehensive income. A study done by Barbu et al. (2011) indicated that there are certain accounting standards (IAS and IFRS) that require the reporting of environmental costs. From these accounting standards, further research was conducted in order to identify the specific accounting standards that are applicable to the platinum mining industry. These standards identified will be used in the content analysis and coding of the published annual reports of the eleven platinum mines listed on the JSE.

When the corporate social reporting initiatives are adhered to in monetary reporting requirements, it will also allow companies to adhere to the International Accounting Standards more accurately in this regard.

1.3. Reporting of environmental costs. Environmental reporting awards a sense of visibility to a company's environmental activities and impacts (Milne and Gray, 2007). On the other hand, the danger of corporate environmental reporting lies therein that some companies will want to use this type of reporting as a method of constructing a new image for stakeholders and prospective investors (Hopwood, 2009). In doing so, a company creates a new face while shielding internal activities from the rest of the business world (Hopwood, 2009), resulting in a positivistic type of reporting that neglects looking at negative environmental impacts.

Bartelmus (2007) notes that the System for Integrated Environmental and Economic Accounting (SEEA), which was revised in 2003, only elaborates on physical and hybrid environmental-economic accounting and detail valuation methods for natural resources. Monetary valuation of environmental impacts, on the other hand, is rejected (UN, 2003). Consequently, the System for Integrated Environmental and Economic Accounting does not fully meet its objective of assessing sustainable development (Bartelmus, 2007). Physical accounting only allows warning signals to be sent with regard to sustainability, but it does not attempt to measure ecological sustainability (UN, 2003; Bartelmus, 2007). The environment needs to be given a voice through the language of business, which entails accounting information (Reyes, 2002).

Reyes (2002) distinguishes environmental reporting within three contexts, of which each has a different approach to the reporting of environmental costs:

- ◆ Environmental accounting within the context of financial accounting.
 - This context includes information regarding the cost impacts of environmental performance (liabilities, contingencies, impairment of assets and intangibles), which is reported in the financial statements (external reporting).
- ◆ Environmental accounting within the context of management accounting.
 - This context entails the use of environmental cost and savings in order to improve internal decision-making (internal reporting).
- ◆ Environmental accounting within the context of auditing.
 - This context involves the assessment of a company's adherence to IFRS and other general accepted accountancy practice (GAAP) issues in relation to environmental matters that can affect the financial statements (external reporting).

A study conducted by Castro and Chousa (2006) concludes that many companies report on environ-

mental issues, but that very few include information on the financial impacts of their sustainability performance. This is a great hurdle in the process of integrating the management of sustainability into the decision-making of a company and its investors (Castro and Chousa, 2006). The study further indicates that there is value in analyzing a company's environmental and social performance in relation to its financial performance. In using SustainAbility (2001) and Rappaport's model for shareholder added value, Castro and Chousa (2006) found it evident that the link between environmental management and the company's ability to create value has the ability to measure sustainability using financial ratios.

Various guidelines (IFAC, 2005; Institute of Directors, 2009; ISO, 2009; ISO, 2010; GRI, 2013) and regulations (country-specific due to the difference in jurisdiction areas) focus their attention on environmental impact reporting, but only guide the users on physical or non-financial reporting of data (Herzig and Schaltegger, 2006). Therefore, a link should be drawn between environmental reporting and financial reporting. In order to achieve this, a strategy-focused design for sustainability performance management requires an overall change in the traditional accounting systems applied in order to accommodate environmental issues and their financial impacts (Herzig and Schaltegger, 2006; Burritt, 2005). From the literature, it is evident that many additional measures need to be taken before the full reporting of environmental impacts (physical and monetary) will be possible and that more standardized accounting and reporting procedures are needed (Bennett and James, 1998; GRI, 2013).

Environmental accounting and reporting are necessary in order to meet the requirements of a company with regard to environmental dangers, corporate responsibility, the relationship between the industry and the environment, the measurement of the impact on the environment and the disclosure and reporting of these impacts. Currently, the accounting applied by mining companies can be considered to be inadequate – there is currently wealth of academic research on how to improve accounting systems through the inclusion of environmental aspects; however, very little studies have been conducted on the success of implementing environmental accounting, specifically environmental management accounting. The main reason for this is the fact that conventional accounting is based on a capitalist view – and modern capitalist accounting has a limited worldview where companies only aim to achieve as much profit from their activities as possible even at the expense of the environment (Mauders and Burritt, 1991). This is a very dangerous viewpoint for

the mining industry as this industry needs to create a sustainable environment to ensure that future generations can use the land and ensure that the biodiversity of the area is protected.

To summarize the literature discussion, the open question is to what extent are platinum mines currently reporting on environmental costs in their published annual reports.

2. Method: case study and analyses

2.1. Case study. In order to determine whether there are environmental costs applicable to platinum mining, as well as the type of environmental costs, an explanatory and exploratory case study was done at a case study principal. This case study concluded that there are various environmental costs applicable to platinum mining and that most of them are measured, but that they were not reported on correctly in their internal reports. These costs were usually hidden within an overheads account and were not correctly allocated to an environmental line item (Du Plessis, 2013).

2.2. Content analysis and coding. The case study proved that environmental costs are applicable to platinum mines and that they are measured, but not reported on correctly internally. The knowledge revealed from the case study was helpful to form a basis to focus on a cross-case analysis of all eleven platinum mines listed on the JSE to determine the extent of *external reporting* of environmental costs currently applied by platinum mines in South Africa.

Using the information obtained from the studies of Negash (2009), Barbu et al. (2011) and the study of the current internal reporting of environmental costs at a platinum mine (Du Plessis, 2013), Table 1 (p.14) was developed as a framework for the content analysis and coding of the platinum mine's performance.

The cross-case analysis focused on the external reports available to the public with regard to the company's annual financial statements as well as its

sustainability reports for the 2013 financial year. A content analysis was done on its published annual reports. The content analysis included a word search as well as a full examination on how the financial statements were compiled focussing on the guidelines used to report on CSR issues as well as the actual reporting of the environmental aspect of CSR using the conceptual scope as a guideline for coding in order to identify their current external reporting compliance based on the identifiable data.

2.3. Gap analysis. The coding of environmental cost reporting will indicate the current gap in the reporting of environmental costs in relation to the corporate social reporting initiatives and the International Accounting Standards. The gap identified will allow mining companies to focus their attention on problem areas within their current reporting, which will, in turn, assist them to improve their compliance with both the corporate social reporting initiatives and the International Accounting Standards.

3. Findings

3.1. Reporting of environmental costs – cross-case analysis. The purpose of the cross-case analysis done in Table 1 is to assist in generalizing the findings of the case study principal and articulating them to theory. The external reports (financial statements, notes to the financial statements and sustainability reports) were reviewed so as to confirm whether the eleven platinum mines listed on the JSE do report on environmental costs. The financial statements and sustainability reports from these platinum mines were downloaded from the companies' official websites in order to establish whether reporting on environmental costs within the financial statements is available or lacking. Only ten platinum mines were used as one mine had no audited financial results or sustainability reports available for the 2013 financial year.

Table 1. Results of content analysis and coding of external reporting of environmental costs at platinum mines (own research)

Item	Identifiable in financial statements	2013 annual reports (published)		
		IAS/IFRS applicable	Monetary information	Descriptive information
	Corporate social responsibility			
	IFAC – guidance document on Environmental Management Accounting			
	Cost categories:			
1	IFAC – energy and water	N/A	1	7
2	IFAC – waste and emission control costs	N/A	0	7
3	IFAC – prevention and other management costs	N/A	1	3
4	IFAC – research and development costs	N/A	0	4
5	IFAC – environmental revenues	N/A	0	0
6	ISO 14000 certification	N/A	N/A	5
7	ISO 26000 certification	N/A	N/A	0
8	KING III	N/A	N/A	7

Table 1 (cont.). Results of content analysis and coding of external reporting of environmental costs at platinum mines (own research)

Item	Identifiable in financial statements	2013 annual reports (published)		
		IAS/ IFRS applicable	Monetary information	Descriptive information
	Corporate social responsibility			
9	GRI	N/A	N/A	5
	International Accounting Standards			
10	Intangible assets with exploration of mineral resources	IFRS 6, IAS 36	4	N/A
11	Emission rights assets	IAS 38, IAS 36, IFRIC 3	0	N/A
12	Emission rights governmental grant	IAS 20, IFRIC 3	0	N/A
13	Tangible assets with exploration of mineral resources	IFRS 6, IAS 36	6	N/A
14	Inventories (waste)	IAS 2	0	N/A
15	Environmental provisions and liabilities (provision for dismantling, removal of assets and the site restoration, provision for CO ₂ emissions, provision for insurance, environmental litigates, etc.)	IAS 37, IFRIC 5, IFRIC 1, IFRIC 3 (withdrawn)	9	N/A
16	Fines and taxes for environmental purposes	IAS 37	6	N/A
17	Other environmental expenses/revenues	IAS 8, IAS 38, IFRS 6	5	N/A

The coding was done through a manual process of review and content analysis. Each item was tagged according to the item number from the coding tables and the results were recorded. The totals of all the codes were added together. A maximum of ten (number of companies) could be awarded for each item number. All the coding tables were added together and summarized in Table 1. The table clearly indicates the lack of compliance with regard to monetary reporting on environmental costs both with regard to the corporate social reporting initiatives and the International Accounting Standards. Companies have moderately reported on environmental issues within their corporate social reports. Most of the mining companies reported on their environmental liabilities with regard to rehabilitation expenses, but only a few companies reported on the other aspects required by the International Accounting Standards and none reported on emission rights assets, emission rights, governmental grants and inventories (waste). During the case study performed, it was clear that these costs do exist in the platinum mining sector, but it is, however, not identifiable within their published annual reports.

3.2. Data quality check. The quality check table was used to ensure that all the validity tests have been conducted and that the research is viable. Multiple sources of evidence and a chain of events were established with which to construct validity. Pattern matching was not done during this case study, but in order to create internal validity, explanation building and logic models have been used in the first part of the study. External validity was ensured by a review of the literature underlying environmental management accounting. In using a case study protocol and a database along with all the

collected data, the reliability of the study’s findings is ensured. Table 2 indicates the data quality checks performed throughout the research to ensure the validity of the research results.

Table 2. Data quality of case study check based on the research done by Yin (2009, p. 41)

Tests	Case study tactic	Done
Construct validity	Use multiple sources of evidence	✓
	Establish chain of events	✓
	Have key informants review draft case study report	✓
Internal validity	Do pattern matching	✓
	Do explanation building	✓
	Address rival explanations	✓
	Use logic models	✓
External validity	Use theory in single-case studies	✓
	Use replication in multiple-case studies	✓
Reliability	Use case study protocol	✓
	Develop case study database	✓

3.3. Reporting of environmental costs. In this section, the findings on where environmental costs are reported on in platinum mining companies’ integrated reports are presented. From Table 1, it can be clearly seen that the monetary reporting on environmental costs is focused on rehabilitation cost. Some platinum mines reported on tangible assets with the exploration of mineral resources, but fewer on the intangible assets with the exploration of mineral resources. It can also be seen that six of the ten reported on environmental fines and taxes and only five reported on other environmental costs. The main reason why most platinum mining companies’ environmental aspects are included in the integrated reports is because the Global Reporting Initiative

and KING III strongly advise companies to apply corporate social responsibility; however, only physical quantities are reported on. The main reason for this lies in the fact that platinum mines currently do not account for environmental cost as a separate cost element within their accounting systems, making the reporting of these costs extremely difficult.

Discussion

It is important to measure and report on environmental costs in the mining industry so as to create a sustainable environment. It was found that platinum mines currently measure most of the environmental costs, but that these costs are absorbed into the utilities and overhead accounts (Du Plessis, 2013). These costs need to be identifiable in order to assist management in improving environmental impact assessments and measuring the value of these impacts. If the impacts can be measured in monetary terms, they will direct internal decision-making and add value to the decision-making process through the identification of areas that need to be improved. The study recommends that a framework be constructed to assist mining companies in measuring and reporting on environmental costs externally.

From the results obtained in the content analysis and coding of the published annual reports of platinum mines listed on the JSE (Table 1), it is clear that not all the reporting requirements are fully met – those that are voluntary as well as the compulsory accounting standards. Table 3 summarizes the current measurement and reporting of environmental costs at a platinum mine, which was identified by means of a case study as well as a cross-case analysis. The variance between the ideal and current situations will be considered as the gap experienced in the mining sector. Further investigation is required to determine exactly how the gap can be filled.

Table 3. GAP analysis of the measurement and reporting of environmental cost at platinum mines (own research)

	Corporate social responsibility			Accounting standards	
	External requirements for the measurement and reporting of environmental costs	ISO			IFRS
GRI					
IFAC					
KING III					
		Physical units	Monetary units		
Components	Environmental				

Notes:




Key	
Compliant	
Semi-compliant	
Non-compliant	

Table 3 was constructed with the use of content analysis and coding done to establish the average degree of compliance pertaining to various reporting guidelines, including ISO, GRI, IFAC, KING III and IFRS. The gap analysis, as seen in Table 1, which summarizes the results of the findings, concludes that the average platinum mine did not fully comply with any of these guidelines (most of the platinum mines – seven out of ten – complied with the KING III guidelines, but this is still not ten out of ten) as well as the accounting standards (IFRS) with regard to environmental costs. Most companies complied with the IAS 37 standard that refers to the rehabilitation liability that should be provided for (nine out of ten), but for the rest of the required standards, very few adhered to the reporting requirement.

Conclusion

The purpose of this study was to determine the extent to which platinum mining companies report on environmental issues in their published annual reports. There is an increasing emphasis on sustainability and, even in the mining sector, stakeholders want to observe that the companies involved are considering the environment as well as the sustainability of the industry for future generations. In order to fulfil the purpose of the study, case study research on the reporting of environmental costs at a platinum mine was used as a base, with the addition of a content analysis and coding of all platinum mines listed on the JSE. This method allowed for the specific identification of environmental aspects that are applicable to platinum mining and to narrow down the accounting standards that should be complied with. It also provided a platform to identify how many platinum mines actually comply with the reporting of the required information.

The main finding of this study answered the question of whether platinum mines do sufficiently report externally on their environmental aspects and revealed new knowledge on the compliance with corporate social reporting initiatives as well as accounting standards. Platinum mines are currently only semi-compliant with all of the required measurables with regard to voluntary and compulsory disclosures.

Currently, there are very few studies that focus on the actual reporting of environmental costs; this makes this study unique. There are, however, certain limitations that need to be considered and these include: (1) this study was only conducted on platinum mines within the South African region; (2) there are only three major platinum mines within this selection; the rest of the mines are relatively small.

The study contributed to the current knowledge gap that exists regarding the measurement of actual external reporting of environmental costs within the platinum mining industry. This gap can be used to assist in refining guidelines and standards to focus specifically on environmental costs and the reporting thereof in published annual reports. This, in turn, will assist financial departments to understand what needs to be reported and how it should be reported in terms of environmental costs. Reporting of these environmental costs as a separate line item

will allow management to identify problem areas within the current costing or production system, which may, in turn, improve profitability. Additional reporting of environmental costs will assist towards triple bottom line reporting. Stakeholders will be able to assess the efficiency of sustainable mining with regard to environmental issues pertaining to company outputs, but specific accounting standards should be introduced with regard to environmental costs, especially in environmentally sensitive industries.

References

1. Ambe, C. (2007). *Environmental management accounting in South Africa: Status, challenges and implementation framework*, Pretoria: Tshwane University of Technology (Thesis, D.Tech.).
2. Barbu, E., Dumontier, P., Feleaga, N. and Feleaga, L. (2011). Mandatory environmental disclosures by companies complying with IAS/IFRS: The case of France, Germany and the UK, available at: <https://halshs.archives-ouvertes.fr/halshs-00658734/document> (accessed, August 20, 2014).
3. Bartelmus, P. (2007). SEEA-2003: Accounting for sustainable development? *Ecological Economics*, Vol. 61, pp. 613-616.
4. Bennett, M. and James, P. (1998). *Environment under the spotlight – Current practice and future trends in environment-related performance measurement for business*, London: Association of Chartered Certified Accountants (ACCA).
5. Buys, P.W., Van Rooyen, S. and Bosman, P. (2009). Do socially conscious companies provide better financial performance? An exploratory study, *Studia Universitatis Babeş-Bolyai Oeconomica*, Vol. 54, No. 1, pp. 3-15.
6. Castro, N.R. and Chousa, J.P. (2006). An Integrated Framework for the Financial Analysis of Sustainability, *Business Strategy and the Environment*, Vol. 5, pp. 322-333.
7. Chamber of Mines (South Africa). (2011). *Facts and figures – 2010/2011*. Available at: http://www.bullion.org.za/Publications/Facts&Figures2010/F%20&%20F%202011_Final.pdf (accessed August 16, 2012).
8. CorporateRegister.com. (2012). *Corporate responsibility reports*. Available at: <http://www.corporateregister.com> (accessed August 17, 2012).
9. Du Plessis, A. (2013). *A framework for the measurement and reporting of environmental costs at a platinum mine*, Potchefstroom: North-West University (Mini-dissertation, M.Com.).
10. Du Toit, M. and Buys, P.W. (2013). An evaluation of the co-operative business model within the context of the Global Reporting Initiative, *International Business and Economics Research Journal*, Vol. 12, No. 12, pp. 179-192.
11. De Villiers, C. and Van Staden, C. (2011). Shareholder requirements for Compulsory Environmental information in Annual reports and websites, *Australian Accounting Review*, Vol. 59, No. 21, pp. 317-326.
12. Gray, R. and Milne, M. (2002). Sustainability reporting: Who's kidding whom? *Chartered Accountants Journal of New Zealand*, Vol. 81, No. 6, pp. 66-70.
13. GRI (Global Reporting Initiatives) (2013). *Version 4: Sustainable reporting guidelines*. Amsterdam. Available at: <http://www.globalreporting.org> (accessed November 15, 2013).
14. Hacking, T. and Guthrie, P. (2008). A framework for clarifying the meaning of Triple bottom line, Integrated, and Sustainability assessment, *Environmental Impact Assessment Review*, Vol. 28, No. 2-3, pp. 73-89.
15. Herzig, C. and Schaltegger, S. (2006). Corporate Sustainability Reporting: An Overview, In *Sustainability Accounting and Reporting*, Schaltegger, S., Bennett, M. and Burritt, R. (eds.), Delft: Springer.
16. Hindley, A.T. (2012). *Integrated reporting compliance with the Global Reporting Initiative framework: An analysis of the South African mining industry*, Potchefstroom: North-West University (Mini-dissertation, M.Com.).
17. Hindley, A.T. and Buys, P.W. (2012). Integrated Reporting Compliance With The Global Reporting Initiative Framework: An Analysis of The South African Mining Industry, *International Business and Economics Research Journal*, Vol. 11, No. 11, pp. 1249-1260.
18. Hopwood, A.G. (2009). Accounting and the environment, *Accounting, Organisations and Society*, Vol. 34, pp. 433-439.
19. Hubbard, G. (2009). Measuring Organisational performance: Beyond the triple bottom line, *Business strategy and the environment*, Vol. 19, pp. 177-191.
20. ICAEW (Institute of Chartered Accountants in England and Wales) (2015). *Knowledge guide to international accounting standards*. Available at: <http://www.icaew.com/en/library/subject-gateways/accounting-standards/knowledge-guide-to-international-accounting-standards> (accessed April 22, 2015).
21. IFAC (2005). *Environmental management accounting: International guidance document*. IFAC: USA.
22. Institute of Directors. (2009). *KING III: Code of governance for South Africa 2009*. Available at: <http://www.iodsa.co.za/?kingIII> (accessed January 10, 2015).

23. ISO (International Organisation for Standardisation) (2009). *Environmental management: The ISO 14000 family of International Standards*, Geneva: ISO.
24. ISO (International Organisation for Standardisation) (2010). *ISO 26000 project overview*. Geneva: ISO.
25. Japan Moe (Ministry of the Environment) (2002). Environmental Accounting Guidelines, Tokyo, available at: www.meti.go.jp/policy/eco_business/pdf/workbook.pdf (accessed March 2, 2011).
26. Jasch, C. (2009). *Environmental and flow cost accounting, principals and procedures*, Delft: Springer.
27. Kolk, A. (2008). Sustainability, accountability and corporate governance: exploring multinationals' reporting practices, *Business Strategy and the Environment*, Vol. 17, No. 1, pp. 1-15.
28. Maubane, P., Prinsloo, A. and Van Rooyen, N. (2014). Sustainability reporting patterns of companies listed on the Johannesburg securities exchange, *Public Relations Review*, Vol. 40, No. 2, pp. 153-160.
29. Maunders, K.T. and Burritt, R.L. (1991). Accounting and Ecological Crisis, *Accounting, Auditing & Accountability Journal*, Vol. 4, No. 3, pp. 9-26.
30. Milne, M. and Gray, R. (2007). Future prospects for corporate sustainability reporting, In *Sustainability Accounting and Accountability*, Unerman, J., Bebbington, J. and O'Dwyer, B. (eds.), London: Routledge.
31. Montalván, S.M. and Chang, J.T. (2006). Is there a market payoff for being green at the LIMA stock exchange? In *Sustainability Accounting and Reporting*, Schaltegger, S., Bennett, M. and Burritt, R. (eds.), Dordrecht: Springer.
32. Negash, M. (2009). IFRS and Environmental Accounting, *Social Science Research Network*, available at: <http://ssrn.com/abstract=1516837> (accessed May 20, 2012).
33. Norman, W. and MacDonald, C. (2004). Getting to the bottom of "Triple bottom line", *Business Ethics Quarterly*, Vol. 14, No 2, pp. 243-262.
34. Project IQ (2011). Mining in South Africa. Available at: <http://www.projects iq.co.za/mining-in-south-africa.htm> (accessed August 20, 2012).
35. Raar, J. (2002). Environmental initiatives: Towards triple bottom line reporting, *Corporate Communications: An International Journal*, Vol. 7, No. 3, pp. 169-183.
36. Reyes, M.F. (2002). The Greening of Accounting: Putting the Environment onto the agenda of the Accountancy Profession in the Philippines, In *Environmental Management Accounting: Informational and Institutional Developments*, Bennett, M., Bouma, J.J. and Wolters, T. (eds.), Dordrecht: Kluwer Academic Publishers.
37. Schaltegger, S. and Figge, F. (2000). Environmental shareholder value: Economic success with corporate environmental management, *Eco-Management and Auditing*, Vol. 7, pp. 29-42.
38. SA (South Africa Department of Environmental affairs and Tourism) (1998). White paper on Environmental management policy for South Africa, *Government gazette*, 395(18894), pp. 1-87, 15 May. (WPD-1998): Government printer.
39. SustainAbility (2001). *Buried treasure: Uncovering the business case for corporate sustainability*. London: Sustainability.
40. UN (United Nations) (2003). Integrated Environmental and Economic Accounting 2003 (final draft), New York: United Nations and others. Available at: <http://unstats.un.org/unsd/envAccounting/seea.htm> (accessed September 15, 2013).
41. UNCCC (United Nations Climate Change Conference) (2011). Kyoto Protocol. Available at: http://unfccc.int/key_documents/kyoto_protocol/items/6445.php (accessed August 17, 2012).
42. Yin, R.K. (2009). *Case study research: design and methods*, Los Angeles: Sage publications.