

# ACID MINE DRAINAGE IN SOUTH AFRICA: A TEST OF LEGITIMACY THEORY

***Boitumelo Loate\*, Nirupa Padia\*, Warren Maroun\****

## **Abstract**

There is a large body of international literature which suggests that there is a correlation between organisational legitimacy, the nature and extent of non-financial disclosures in corporate reports, and the society's awareness of social, governance and environmental concerns. Little studied, however, is corporate reporting in South Africa through the lens of legitimacy theory. This paper addresses this gap by exploring whether local mining companies are providing additional environmental information in their annual or integrated reports following media coverage on acid mine drainage and, if so, to what extent. A review of press articles released by the mining houses also reveals how claims to pragmatic, moral and cognitive legitimacy are employed to mitigate negative publicity. In this way, the paper offers additional material on the role of legitimacy theory for explaining developments in corporate reporting. It also contributes to the limited body of interpretive corporate governance research in a South African context.

**Keywords:** Acid Mine Drainage; Environmental Reporting; Legitimacy Theory; South African Mining Companies

*\* University of the Witwatersrand, School of Accountancy*

## **1. Introduction**

The last twenty years have seen a steady increase in the extent of and emphasis placed on non-financial reporting (McCann et al, 2003; de Villiers and van Staden, 2010; KPMG, 2011; Hughen et al, 2014). From a classic agency perspective, much of the development in the reporting of environmental, social and governance (ESG) issues can be attributed to the need to manage information asymmetry and improve the scope of users of annual or integrated reports to assess the long-term sustainability of the respective organisations (de Klerk and de Villiers, 2012; Eccles et al, 2012; International Integrated Reporting Council [IIRC], 2013; Atkins and Maroun, 2014). Relaxing the assumption of bounded economic rationality, however, provides an alternate perspective. If the corporate reporting process is interpreted as a social construct – rather than just an economic imperative – the prior research highlights how corporate responsibility reporting (CRR) can be important for gaining or repairing organisational legitimacy (de Villiers and Barnard, 2000; O'Donovan, 2002; Patten, 2002; Brennan and Merkl-Davies, 2014).

This research focuses on the institutional aspect of environmental reporting in a South African context. Inspired by the work of Patten (1992; 2002), De Villiers and van Staden (2006; 2010) and O'Donovan (2002), the paper examines changes in the nature and extent of environmental disclosures of South African mining companies confronted with the

challenge of acid mine drainage (a serious environmental issue) featuring in the popular press from late 2010 to early 2011. The intention is not to evaluate the quality of the information being communicated to stakeholders but to gauge how the frequency of disclosures changes over a specified period of time and the underlying influence of legitimacy theory.

While there has been some research on environmental, social and governance (ESG) disclosure by South African organisations, much of this tends to be descriptive and aimed at demonstrating how, for example, the introduction of King-III (Makiwane and Padia, 2012) or the integrated reporting discussion papers and framework (PwC, 2013; Raemaekers and Maroun, 2014) may have contributed to technical changes in corporate reporting. Few South African studies have, however, considered the relevance of organisational legitimacy for explaining why companies alter the extent and focus of the ESG information being included in their annual or integrated reports. As such, this research makes an important contribution to a limited body of literature (see de Villiers and Barnard, 2000; de Villiers and van Staden, 2006; de Villiers and van Staden, 2010; de Villiers and Alexander, 2014) by exploring the interconnection between non-financial reporting; the emphasis being placed on environmental issues by the press; and the need to preserve organisational legitimacy. Concurrently, this study extends the seminal work on ESG reporting as

an instrument of legitimisation in a South African setting.

De Villiers and van Staden (2006) document changes in environmental reporting trends of South African mining companies from 1994 to 2002 and, in line with the findings of Patten (1992; 2002) and O'Donovan (2002), conclude that these organisations communicate non-financial information in response to perceived stakeholder expectations. Almost twenty years after democracy, and following the introduction of triple-bottom line reporting in 2002, it will be interesting to consider whether this reporting strategy is still applied. Added to this is the need for case-specific evidence. Prior research in the U.S.A or European Community (see Hogner, 1982; Patten, 1992; O'Dwyer, 2002; Brennan and Merkl-Davies, 2014) has considered ESG reporting as a tool for repairing, gaining or maintaining legitimacy by specific organisations in response to a single threat to legitimacy. In contrast, the South African-focused research is more generic, examining longitudinal trends in ESG reporting over several years (de Villiers and van Staden, 2006) or considering how, in general, isomorphic forces contribute to the standardisation of ESG information being included in corporate reports (de Villiers and Alexander, 2014).

In this context, this study makes an important contribution by exploring changes in the frequency of environmental reporting by the South African mining industry over a relatively short period of time in response to a specific environmental disaster and threat to legitimacy. Unlike the prior research, it also provides one of the first accounts of legitimisation strategies employed by the South African mining industry using Suchman's (1995) legitimacy typology as a frame of reference. More specifically, the study considers the extent to which disclosures appeal to a sense of pragmatic, moral and cognitive legitimacy and how these are designed either to repair or maintain legitimacy in the face of environmental challenges and mounting public criticism.

The remainder of this paper is organised as follows. Section 2 provides background information on the South African mining industry. Section 3 examines prior research on ESG reporting and provides a theoretical frame of reference. Section 4 lays out the method. Section 5 and 6 present results and analyse the findings and Section 7 concludes.

## **2. Background**

The South African mining industry has a very long and proud history dating to the discovery of diamonds in the Orange River and gold in the Witwatersrand during the mid-1800's (Chamber of Mines of South Africa [COMSA], 2013). Since then the sector has become a significant part of the country's economy, contributing between 8% and 17% of the country's GDP (COMSA, 2015). The industry is also an important source of employment and a significant

contributor of precious and basic metals on the global market. According to the International Marketing Council (IMC) of South Africa (2009):

"South Africa accounts for over 10% of world gold production, and is the leading producer of platinum, manganese, titanium, chrome, zirconium and vanadium. It is also South Africa's biggest employer, with around 460,000 employees and another 400,000 employed by the suppliers of goods and services to the industry".

While mining has contributed to the growth and prosperity of South Africa (SACOM, 2013; 2015) this has not been without significant social and environmental challenges such as land use, habitat loss, emission of greenhouse gasses, and worker health and safety concerns (Azapagic, 2004; de Villiers and Alexander, 2014). This is at the same time that the world is becoming increasingly aware of the importance of sustainability and the need for companies to manage vigorously their social and environmental impact (de Klerk and de Villiers, 2012; Jones and Solomon, 2013; Atkins and Maroun, 2014).

In this context, there is a large body of research which shows that South African mining houses are going to considerable lengths to provide users of their annual or integrated reports with additional information on important ESG metrics. A KPMG survey of the world's 50 largest mining companies (which included 6 South African entities) revealed that 90% of these included sustainability information in their annual reports and that all dealt with the issue of sustainability on their websites (KPMG, 2006). Hindley and Buys (2012) deal specifically with the South African mining industry and its compliance with the Global Reporting Initiative's (GRI) Sustainability Framework. They find that adherence to the reporting prescriptions have improved from 2010 to 2012. Similarly, Carels et al (2013) examine the possible implications of the integrated reporting initiative for non-financial disclosures by South African companies and report a significant increase in the extent to which environmental and social information is being included in the annual/integrated reports produced from 2008 to 2012. These findings are consistent with earlier research examining the environmental disclosures of the South African mining houses from 1994 to 1999 which concluded that local mining operations were more likely to provide additional information on the environment in their annual reports than other large organisations because of a marked environmental impact and the need to manage stakeholder expectations (de Villiers and Barnard, 2000). For example, greenhouse gas emissions, water usage, biodiversity loss and energy consumption are regularly included in the annual and integrated reports of local mining companies (Hindley and Buys, 2012; Solomon and Maroun, 2012; Carels et al, 2013; PwC, 2014). This is consistent with the generally accepted view that these

are important indicators being taken into account by a broad group of users such as investors, local communities and the State (Azapagic, 2004; de Villiers and van Staden, 2010; Atkins and Maroun, 2014). These measures are relevant not only for informing investment decisions (Atkins and Maroun, 2014). Increasingly, they are becoming important for gauging the extent to which the sector is taking cognisance of society's ever-growing concern about environmental degradation and the long-term sustainability of the country's mining industry (de Villiers and van Staden, 2010; King, 2012).

### 3. Prior research, theory and hypothesis development

#### 3.1. ESG reporting and organisational legitimacy

The link between stakeholder expectations and the nature and extent of information being included in annual or integrated reports is not unique to South African mining companies. There is a large body of research which draws on institutional theory to explain the proliferation of non-financial reporting over the last 20 years (for examples, see Gray et al, 1995; McCann et al, 2003; Gray, 2013; Tregidga et al, 2014). Of particular importance for the purpose of this paper are prior studies which examine how organisations respond to specific challenges to their legitimacy by altering the information which they communicate to stakeholders.

Brennan and Merkl-Davies (2014, p. 603), for example, explain that 'stakeholder communications relating to violations of social norms and rules or stakeholder values and beliefs' can be interpreted as part of the process of normative evaluation by a company's stakeholders. This is consistent with Suchman's (1995) interpretation of legitimacy as a socially constructed concept informed by moral, social and cultural variables and the interactions between an entity and its constituents. In the ESG reporting context this means that, 'as judgements are formed through public discussion, legitimacy is reliant on communication and is achieved by organisations participating in social dialogue' (Brennan and Merkl-Davies, 2014, p. 604; Tregidga et al, 2014).

This process is evident in the reporting strategy followed by BHP Ltd, a large diversified Australian company which discloses specific social and environmental information in response to changing societal expectations (Deegan et al, 2002). Comparable results – also in an Australian context – are reported by Brown and Deegan (1998) who demonstrate that managers react to the level of media attention afforded to their respective industries by altering the level of environmental disclosure included in their main corporate report. Patten (1992) provides additional evidence on the link between the

frequency of ESG reporting and specific social or environmental challenges, reporting a significant increase in the extent of environmental reporting in the aftermath of the *Exxon Valdez* oil spill. More recently, in a review of the environmental disclosures by a large Finnish chemical company over a 34-year period, Laine (2009a) finds that variations in the rhetoric employed by the case organisation in its corporate environmental disclosure mirror changes in the social and institutional context. South African corporate reporting is no different. An examination of environmental reporting by South African mining houses from 1994 to 2002 reveals that the country's socio-political context influences the nature and extent of specific and generic environmental information being communicated to stakeholders (de Villiers and van Staden, 2006). Collectively, these results provide evidence in support of the use of ESG disclosures as an instrument of legitimisation and are consistent with the general view that organisations rely on "evoking a sense of desirability, appropriateness and 'uprightness', [in order to] garner support from jurisdictions" and to ensure their own continued existence (Ashforth and Gibbs, 1990).

In this context, three broad 'types' of legitimacy can be discerned each of which is associated with specific strategies for gaining, preserving or repairing legitimacy (Suchman, 1995). From a pragmatic perspective, an organisation is able to secure credibility if its policies are regarded as valuable (exchange legitimacy) or if it is seen as being responsive to the interests of immediate stakeholders (influential legitimacy) (Dowling and Pfeffer, 1975). To the extent that constituents identify with the goals of the organisation and associate it with favourable social standards, dispositional legitimacy (which is a variant of pragmatic legitimacy) results (Suchman, 1995). Related to this, if the entity's policies, procedures or outputs are regarded as socially acceptable – according to a pro-social normative criteria – moral legitimacy may be accorded. Finally, to the extent that the entity is able to integrate itself in the daily lives of stakeholders and be accepted as a natural or inevitable part of modernity, the organisation's position in society is taken for granted leading to cognitive legitimacy (DiMaggio and Powell, 1983; Suchman, 1995).

When applied to ESG reporting strategies, the relevance of each of these legitimacy 'subsets' becomes apparent. Most obviously, and as discussed earlier, companies go to great lengths to signal an awareness of societal concerns (Laine, 2009b) and to present their systems, products and processes as socially responsible and valuable (Hogner, 1982; Deegan et al, 2002) in order to confer pragmatic legitimacy. At the same time, organisations are quick to report compliance with generally accepted ESG standards and the latest developments in the area of CRR to confer moral legitimacy (Higgins and Walker, 2012; Solomon et al, 2013). This goes hand-

in-hand with emphasising the positive impact which the company is having on local communities and the important social and economic benefits which the organisation's activities offer its stakeholders (Deegan and Blomquist, 2006; Patten, 2002). The aim is to rely on non-financial reporting to construct the image of a socially responsible corporate citizen which is "making a good faith effort" to achieve valued results (Suchman, 1995, p. 580; Deegan and Blomquist, 2006; Tregidga et al, 2014).

### **3.2. Acid Mine Drainage (AMD): A challenge to legitimacy**

Acid mine drainage (AMD) arises when pyrite (fool's gold) comes into contact with oxygenated water, forming acid. Pyrite is commonly found in mineral deposits, including the large coal and gold deposits of the Witwatersrand Basin in South Africa<sup>1</sup> (McCarthy, 2011). Although acid concentrates occur naturally due to weathering, the formation of acid is accelerated significantly by mining processes which can result in significant contamination of ground water. As the gold mines in the Witwatersrand Basin closed, water - with low pH levels (indicating acidity) and dangerously high concentrations of heavy metals - has filled the voids left by mineral extraction (ibid).

The Witwatersrand, which has been home to South African gold mining for some 120 years, saw the first decant of acid water in 2002 when it flowed from a Rand Uranium operation into Robinson Lake (Kadras-Nelson, 2010) and reached the surface of abandoned mines in Randfontein, in the western parts of the Witwatersrand Basin (The Council for Geoscience, 2010). Since then, the problem has been reported from a number of other mining areas with the worst affected being the Western, Central and Eastern Basins. These are home to some of the oldest mining operations where inadequate measures have been taken to manage rising water levels at abandoned shafts (ibid). The result is that AMD poses a significant threat to the quality of water in the Vaal River System which supplies South Africa's most densely populated province with much of its drinking water. A similar problem is being faced at abandoned coal mines in Witbank and Middleburg, threatening the supply of clean water from the Crocodile and Olifants rivers (McCarthy, 2011; Greenpeace Africa, 2011).

In response, the Government commissioned an Inter-Ministerial Committee to investigate the problem and propose possible solutions. A report was issued to the Committee during December 2010 outlining the need for immediate intervention in the

most affected regions in order to avert catastrophic environmental repercussions (The Council for Geoscience, 2010; Greenpeace Africa, 2011; McCarthy, 2011). This report also sparked considerable debate on the looming AMD crisis in the popular press during late 2010 and early 2011.

The Centre for Environmental Rights (2011) noted that the some 2.5 billion litres of polluted water had entered the country's river systems, despite the initial allocation of ZAR250million per annum by Government to treat contaminated water. This led to significant pressure from NGO's demanding that Government provide a clear course of action to deal with the mounting crisis (Centre for Environmental Rights, 2011; Greenpeace Africa, 2011). At the same time, commentators began to question the immediate impact of AMD on the Gauteng province, in which the worst affected mining areas are located.

Concerns were raised that AMD could result in the degradation of property in the Johannesburg City Centre resulting in significant losses in both economic and cultural terms (Kadras-Nelson, 2010). This went hand-in-hand with fears of localised flooding, widespread ground water contamination and material ecological damage (The Council for Geoscience, 2010). Naturally, this would pose significant challenges to agricultural activity in affected areas leading, not only to a loss in revenues, but also added to pressure on the country's food supply (Kadras-Nelson, 2010; Greenpeace Africa, 2011). Questions have also been asked about the direct cost of remediation; the expected time frames for addressing the problem; and people who are responsible for funding environmental remediation (Donnelly, 2011).

The complexity of the AMD process, coupled with the legal challenge of locating the former owners of abandoned mines, has made it almost impossible to hold any one organisation responsible for the environmental crisis (Donnelly, 2011; Keet, 2011). Nevertheless, current operators of the country's gold and coal mines are being forced to take cognisance of the ramifications of the water crisis. As explained by the Council for Geoscience (2010), if left unchecked, AMD could adversely affect the viability of ongoing mining operations by hindering access to new ore bodies. AMD has also raised questions about the adequacy of environmental provisions for remediation work by current mining houses; the added costs of accessing and processing proven and probable reserves; and the economic viability of some South African mining concerns (Keet, 2011; Reuters, 2011).

Consequently, there has been considerable pressure on the industry to demonstrate how AMD is being addressed at the operational level (Keet, 2011; The Times, 2011). Added to this is the increased emphasis on the importance of sound environmental practices (de Villiers and van Staden, 2010; King, 2012). In particular, the drive for effective integrated

<sup>1</sup> Not all of South Africa's mineral deposits are afflicted by acid production. Diamond, iron, manganese, chrome and vanadium mines do not generate acid-producing waste and the majority of South Africa's platinum mines do not appear to be affected by AMD (McCarthy, 2011)

reporting is leading to calls for improved communication of how non-financial measures are being managed in order to create and sustain value in the short-, medium- and long-term (IRCSA, 2011; International Integrated Reporting Council [IIRC], 2013). As such, the first proposition is stated as follows:

*Proposition 1:* There is a significant increase in the frequency of environmental-related disclosures in the annual/integrated reports of South African mining companies following the increased public interest in AMD.

More specifically, the research proposes that there is a positive correlation between media attention accorded to AMD during late 2010 and early 2011 and quantum of environmental disclosures found in 2011 annual/integrated reports (cf Patten, 2002). This is not entirely consistent with de Villiers and van Staden (2006) who suggest that firms may limit the extent of specific environmental disclosures when faced with a threat to legitimacy. AMD is, however, part of the legacy of South African mining rather than the result of the operations of any one mining company. As a result, it is expected that, in general, the local mining industry will react to the added media attention on AMD in 2010/2011 by including added disclosures in their next set of annual or integrated reports (cf Patten, 1992; O'Donovan, 2002; Laine, 2009a). The prior research also suggests that this added disclosure is part of a complex dialogue between companies and their stakeholders designed to preserve claims to pragmatic, moral or cognitive legitimacy (Brennan and Merkl-Davies, 2014; Tregidga et al, 2014). To this end, the second proposition dealt with in this paper is:

*Proposition 2:* There is evidence of companies making direct statements on AMD in the aftermath of negative media coverage which appeals to a sense of pragmatic, moral or cognitive legitimacy.

#### 4. Method

The study uses a mixed method, relying on a content analysis to highlight trends in environmental disclosures found in the annual or integrated reports of South African mining companies from 2008 to 2011. This is complemented by an interpretive text analysis of a sample of media releases to consider how these organisations appeal to pragmatic, moral and cognitive legitimacy in the face of the AMD environmental disaster. It should be noted that, although the study makes use of quantitative methods, it is inspired by an interpretive approach. The intention is to explore the nature and extent of environmental disclosure to highlight the influence of legitimacy theory. It is not the aim of this study to quantify the disclosures; propose a measure of quality; determine the optimal level of disclosure or prove a causal relationship between the frequency of ESG reporting and different variables.

#### 4.1 Data analysis

The study is concerned with how media attention accorded to AMD influences the nature and extent of environmental-related disclosures of South African mining houses. Most of the media coverage occurred during the second half 2010 and early 2011 at approximately the same time that the Inter-Ministerial Panel completed its investigation into the environmental disaster. As a result, the researchers decided to evaluate the disclosures of a sample of mining houses for 2008 and 2009 to provide a frame of reference. Annual or integrated reports produced in 2010 were not considered due to the fact that varying financial year-ends would have resulted in some companies releasing their reports after extensive media attention on AMD. As a result, the disclosures from the 2008 and 2009 reports were compared with those found in the most recent annual or integrated report published after the release of the Government's findings on AMD (the 2011 reports).

Due to the fact that King-III recommends the preparation of a single high-quality report for users (Institute for Directors in Southern Africa [IOD], 2009), supplementary information found in sustainability reports or on the companies' websites were not considered. This approach is also consistent with comparable studies which have focused on the primary report being prepared by companies to engage with their stakeholders (Brown and Deegan, 1998). In addition, only companies listed on the JSE's mining sector which had consistently published annual or integrated reports from 2008 to 2011 were considered. This resulted in a final sample of 36 companies. Their annual or integrated reports were then analysed in detail.

Following an approach similar to Marx and van Dyk (2010), Makiwane and Padia (2012), Solomon and Maroun (2012) and Carels et al (2013), an environmental disclosure checklist was interpretively developed. The final disclosure register was informed by the guidelines provided by Sustainability South Africa, King-II/King-III (as applicable) and the GRI G3 due to their widespread use by South African mining companies (Carels et al, 2013). To ensure completeness, the register was complemented with the disclosures identified by similar studies examining reporting trends in South African integrated reports (cf Marx and van Dyk, 2011; Solomon and Maroun, 2012; Carels et al, 2013; PwC, 2014). Due to the fact that the data collection phase of the study took place during 2013, the integrated reporting framework released by the IIRC in late 2013 was not specifically taken into account when developing the final disclosure checklist<sup>2</sup>.

<sup>2</sup> This is not regarded as an inherent limitation due to the fact that the study does not specifically deal with the extent to which ESG issues are being integrated with financial measures in corporate reports.

Each of the annual/integrated reports was examined to gain a sense of its content and structure. The lead researcher then followed a systematic content analysis approach to identify environmental disclosures. Information was classified as an 'environmental disclosure' if it addressed one of the following: (1) environmental laws or related requests by government; (2) activities performed to reduce environmental damage; (3) environmental strategies; (4) policies implemented to alleviate environmental effects; (5) outlays on environmental activities; or (6) litigation for environmental damage (Wiseman, 1982).

Where a disclosure was included in an annual report, a value of '1' was assigned. A nil score was provided when a risk disclosure was not found. A spreadsheet was used to aggregate final results. To ensure accuracy, a sample of disclosure score sheets was reviewed by the support researcher (adapted from Makiwane and Padia, 2012; Carels et al, 2013). To minimise researcher bias, the reports were only analysed for the presence or absence of specific disclosures. No effort was made to rank the disclosures according to their perceived usefulness to stakeholders. Similarly, this research did not differentiate between the types of disclosures<sup>3</sup>. In addition, data collection dealt only with text information found in the reports. Images which related directly or indirectly to the environmental issues were excluded due to the added subjectivity involved in interpreting them and the difficulty in comparing changes in the images found in the reports.

#### **4.2 Data analysis**

The final result was a set of frequency tables for each company which showed the total number of environmental-related disclosures found in the 2008, 2009 and 2011 annual or integrated reports. This data set was used to generate initial descriptive statistics (mean, median and standard deviations) for each year under review. In order to test whether there had been a statistically significant change in the extent of risk disclosures from 2008 to 2011, the disclosure scores (which are treated as being at last ordinal, in line with prior studies<sup>4</sup>) were subject to paired-sample T-tests. At this point, it should be noted that the relatively small sample sizes are an inherent limitation of the

study<sup>5</sup> with the result that normal distributions and homogeneity of variances cannot be guaranteed. Consequently, the results of the t-tests are corroborated by the non-parametric Wilcoxon Sign and Rank Test. For this purpose there is, however, the assumption that the disclosures in each year are independent in the sense that, for example, changes in 2009 disclosures (if any) are not driven by the nature and extent of disclosures in 2008. In other words, changes in nature and extent of environmental information included in the annual or integrated reports are affected by exogenous variables and not the prior year disclosures themselves.

To provide additional insights, the review of disclosure trends was complemented by an interpretive text analysis of a sample of media reports by the companies under review. The intention was not to change the focus of the study from the primary reports being provided to stakeholders. Due to the sample size limitation discussed above, however, the researchers decided to corroborate findings on the relevance of legitimacy theory for explaining changes in disclosure frequencies by examining how organisational legitimacy was being operationalised by companies in their interactions with the press. These media reports were chosen because, unlike the annual or integrated reports, the respective commentary is in direct response to the AMD crisis. Related to this, the reports contain new information rather than repeating or summarising content found in the annual reports, as is often the case with sustainability or environmental reports published in conjunction with the annual or integrated reports (King, 2012; Samkin, 2012). As such, the press releases offered an independent data set which could be used to confirm the relevance of legitimacy theory for corporate communications (as evidenced by the environmental disclosures in the annual or integrated reports).

The researchers searched for all media releases on established databases of the lead author's university. A total of 89 articles, published at approximately the same time as the release of the Inter-Ministerial report on AMD, were included in the final analysis. Following the approach recommended by Merkl-Davies et al (2011), these were subject to a detailed interpretive text analysis. This involved reading each article several times in order to gain a sense of the content and conclude on how (if at all) appeals were being made to a sense of pragmatic, moral or cognitive legitimacy. For this purpose, the framework provided by Suchman (1995) for describing each 'form' of legitimacy was used. Results were included in a basic frequency table and specific examples highlighting the relevance of legitimacy theory are used for illustrative purposes.

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<sup>3</sup>In other words, the research did not differentiate between the disclosures found in the annual/integrated reports according to the respective framework which either requires or recommends that the information be communicated to stakeholders.

<sup>4</sup> Consider de Villiers and van Staden (2006);

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<sup>5</sup> This results from the fact that there are few mining companies listed on the JSE when compared with larger stock exchanges.

Before proceeding with the discussion of the findings, it must be stressed that this analysis was exploratory. The intention was to provide additional evidence showing that companies are aware of the need to preserve their credibility in the face of an environmental challenge. Indirectly, this offers additional evidence in support of the operation of legitimacy theory in the drafting of corporate communications with stakeholders, including the annual or integrated report. The intention is not to prove a causal relationship between variables or to contrast the type of information found in different

communications between companies and their stakeholders.

**5. Results**

Table 1 presents descriptive statistics for the three years under review. The mean environmental disclosure frequency is relatively consistent from 2008 (Mean = 540) to 2009 (Mean = 521). There is, however, an increase in the average frequency of environmental disclosures by the mining companies under review in 2011 (Mean = 866).

**Table 1.** Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Word Count 2008	36	14	2787.0	539.556	634.3672
Word Count 2009	36	14	2726.0	521.083	635.3562
Word Count 2011	36	123	3415	865.750	848.366

An un-tabulated paired-samples T-test confirmed that, at the 5% level, there was no significant change in the disclosure scores from 2008 to 2009 (p=0.757) but that the increase in the average

disclosure of environmental issues from 2009 to 2011 was statistically significant (p<0.05). This result was corroborated by non-parametric testing.

**Table 2.** Ranks

	N	Mean Rank	Sum of Ranks
WordCount2009 < WordCount2008	11	18.77	206.50
WordCount2009 > WordCount2008	23	16.89	388.50
WordCount2008 Ties	2		
Total	36		
WordCount2009 < WordCount2011	35	18.00	630.00
WordCount2009 > WordCount2011	0	.00	.00
WordCount2011 Ties	1		
Total	36		

Table 2 shows that 11 (30%) of mining companies decreased their disclosure from 2008 to 2009. This is in contrast with the change from 2009 to 2011 when all but 1 company provided additional environmental disclosure<sup>6</sup>. The statistical significance of these changes is highlighted by Table 3A and Table 3B.

<sup>6</sup> A possible explanation for this is that the company in question included a separate environmental report. This study was, however, limited to analyzing only the disclosures found in the main corporate report for the year under review.

**Table 3A.** Test statistics - Wilcoxon Signed Ranks Test

	WordCount2009 - WordCount2008	WordCount2009 - WordCount2011
Z	-1.556	-5.160 <sup>c</sup>
Asymp. Sig. (2-tailed)	.120	.000

**Table 3B.** Test statistics – Sign test

	WordCount2009 - WordCount2008	WordCount2009 - WordCount2011
Z	-1.886	-5.747
Asymp. Sig. (2-tailed)	.059	.000

At a 5% level of significance, Table 3A shows that the change in disclosure scores for companies decreasing their information on environmental issues from 2008 to 2009 is not statistically significant (p=0.120). This is confirmed by the relatively constant mean scores over this period (Table 1) and the results of the sign test which also reports statistically insignificant results (p=0.059) (Table 3B). In contrast, the increase in disclosure by companies from 2009 to 2011 is statistically significant (p=0.000). This is confirmed by the increase in mean scores from 2009 to 2011 from 521 to 866 (Table 1) and the statistically significant result (p=0.000) on the sign test (Table 3B). These results suggest that, from 2009 to 2011, there was a general increase in the extent of environmental-specific

disclosures being provided by the mining houses. To confirm that the change was not specific to a particular category of miners, the researchers tested for the relevance of the size of the companies under review and the primary type of mining operation.

In the first instance, the mining companies were grouped according to their market capitalisation per year under review. A total of 27 companies were categorised as ‘below average’ in terms of their relative market capitalisation in 2008 and 2009. In 2011, 26 firms were categorised as below average. Table 4 presents the statistics for the Mann-Whitney Test on firm size. At a 5% level of significance, the p-values for each year tested are statistically insignificant suggesting that the size of the firm was not correlated with the disclosure score.

**Table 4.** Test statistics – effect of size

	WordCount2008	WordCount2009	WordCount2011
Mann-Whitney U	72.000	59.000	83.000
Wilcoxon W	507.000	494.000	489.000
Z	-1.179	-1.699	-1.103
Asymp. Sig. (2-tailed)	.238	.089	.270
Exact Sig. [2*(1-tailed Sig.)]	.253	.094	.284

Similarly, the researchers tested for the effect of the type of mining operation. Companies were grouped according to their primary extractions as either gold, platinum group metal (PGM), gemstone or coal miners. Diversified operations were categorised as ‘general’ miners. Mean ranks and

frequencies per type of mining operation are presented in Table 5. At the 5% level of significance, there is no evidence to suggest that the mean disclosure scores differ significantly according to the nature of the mining operation (p= 0.175) (Table 6).

**Table 5.** Kruskal Wallis: Rank test

	Type	N	Mean Rank
Word Count 2011	Gold	11	19.09
	PGM	8	18.38
	General	9	19.33
	Coal	4	26.00
	Gemstones	4	7.75
	Total	36	

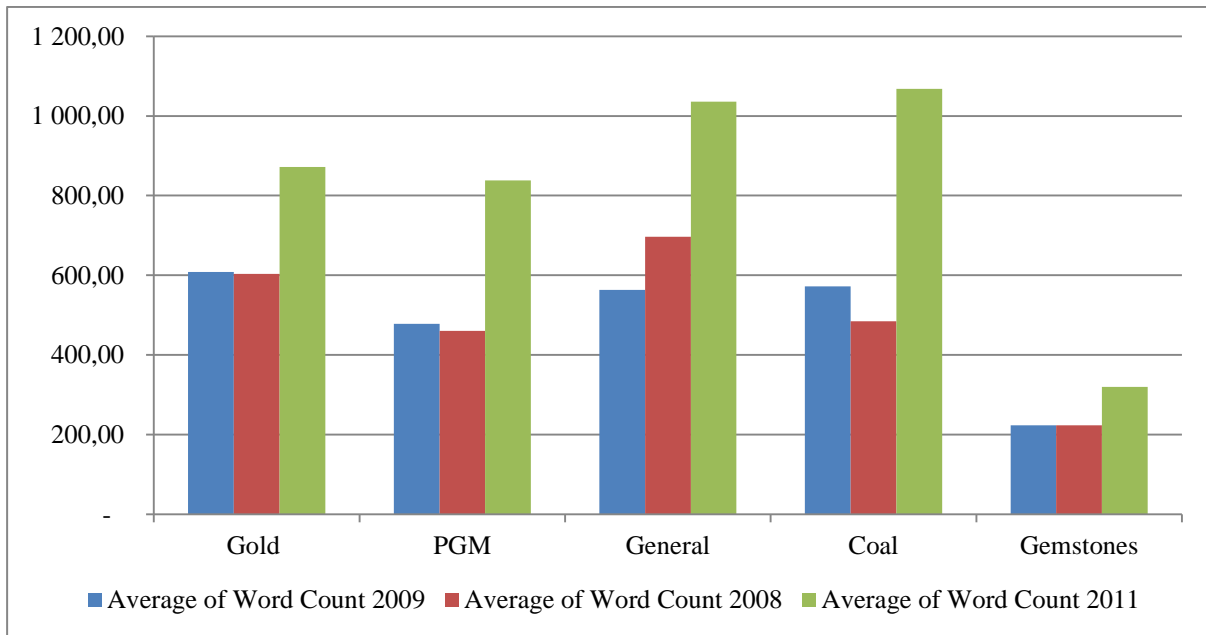


**Table 6.** Test statistics: Kruskal Wallis Test

	WordCount2011
Chi-Square	6.283
Df	4
Asymp. Sig.	.179

The average environmental disclosures per type of mining operation over the period under review is summarised in Figure 1.

**Figure 1.** Environmental disclosures per type of mining company



## 6. Discussion

Section 5 shows that there has been a general increase in environmental-related disclosures from 2009 to 2011 by South African mining companies. This coincides with a period of increased media attention being accorded to causes and effects of AMD and the possible impact of the crisis for the sector (Section 3.2). These findings are largely consistent with the prior research which suggests that environmental disclosures are frequently used by organisations to respond to societal concerns and the possible delegitimising impact of negative media publicity (Patten, 1992; O'Donovan, 2002). As such, the results in Section 5 provide evidence in support of Proposition 1.

Interestingly, the use of additional disclosure is not limited to smaller operations which lack the well-established track record (and cognitive legitimacy reserve) of their larger counterparts. By the same token, a statistically significant increase in environmental reporting is not only found in the annual reports of the gold and coal mining companies, which are most affected by the challenges posed by AMD (cf McCarthy, 2011). A possible explanation is that the AMD media coverage is broad

and not limited to a single type of mining operation (cf Keet, 2011; The Times, 2011). Concerns are raised about the impact of rising acid water levels on the country's biodiversity (Greenpeace Africa, 2011); the threat posed to the nation's water supply (The Council for Geoscience, 2010; McCarthy, 2011); and the cost of remediation which will need to be financed by the public and private sectors, and not just a particular group of miners (cf Keet, 2011; The Times, 2011). Added to this is the fact that the media are not concentrating on subject experts. To the contrary, publications in the popular press are aimed at a wide group of stakeholders who are unlikely to be well-informed on the technical aspects of AMD. In this light, the water crisis is quickly interpreted as a far-reaching one which the industry as a whole needs to take cognisance of (cf Greenpeace Africa, 2011; The Times, 2011).

A similar result is reported by Patten's (1992) study on the effect of the *Exxon Valdez* oil spill which finds that petroleum firms, other than Exxon, react to negative publicity by increasing the extent of their environmental reporting. In other words, the effects of negative publicity are not necessarily restricted to those directly implicated in an adverse event. In periods of late modernity, stakeholders' experiences

when dealing with a delegitimising event specific to one entity or sector can have repercussions for other players as scepticism is piqued, comparisons are made and additional questions are asked (cf Dowling and Pfeffer, 1975; Suchman, 1995). In other words, an event which highlights a social, environmental or governance (ESG) shortcoming at one organisation can result in a more general awareness of the ESG issues for the sector or industry as a whole.

In the context of AMD, even though rising levels of acid water have not been reported at *all* of the country's mining operations, South African mining companies are either reacting to or pre-empting additional public scrutiny of their environmental track record. They do this by increasing the amount of information on their environmental policies and practices (Figure 1) in order to portray themselves as responsible corporate citizens and rebuff indirect challenges to their credibility posed by the AMD disaster (cf O'Donovan, 2002). This is not entirely inconsistent with the findings of de Villiers and van Staden (2006) which report a decrease in specific disclosures when faced with a challenge to legitimacy. The popular press explains that the legal and technical challenges of determining which companies are responsible for the production of acid water are immense. Furthermore, the environmental problem is the product of over 100 years of mining with the result that attributing blame is almost impossible (cf Keet, 2011; 2011McCarthy, 2011; The Times). As discussed above, this means that companies are responding, not to a direct threat to their legitimacy, but to the risk of stakeholders mounting a general challenge to existing environmental practices. In this regard, the body of literature on the link between ESG reporting and organisational legitimacy predicts that negative media publicity is associated with a general increase in non-financial reporting (Higner, 1982; O'Donovan, 2002; Patten, 2002; Brennan and Merkl-Davies, 2014), a strategy which is also apparent in the South African mining industry.

The broader context - in particular the move towards integrated reporting - must, however, be taken into account. A revised code of corporate governance (King-III), which recommends that companies adopt a more integrated approach to reporting (IOD, 2009), was released during 2009. This was followed by the publication of a discussion paper on the preparation of an integrated report which would define clearly the link between financial and non-financial metrics (Integrated Reporting Committee of South Africa [IRCSA], 2011). Furthermore, 2010 saw the Johannesburg Stock Exchange introduce a requirement for listed companies to comply with King-III (and produce an integrated report) or provide reasons for not doing so (Johannesburg Stock Exchange, 2013).

A move towards more balanced reporting on financial and ESG measures may be part of the

reason for the general increase in mining disclosures reported in Section 5 from 2009 to 2011 (consider Makiwane and Padia, 2012; Solomon and Maroun, 2012; PwC, 2013). Developing a model which distinguishes between the effect of media coverage on AMD during 2010 and the implications of King-III and the IRCSA's discussion paper is beyond the scope of this research<sup>7</sup>. Nevertheless, in order to offer additional evidence that environmental reporting was, at least in part, a reaction to AMD media coverage, press releases by the companies under review for 2011 were examined for evidence of strategies to gain, maintain or repair legitimacy. Of the 89 media articles included in the final analysis, the researchers identified 124 direct or indirect references to organisational legitimacy in the context of the AMD problem. These were grouped according to their appeal to pragmatic, moral or cognitive legitimacy. Results are summarised in Table 6.

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<sup>7</sup> It is also questionable if such a model can provide relevant and reliable results. The prior research has shown that the preparation of corporate reports is a very complex social and political process (consider Tregidga et al, 2014; de Villiers and Alexander, 2014) which is unlikely to conform to the assumptions of bounded rationality needed for an econometric evaluation of corporate reporting.

**Table 6.** Frequency of points with links to legitimacy

Legitimacy type	Total
Pragmatic	53
Moral	33
Cognitive	38
Total	124

Table 6 shows that, in addition to the relatively generic disclosures included in the annual/integrated reports (Figure 1), companies were responding specifically to the challenges posed by AMD in their interactions with the press. Often, these statements were aimed at showing that the organisation in question was aware of the public’s concerns about the health and safety risks posed by rising acid water levels and that the problem was not being ignored. For example:

“Mining companies have acknowledged and accepted that acid mine drainage is a problem needing to be addressed urgently. This should be done in a co-ordinated manner between a range of stakeholders that include the mining industry and government should always play a leading role” (Article 61).

The intention is to secure pragmatic legitimacy by demonstrating an understanding of constituents’ fears. At the same time, the companies are attempting to highlight how their environmental policies have taken the effects of AMD into account and, accordingly, are sound. This goes hand-in-hand with a concerted effort to show that the mining houses identify with stakeholders and to reassure them that panic is unnecessary, thereby appealing to a sense of dispositional legitimacy. Concurrently, these reassurances are designed to confirm that the organisation continues to play a valuable role in society, according an exchange variant of pragmatic legitimacy (cf Suchman, 1995). Consider, for example, the following comments:

“We are now working together to find sustainable solutions to the challenges posed by acid mine drainage. We will not allow the situation to get out of hand; it will not reach crisis proportions” (Article 46).

“We want to assure South Africa that there is no need to panic at the moment, as it remains our responsibility to ensure the safety of our water systems in the country” (Article 71).

Direct statements on the actions taken to address the AMD problem add to the pragmatic legitimacy of the respective organisations:

“The measures in place to deal with the present environmental emergency, is a donation of R6.9million to purchase massive quantities of lime. This decision is based on evidence that lime corrects the pH of the discharge” (Article 7)

“Mining companies have made some progress in addressing the acid mine drainage issue, there is now

a Remediation Action Plan for the Wonderfonteinspruit catchment area and a huge amount of research has been done on the issue of acid mine drainage” (Article 61).

In order to preserve hard-won pragmatic legitimacy, the mining companies are also engaged in a process to dispute adverse findings. The intention is not to deny the existence of AMD but, again, to reassure stakeholders and to avoid panic. Consider, for example, the following direct response to a press release:

“We want the South African public to know that Gauteng will not run out of water in the near future, it is also incorrect to say that 80% of South Africa’s water will be so polluted that it will not be possible for it to be treated to potable quality and that the Gauteng province will be worst affected as the Environment Conservation Association claims” (Article 30).

Statements designed to comfort stakeholders and confirm responsibility for managing the environmental safety of their plants should, however, be contrasted with a clear effort to avoid responsibility for the legacy of AMD and justify ongoing mining operations. To secure moral and exchange legitimacy, several companies demonstrate how they provide a valuable service to society. They stress the need to balance the risks posed by AMD with the significant social and economic pressures to expand mining operations. Consider, for example, the following statement which is given in the context of the Country’s on-going power shortages:

“We are under massive pressure to develop the huge coal resource in western Limpopo, estimated to contain nearly half our national coal reserve. Mining investors see massive opportunities in the region” (Article 13)

Similarly, companies were quick to discuss the risks of AMD against the backdrop of the industry’s very valuable social contributions. All of the annual reports under review discussed the considerable investment which the mining industry has made in its immediate communities while several of the articles included in the analysis emphasised the importance of finding a sustainable solution to the AMD crisis which would not jeopardise the employment and community upliftment which established mining houses were providing. This strategy secures moral legitimacy by demonstrating how mining companies are attempting to manage the competing demands for economic growth with prudential management of

environmental and social concerns (cf Solomon and Maroun, 2012). Integral to this are statements which reassure stakeholders that current mining practices are sound and pose little risk of additional contamination:

“In the eastern basin - located roughly below the town of Nigel - there was currently no risk because the water was 700m below the surface. There were also no immediate problems with the central basin, directly below Johannesburg” (Article 31).

The mining companies are also aware of the need to address historic environmental damage. Here, legitimacy is preserved, not by accepting responsibility, but by making it clear that the current operators cannot in practical or fair terms be held accountable for the effects of AMD:

“The increased rainfall over the last few months had considerably raised the level of the acidic mine water in the underground mined-out pockets of the Witwatersrand, regardless of our actions” (Article 29)

“The seriousness of the [AMD] problem had been recognised long ago and it was becoming clear it was a legacy issue...Spending all our time finding culprits may well be a waste of resources...There were new operators in the area. These companies were brand new. They simply could not have created this problem. As a result, burdening these new companies with the sins of the past is simply unsustainable” (Article 1).

Over the last ten years, the mining industry has become acutely aware of its environmental obligations (Chamber of Mines, 2013) and the need to manage related stakeholder concerns (de Villiers and van Staden, 2010; Carels et al, 2013). In this context, and as indicated in Figure 1, all of the companies under review addressed environmental issues in detail in their annual/integrated reports. There is also a considerable amount of attention paid to demonstrating compliance with recommended codes of best practice on environmental management and disclosure (cf Makiwane and Padia, 2012; Solomon and Maroun, 2012; PwC, 2013; Carels et al, 2013). Complementing this is the fact that many of the mining houses included in the analysis are well established, with considerable expertise and resources at their disposal. These have been successfully mobilised to secure credibility and provide a strong legitimacy reserve (cf Suchman, 1995). When faced with the challenges posed by AMD, many address the threat to this cognitive legitimacy by drawing a clear line of demarcation between the mining houses of the past and the environmentally responsible institutions of today

## **7. Conclusions**

There is a large body of research which shows that changes in the nature and extent of environmental disclosures can be interpreted as part of a process of legitimisation. Much of this is based in the U.S.A or

Europe with the result that academics know comparatively little about corporate reporting in an African context (de Villiers and van Staden, 2006; Brennan and Solomon, 2008). To this end, this study has made an important contribution by examining how a general increase in environmental-related information being included by South African mining companies from 2008 to 2011 in their annual/integrated reports is, in part, a reaction to a perceived threat to legitimacy.

Consistent with the findings of, inter alia, Patten (1992; 2002) and O'Donovan (2002), there is evidence to suggest that local mining corporations reacted to negative media publicity on AMD by providing stakeholders with additional information on their environmental policies and practices (cf Brennan and Merkl-Davies, 2014). This is not entirely in line with earlier work by de Villiers and van Staden (2006) which argues that companies may reduce specific environmental disclosures in order to avoid added criticism. What should, however, be born in mind is that AMD is the legacy of over 100 years of mining with no single company specifically responsible for the related social and economic consequences. To this end, the findings presented in this paper suggest that the mining industry is reacting, not only to localised cases of acid water contamination, but to the added social awareness of the importance of sound environmental practices in general.

The research is unable to prove a causal relationship between media coverage and environmental reporting. Related to this, an econometric technique for ‘isolating’ the effect of other variables which might have impacted the nature and extent of non-financial reporting over the period under review was not carried out. Most notable is the possibility of King-III and the IRCSA’s discussion paper on integrated reporting providing most of the explanation for additional environmental information being included in the 2011 integrated reports. While this is an inherent limitation of this research, the study provides additional evidence in support of the view that companies rely on carefully constructed communications with stakeholders to preserve claims to pragmatic, moral and cognitive legitimacy.

An interpretive analysis of press articles on AMD provides interesting insights into how companies are relying on different strategies to win legitimacy. Most notable were the efforts to demonstrate how the mining companies were identifying with stakeholders and implementing appropriate measures to mitigate the effect of water contamination in order to secure pragmatic legitimacy. This was complemented by carefully constructing an image of mining houses which conform to generally-accepted environmental standards and play an important social and economic role in order to confer moral legitimacy. Perhaps most important is the fact that many South African

mining houses have become institutions in their own right. Because of this, it is relatively easy for these organisations to draw a clear distinction between the mining practices of the past and environmentally sound modern operations, minimising the effect of much of the negative publicity on AMD.

This conclusion needs to be interpreted in light of certain limitations. The research has only offered limited evidence on the influence of legitimacy theory in the South African mining industry. Most notably, only a select number of press releases from 2010/2011 were analysed to identify 'elements' of pragmatic, moral and cognitive legitimacy. Detailed interviews will be needed with preparers to understand the processes followed by companies when preparing their reports and press statements. This should be complemented by future research concentrating on how stakeholders interpret the information found in these documents and the interconnection with legitimacy theory. Ultimately, the precise mechanisms and strategies which South African companies use to gain, maintain or repair legitimacy (and the relevance of the country's socio-political context in this regard) is poorly understood and needs additional analysis.

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