



IC measurement and reporting: establishing a practice in SA mining

IC measurement
and reporting

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Abstract *This paper presents findings from an investigation of intellectual capital measurement, reporting and management in the South African mining industry. The research methodology employs a combination of content analysis of annual reports for the 20 largest listed companies in South Africa, combined with interviews with senior individuals in mining companies. Data is analysed in accordance with a selected intellectual capital framework consisting of 24 indicators across the three categories of internal, external and human capital. Results show that mining companies tend to report on fewer intellectual capital attributes than other companies and tend to focus more on external attributes such as business collaborations and favourable contracts. Results show that mining companies rate intellectual capital highly, but appear to be lacking in the measurement and reporting of intellectual capital. From these findings it is concluded that mining companies value intellectual capital but lack the appropriate systems and structures to manage intellectual capital meaningfully.*

Introduction

The growth in interest in the topic of intellectual capital, according to Guthrie *et al.* (2001), has arisen commensurate with the ascendance of the information age and the virtual economy (Petty and Guthrie, 2000; Litan and Wallison, 2000; Blair and Wallman, 2000). From a research perspective, through two main intellectual capital missions, there seems to be an outcry for data and research that produce measurable outcomes that have a direct and positive influence on practice (Foster and Young, 1997; Shields, 1997; Petty and Guthrie, 2000; Guthrie *et al.*, 2001). The first mission relates to the ongoing quest to develop better enabling technological and infrastructural systems for creating, capturing, and disseminating “know-how” within organisations. The second relates to the growing awareness that intellectual capital adds significantly to the value of a business, and in some cases, represents almost the entire sustainable value base of that business. According to Guthrie *et al.* (2001),



stemming from the second mission is the drive to establish new measures and ways of reporting that can be used to record and report.

The aim of this study, in the vein of the second mission, was to research the field of intellectual capital measurement, reporting and management in the South African mining industry. Companies that measure, report and manage their intellectual capital effectively have a competitive advantage because they have identified all the assets at their disposal (tangible and intangible), and are thus in a position to operate at their full potential by making maximum use of their asset pool. In addition, understanding the real value of all assets provides a more accurate reflection of the worth of a company, which supports the corporate goals of transparency to shareholders, potential investors and market analysts. This sentiment has recently been echoed by many European nations, where accounting reports of some companies place heavy emphasis on the non-financial metrics (OECD, 1999; Meritum, 2001; Mouritsen *et al.*, 2001).

It is generally accepted that existing, traditional methods of accounting fail to show the real prospects, and future opportunities, of companies (Skyrme, 1998; Clare and Detore, 2000), because they are based on historical data and are therefore lag indicators. Intellectual capital, on the other hand, reflects the future earnings capabilities of a company, and is therefore a leading indicator (Edvinsson and Malone, 1997). The aim of this research was to provide South African mining companies with intellectual capital benchmarks (a first for this country) against which to compare themselves, and use to launch their intellectual capital initiatives and thus enhance their global competitiveness. The following research question was posed at the inception of the study:

RQ1. Is intellectual capital at all relevant or meaningful to South African mining companies and, if so, what are they doing in this regard?

Research methodology

The research methodology used in this study was based on that originally used by Guthrie *et al.* (1999) in an analysis of intellectual capital in Australian companies, and subsequently used by Brennan (1999) in a similar study for Irish companies. The methodology used a combination of: content analysis of company annual reports and interviews with senior individuals in South African mining companies, conducted in conjunction with questionnaires. The 20 largest South African listed companies by market capitalisation (Table I) were selected for analysis as per Guthrie *et al.* (1999). These included the seven largest mining companies in South Africa and the telecommunications company M-Cell, which is considered a benchmark company for good intellectual capital management practice (a company in which Karl-Erik Sveiby implemented and tested many of his intellectual capital tools and frameworks).

Rank	Company	Sector	Market cap (SAR – billions)
1	Anglo American	Mining holding and houses	185.6
2	De Beers	Diamonds	121.9
3	Richemont	Diversified industrial	91.9
4	BHP-Billiton	Mining holding and houses	83.0
5	Old Mutual	Life assurance	59.8
6	Anglo Platinum	Platinum	58.2
7	Sasol	Chemicals, oils and plastics	43.8
8	Didata	Information technology	42.2
9	SBIC	Banks	41.5
10	SAB	Beverages	40.7
11	FirstRand	Banks	40.3
12	Nedcor	Banks	33.0
13	M-Cell	Telecommunications	30.1
14	Anglo Gold	Gold	24.2
15	Sanlam	Life assurance	24.1
16	Remgro	Diversified industrial	22.9
17	ABSA	Banks	20.8
18	Implats	Platinum	18.8
19	Lonmin	Platinum	18.0
20	Liberty	Property	17.0

Table I.
The 20 largest
South African listed
companies as of
March 2001

Annual reports

A content analysis was performed on the annual reports in order to obtain an overall view of the status quo for intellectual capital reporting by South African companies. Content analysis, a research technique for making replicable and valid inferences from data to their context (Krippendorff, 1980, p. 21; Robson, 1993), involves codifying qualitative and quantified information into pre-defined categories in order to derive patterns in the presentation and reporting of information. The technique is particularly useful for extracting information, which is not explicitly presented in a quantified and structured format, but is implicit in the information. Annual reports are a useful source of data, as companies commonly signal what is important in the report. Approaches focusing on the intentions of writers of documents are well documented, and are derived from the methods of historians (Marwick, 1970; Barzun and Graff, 1977).

The content analysis involved reading the annual reports of each company and coding the information contained therein, in accordance with a selected framework of intellectual capital indicators/attributes. The chosen intellectual capital framework (Table II) was that used by both Guthrie *et al.* (1999) and Brennan (1999). The framework is derived from Sveiby (1997) and consists of 24 indicators across the three intellectual capital categories of internal, external and human capital.

Originally it was intended to use a detailed numerical coding scheme, as per Guthrie *et al.* (1999). Here, “0” would indicate that the attribute did not appear in the annual report. A value of “1” would denote that the attribute appeared in a

discursive form. A value of “2” would be assigned if the attribute was expressed in numerical terms, and a value of “3” would be used if the attribute was quantified in currency terms. However, almost all the information in the annual reports was of a discursive form, and intellectual capital attributes were rarely quantified. Consequently, the original coding system was abandoned and only a “0” and a “1” were used, with a value of “1” indicating that the attribute was reported in some form. Attributes were mentioned multiple times in the reports, but these were mostly repetitions of the same basic attribute and the number of occurrences was ignored, i.e. a value of “1” was chosen to mean that the attribute was mentioned at least once. Information from the content analysis was summarised in a table identifying the incidences of intellectual capital reporting for the 20 chosen companies.

Interviews

Interviews were conducted with senior representatives from the mining companies:

- Anglo American;
- Anglo Platinum;
- Anglo Gold;
- BHP-Billiton;
- De Beers;
- Implats; and
- Lonmin.

Face-to-face interviews were arranged where possible but, due to the busy schedules of the senior representatives, most interviews were via telephone. Interviews were conducted in conjunction with an intellectual capital questionnaire which was based on the chosen intellectual capital framework. Most representatives chose to fill in the intellectual capital questionnaire a week or two after the interview in order to source additional information and/or other people’s input. As such, the responses to the intellectual capital questionnaire can be regarded as the best available company response in this study.

Internal capital	External capital	Human capital
Patents	Brands	Employee know-how
Copyrights	Customers	Employee education
Trademarks	Customer loyalty	Vocational qualifications
Management philosophy	Company names	Work-related knowledge
Corporate culture	Distribution channels	Work-related competency
Management processes	Business collaborations	Entrepreneurial spirit
Information systems	Licensing agreements	
Networking systems	Favourable contracts	
Financial relations	Franchising agreements	

Table II.
Intellectual capital framework used in the study

In the first part of the questionnaire, companies were asked to give their views on the relative usefulness of the 24 intellectual capital attributes in the framework using a Likert rating scale of 1 to 5, as per the method of Miller *et al.* (1999). In the second part of the questionnaire, companies were asked to specify the actual metrics they use to quantify these attributes.

Analysis of the interviews was relatively straightforward and involved representing information as a descriptive summary of findings containing company perspectives, opinions and insights on intellectual capital. Analysis of the intellectual capital questionnaire was more complex. All companies rated the attributes accordingly and most mentioned the actual metrics they used but, in some cases, companies responded with a simple “yes” or “no” as to whether they measure a specific attribute or not, for reasons of confidentiality. Consequently, the specific metrics were not used in the analysis but rather a value of “1” was used to indicate that an attribute was measured in some way or another, while a value of “0” indicated that it was not measured. Information from the intellectual capital questionnaire was summarised in two separate tables identifying the relative importance of intellectual capital attributes and their associated measurement for the seven mining companies.

Critique of methodology

The methodology proved to be practical and useful, but involved a large number of subjective “judgement calls” by both researchers and interviewees. The content analysis involved the application of judgement in deciding whether an attribute was indeed mentioned or not. It was frequently difficult to decide whether a paragraph in an annual report contained a specific reference to an intellectual capital attribute, or whether it was just a pro forma corporate statement, e.g. “our employees are our greatest asset”. These potential errors in judgement were exacerbated by the fact that annual reports are often hundreds of pages long and contain an enormous amount of information. Reader fatigue and information desensitisation could have resulted in some errors and omissions. In addition, content analysis is a static tool that identifies what is happening at a particular point in time, and does not identify long-term strategy.

The value of the interviews and the questionnaires rest heavily on the level of understanding, the sincerity and the commitment of the interviewees to expressing their company’s perspectives on intellectual capital (Powney and Watts, 1987; Glassner and Moreno, 1989; Hammersley, 1989). All participants in the study took it very seriously and went out of their way to provide meaningful responses, but most were extremely busy and might not have had time to provide as full and accurate a response as would have been preferred – the issue of time constraints is a real issue in conducting research in the business environment, particularly when senior managers and executives are involved. There is also the possibility of the misinterpretation of information due to differences in the understanding of intellectual capital between ourselves

and the relevant companies. We attempted to minimise this possibility, taking cognizance of the work of Dillon *et al.* (1987), Weber (1990) and Miles and Huberman (1994), by providing companies with a summary of intellectual capital and a list of definitions of the specific intellectual capital attributes. However, intellectual capital is a complex, intangible subject and there can be no doubt that some (largely subjective) “errors” were made both by ourselves and by the mining companies. Nonetheless, we are of the opinion that the methodology used in the study represents a (first) best effort at obtaining information on the level of intellectual capital measurement, reporting and management in South African mining companies.

Results and discussion – annual reports

The following section presents results and discusses findings from the content analysis of the annual reports of the 20 largest South African listed companies. The section first focuses on individual intellectual capital attribute reporting and then considers reporting per intellectual capital category. This is followed by an analysis of reporting per sector, and finally a comparison is made to Guthrie’s Australian findings (Guthrie *et al.*, 1999). Note that where data is presented as “external”, “internal” and “human” capital, this refers to the combined averages for the individual intellectual capital attributes in the external, internal and human capital categories. Similarly, “intellectual” capital refers to the combined average of all 24 intellectual capital attributes, i.e. the grand total. Also note that all information has been converted to percentages for comparative purposes. Here, 0 per cent implies zero occurrences while 100 per cent implies the maximum number of occurrences, depending on the nature of the information presented.

Individual attribute level findings

Figure 1 shows the total number of occurrences per intellectual capital attribute for the 20 company annual reports that were analysed. This number is displayed as a percentage “incidence of occurrence”, where the maximum number of possible occurrences for any attribute is 20, i.e. 100 per cent. The top five occurrences were for:

- (1) business collaborations – 100 per cent;
- (2) work-related competencies – 80 per cent;
- (3) management processes – 80 per cent;
- (4) customers – 75 per cent; and
- (5) brands – 60 per cent.

The five lowest occurrences were for:

- (1) copyright – 0 per cent;
- (2) patents – 5 per cent;

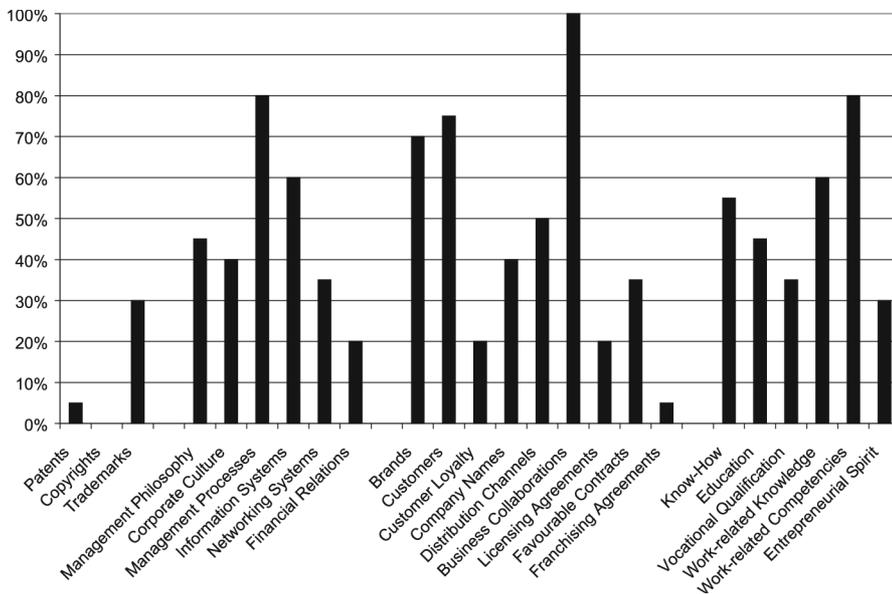


Figure 1.
Incidence of reporting
(%) per attribute

- (3) franchising agreements – 5 per cent;
- (4) licensing agreements – 20 per cent; and
- (5) customer loyalty – 20 per cent.

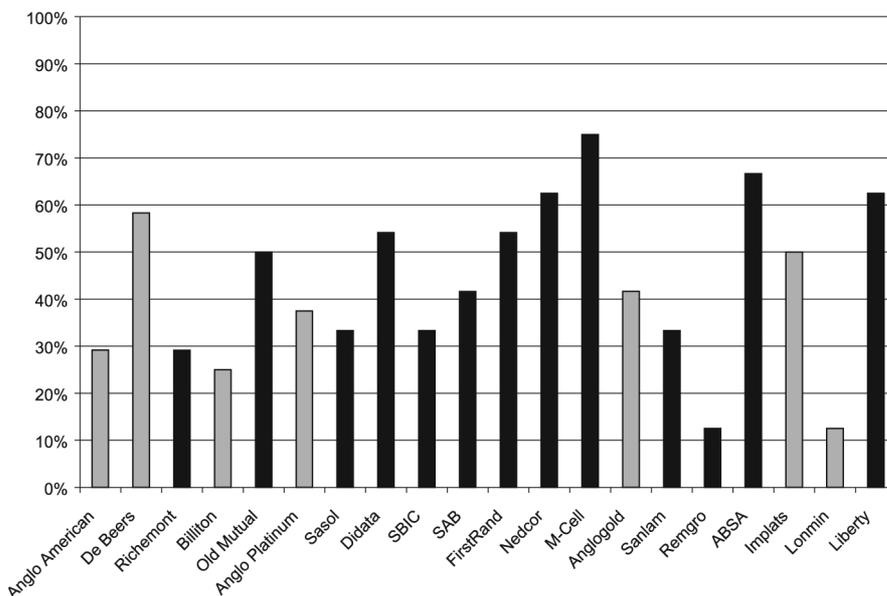
According to the intellectual capital framework used, a company can record a maximum of 24 attributes. Figure 2 shows the incidence of attribute reporting for the 20 companies that were analysed. The top five companies were:

- (1) M-Cell – 75 per cent;
- (2) ABSA – 67 per cent;
- (3) Nedcor – 63 per cent;
- (4) Liberty – 63 per cent; and
- (5) De Beers – 58 per cent.

The bottom five companies were:

- (1) Lonmin – 3 per cent;
- (2) Remgro – 3 per cent;
- (3) Billiton – 25 per cent;
- (4) Richemont – 29 per cent; and
- (5) Anglo American – 29 per cent.

Figure 2.
Incidence of attribute reporting (%) per company



The shaded bars signify the seven resource or mining companies which are the focus of this study. The ranking of the mining companies, from highest to lowest are:

- De Beers – 58 per cent;
- Implats – 50 per cent;
- Anglogold – 42 per cent;
- Anglo Platinum – 38 per cent;
- Anglo American – 29 per cent;
- Billiton – 25 per cent; and
- Lonmin – 3 per cent.

The average attribute occurrence for all 20 companies is 43 per cent, with only two of the seven mining companies managing to score above this average (De Beers and Implats).

Category findings

Figure 3 shows the breakdown of reporting in terms of average percentage occurrence per intellectual capital category, for the three categories of internal, external and human capital. Internal capital and human capital are closely matched at about 30 per cent, while external capital is significantly higher at 40 per cent. There is clearly more of a focus on external capital, which is not surprising considering that many of the companies under consideration

compete globally and are focused on the external drivers of intellectual capital such as business collaborations, customers, brands and distribution channels.

Country findings

As mentioned previously, a content analysis of company annual reports was first conducted on Australian companies by Guthrie *et al.* (1999), followed by a similar study on Irish companies by Brennan (1999). However, Brennan (1999) concentrated specifically on knowledge companies, whereas both this study and the Australian study concentrated on the top 20 listed companies in terms of market capitalisation. Consequently, a direct comparison between the current South African study and the Australian study is possible, as shown in Table III. The results for the two studies are strikingly similar. The average number of attributes per company is higher for the South African study and high enough to suggest that there is an awareness of the importance of intellectual capital. This also indicates that companies realise the importance of reporting intellectual capital to an external audience.

Figure 4 compares the reporting of specific intellectual capital attributes for the Australian and South African studies. In the Australian study, entrepreneurial spirit was the most frequently reported attribute (19 out of 20 companies) compared against the South African study where only six companies mentioned the importance of entrepreneurialism. South African companies appear to be much more focused on business collaborations and securing favourable contracts than their Australian counterparts.

Figure 5 compares the relative emphasis South African and Australian companies place on the overall intellectual capital categories. The results for

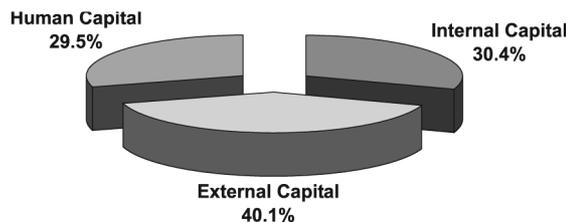


Figure 3. Average (%) occurrence per intellectual capital category

	Australia ^a	South Africa ^b
Number of companies	20	20
Number of sector groups	10	9
Number of IC attributes in model	24	24
Average number of IC attributes reported	8.9	10.4
Minimum number of IC attributes reported	2	3
Maximum number of IC attributes reported	17	18

Table III. Descriptive statistics for the Australian and South African studies

Sources: ^aGuthrie *et al.* (1999); ^b this study

Figure 4.
Frequency of reporting
of attributes for
Australia and
South Africa

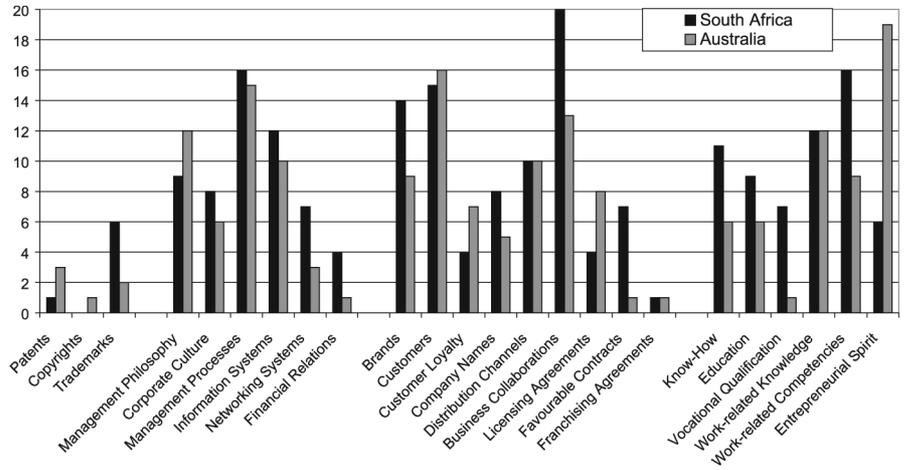
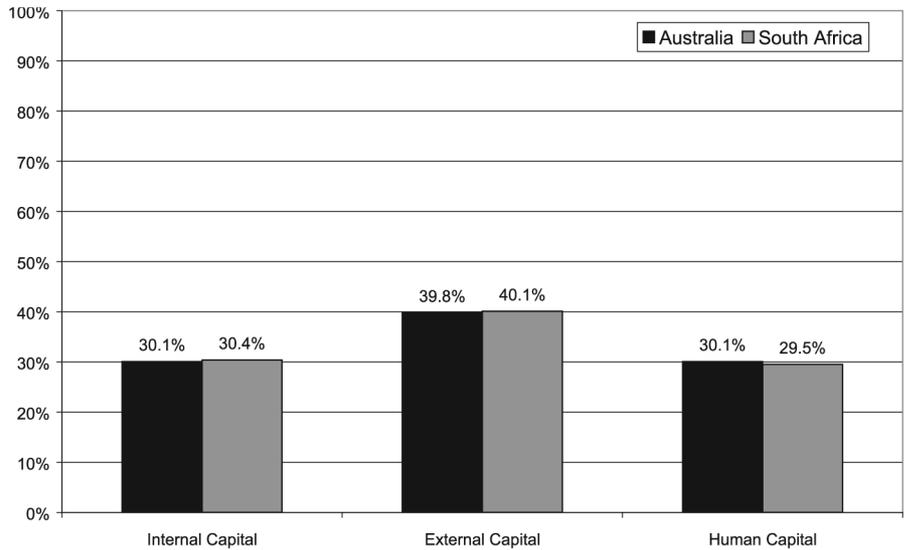


Figure 5.
Comparison between
intellectual capital
categories



South Africa are virtually identical to those for Australia, with both countries emphasizing the reporting of external capital. Guthrie *et al.* (1999) were not surprised by these findings and ascribed this to the emphasis, in recent years, on the rationalising of distribution channels, the reconfiguring of firm value chains and the re-assessment of customer value, i.e. findings are consistent with the increased global competition that companies are experiencing.

Results and discussion – interviews

The following section presents results and discusses findings from the interviews, intellectual capital questionnaires and annual reports from the seven South African mining companies. Note that the data presented is average data for all seven companies, and that information has been converted to percentages for comparative purposes. Here, 0 per cent implies either “not useful” or zero occurrences, while 100 per cent implies “very useful” or the maximum number of occurrences, depending on the nature of the information presented.

Overview

During the course of the study, we had the opportunity to discuss the topics of “intellectual capital” and “knowledge management” with many senior people in the South African mining industry. We also made use of suitable opportunities to obtain the opinions of people from non-South African mining companies, such as Rio Tinto. We were surprised to find that, contrary to our original expectations, most companies were very aware of the importance of intellectual capital and knowledge management. Several companies even had active intellectual capital and/or knowledge management initiatives underway, championed by an appointed intellectual capital/knowledge manager. However, it was also clear that these initiatives were still in their infancy and that there was a lot of confusion in the various companies, particularly among middle-to-low level employees, with respect to the meaning of intellectual capital, and its role in the organisation. Intellectual capital was often confused with related legal or balance sheet items, such as intellectual property.

The “responsibility” for managing intellectual capital also appeared to vary from company to company, and in most cases was spread over several departments or people. The level of understanding and opinions of these people, with respect to the topic of intellectual capital, also varied quite considerably. Certain people were enthusiastic and well-informed proponents of intellectual capital, while others had a vague understanding and were either indifferent or ambivalent towards the subject. Overall, we can summarise by stating that there is a growing awareness of the importance of measuring, reporting and managing intellectual capital in the mining industry, but that the appropriate structures have yet to be put in place to manage this meaningfully.

Rating of intellectual capital attributes

Average Likert ratings for the 24 individual intellectual capital attributes are shown in Figure 6. Ratings are fairly high across the full set of indicators, even with attributes such as trademarks, brands and franchising agreements achieving reasonable scores (even though these would not generally be associated with a resource company). However, it would appear that mining companies value their management, their culture, and their people most of all as management philosophy, corporate culture and employee know-how/competence are the most highly valued attributes, at over 90 per cent.

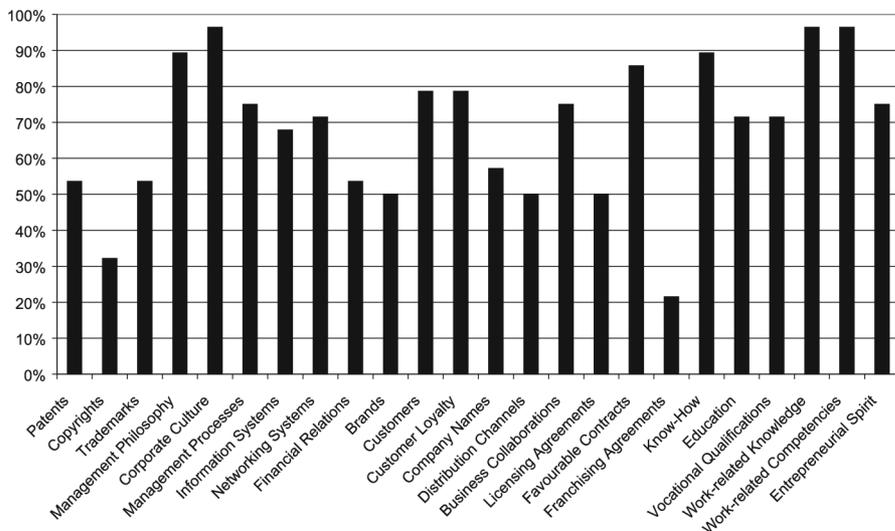


Figure 6.
Ratings versus
intellectual capital
attributes

On average, mining companies rate human capital at over 80 per cent, nearly 20 per cent ahead of either internal or external capital. The overall intellectual capital rating comes out at 68 per cent, which is considerably higher than one might have expected from resource companies whose profitability relies heavily on exploiting hard, tangible assets due to the capital-intensive nature of their operations.

Measurement of intellectual capital attributes

Average incidence of measurement for the 24 individual intellectual capital attributes are shown in Figure 7. Unfortunately, it would appear that the mining industry’s enthusiastic rating of the various intellectual capital attributes are not coupled to measuring these attributes in practice. Indeed, the overall incidence of actually measuring intellectual capital attributes (36 per cent) is about half that of the rating for these attributes (68 per cent). However, it is reassuring to observe that the highly valued attributes of corporate culture and employee know-how/competence are indeed measured, through culture surveys, career development programs and performance reviews. Management philosophy and entrepreneurial spirit are two attributes with the largest difference between rating and measurement (over 60 per cent), suggesting that companies need to develop measures for these important, yet intangible attributes.

Reporting of intellectual capital attributes

Average incidence of reporting for the 24 individual intellectual capital attributes are shown in Figure 8. There appears to be a similar level of reporting of intellectual capital attributes to the measurement of these attributes as most are well below 50 per cent, with the overall intellectual

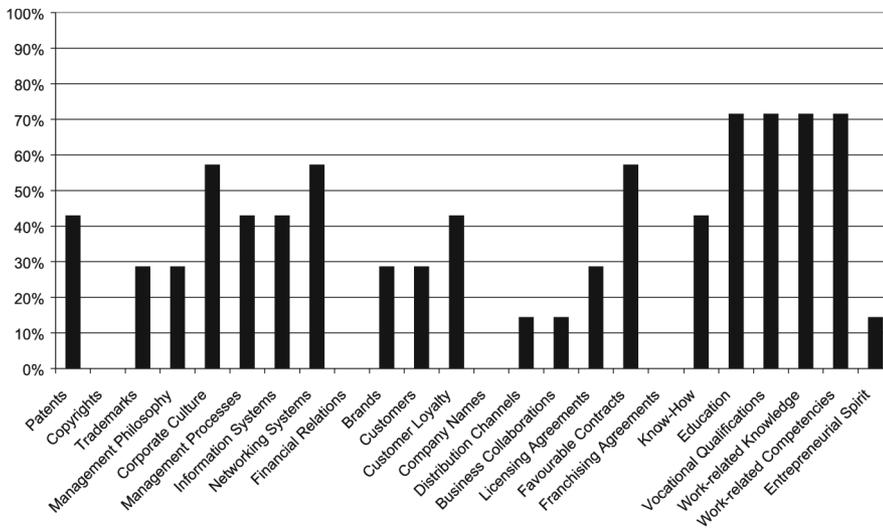


Figure 7.
Incidence of
measurement (%) versus
intellectual capital
attributes

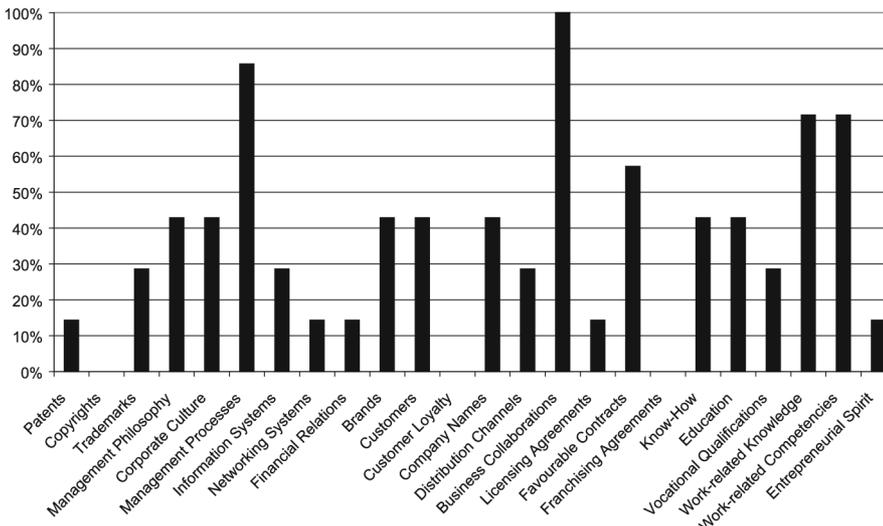


Figure 8.
Incidence of reporting
(%) versus intellectual
capital attributes

capital values being identical at 36 per cent. However, more emphasis is placed on reporting “concrete” attributes such as specific management processes and business collaborations, although employee know-how/competence is still fairly high at just over 70 per cent. In addition, more emphasis is being placed on the reporting of external capital, such as business collaborations, which reflects the industry’s current focus on global expansion through acquisitions and partnerships.

Summary and conclusions*Annual reports*

Individual attribute level findings indicate that the top 20 companies place the most emphasis on the reporting of business collaborations, work-related staff competencies, management processes, customers and brands. Companies place least emphasis on the reporting of copyrights, patents, franchising agreements, licensing agreements and customer loyalty. A ranking of the attribute reporting incidence per company shows that only two of the seven mining companies managed to score above the overall average for all 20 companies (De Beers and Implats). This indicates that mining companies either have a lower awareness of intellectual capital, or have a lower propensity to report on intellectual capital relative to other companies. M-Cell confirmed its reputation as an intellectual capital benchmark company in South Africa by scoring the highest incidence of attribute reporting. Intellectual capital category findings indicate that the 20 companies tend to report more on external capital than on either internal or human capital, which are equally weighted. The tendency to report on external capital is attributed to globalisation pressures and the increasing need for companies to focus on external factors such as distribution channels, value chains and customer relationships.

Comparisons between the South African and Australian industries show that South African companies are more focused on business collaborations and securing favourable contracts than Australian companies. Intellectual capital category findings for the two countries are almost identical, with companies from both countries placing most emphasis on the reporting of external capital. The content analysis indicates that South African mining companies generally have a low awareness of their intellectual capital assets, or do not see the need to report on them. Alternatively, as per Guthrie *et al.* (1999), this may be attributed to the lack of an established and generally accepted framework for intellectual capital reporting. Such a framework would enable companies to report on their intellectual capital assets to shareholders and stakeholders, resulting in better investment and strategic decisions.

Interviews

Figure 9 summarises the current state of intellectual capital rating, measurement and reporting for the South African mining industry. Mining companies rate human capital highest of all, at over 80 per cent followed by internal and external capital. This suggests that the industry has a strong internal focus and relies more heavily on its own resources than on external networks. Incidence of measurement and reporting of intellectual capital generally track the ratings, implying that mining companies do attempt to quantify attributes they value. However, on average, incidence of measurement and reporting are significantly lower than the corresponding ratings. Mining companies clearly value intellectual capital, but have some way to go in

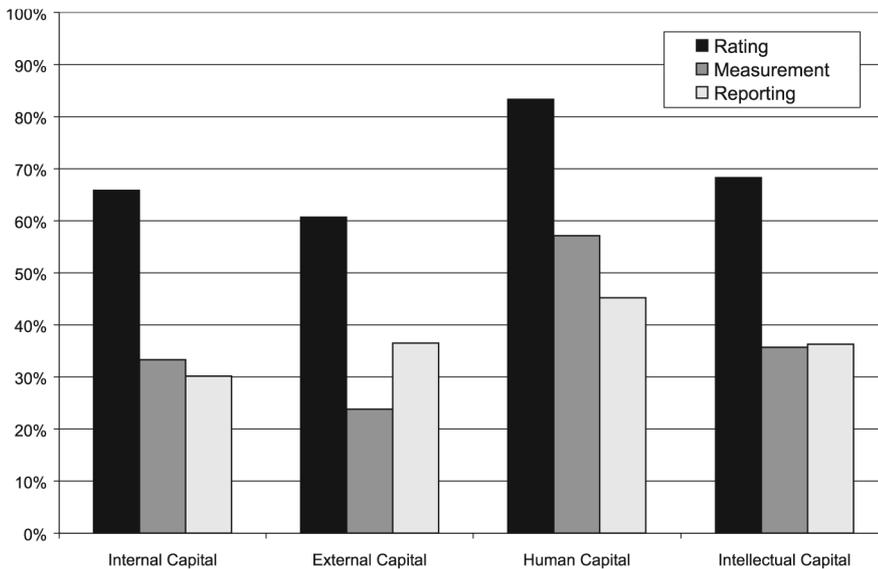


Figure 9.
Ratings (%) versus
external, internal, human
and intellectual capital

implementing appropriate systems and structures to manage intellectual capital meaningfully. This corresponds with impressions gained from personal discussions with senior managers and executives in the South African mining industry outlined previously.

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