"Investigating the use of business, competitive and marketing intelligence as management tools in the mining industry"

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Abstract

The main objective of this research study is to investigate the extent to which business intelligence, competitive intelligence and marketing intelligence are used within the mining industry. Business intelligence, competitive intelligence and marketing intelligence are the management tools used to mine information to produce up-to-date intelligence and knowledge for operative and strategic decision making.

A structured questionnaire is used for the study. A total of 300 mines are randomly selected from a research population of mining organizations in South Africa, Africa and globally. The respondents are all part of senior management. A response rate of 64% is achieved. The results indicat that more than half of the respondents do not have real-time intelligence and proper data mining tools to identify patterns and relationships within a data warehouse. Although a large proportion agrees that their organizations have systematic ways of gathering these different types of intelligence and use them for strategic decision making, there is a significant proportion that did not have any systems.

Statistically and practically significant positive relationships with a large effect are found among the dimensions of business intelligence, marketing intelligence, competitive intelligence and perceived business performance.

Keywords: business intelligence, competitive intelligence, marketing intelligence, mining industry.
JEL Classification: M10, M15.

Introduction

This study focuses on investigating the use of business intelligence, competitive intelligence and marketing intelligence in the mining industry. A background to the research study will be provided to enable the framing of the research focus. Subsequently, the research objectives and an overview of the research methodology will be presented. The results of the empirical study will, thereafter, be reported. Finally, the conclusion resulting from the study will be discussed, as well as any recommendations that can be made to management and for future studies.

1. Background

According to Igbaekemen (2015), reliable data and information form the basis of any strategic management decision and also for all the investigative and analytical efforts of managers. Obtaining accurate and reliable relevant information promptly from both external and internal sources can assist in anticipating, identifying, analyzing and resolving or preventing problems. The environment within which organizations operate is also changing at an accelerating rate, so there is a pressing need for real-time intelligence and information. This research focuses on three constructs of intelligence which are defined below.

According to Troy Media (2015), business intelligence (BI) is the analysis of the organization's internal data. BI is about gathering large amounts of raw data concerning all aspects of business, from profits and losses to productivity, and converting them into actionable insights. Organizations use business intelligence to make improvement to current processes, products and services, as well as identify and develop new opportunities. Coker (2014) views business intelligence as the means by which an organization collects its own information about customers, returning clients, sales or website hits and transforms the numbers into measurable metrics to ascertain that the organization is performing efficiently. BI depends mainly on technology, using applications and processes to analyze the (mostly internal) data. One of the main benefits of BI is that it permits the organizations to contextualize both historical and current data, which enables them to make better and informed predictions. It is also critical for effective measurement of benchmarks or performance metrics. Organizations have also realized that BI gives them an opportunity to gain insight and enhance decision-making capabilities to assist other organizations in uncovering new opportunities, improving efficiency and achieving strategic goals (Gartner, 2013). BI has applications across all levels of an organization, from research and development, product development and pricing to staffing and strategic planning process improvement (Troy Media, 2015).

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While business intelligence focuses, to a large extent, on the organization's internal data, competitive intelligence focuses mainly on the external factors that affect the operation. Competitive intelligence (CI) means looking at the state of the competitive environment, in which the organization operates, to identify trends and detect potential threats, as well as points of possible differentiation (Pellissier & Nenzhelele, 2013, p. 5).

According to Anica and Cucui (2009) and Troy Media (2015), competitive intelligence usually involves looking thoroughly at the competitors, and assessing their strengths and weaknesses to identify possible opportunities. CI involves taking the information that has been gathered and converting it into actionable insights to gain competitive advantage – for example, analyzing poor performance of a rival in a certain market can provide information about what not to do and generate some ideas for a successful market penetration strategy. CI practitioners emphasize that in order for data to be considered as real and true competitive intelligence, it has to be actionable. It is also of utmost importance to differentiate between competitive intelligence and corporate or competitive espionage. Competitive intelligence is completely legal and is collected using publicly available information. Corporate espionage or collecting information about the rivals via questionable ways (such as hacking, posing as a potential customer or poaching employees) is not only unethical, but also illegal, in most instances.

According to Kotler et al. (2009), marketing intelligence (MI) is industry-targeted intelligence which is developed on real-time dynamic features of competitive developments happening among the 4Ps of the marketing mix (pricing, place, promotion and product) in the market-place to assist in understanding the attractiveness of the market. MI is the information related to organization's markets, collected and examined specifically for a correct and well-informed decision making in formulating strategy in areas such as market opportunity, market penetration strategy, and market development.

The problem statement is discussed below.

2. Problem statement

Mining organizations across the globe face significant challenges, putting the industry at a crossroad. The pressure on these mining organizations is great for them to be efficient, productive and remain profitable in spite of challenges such as volatile commodities market (Deloitte, 2014). Lack of credible information and knowledge of decisions taken by all stakeholders within the mining organizations has led to the

weakening and even failure of some of these mines. A lot of data are produced continuously at a site of the mine. Without a proper and systematic way to organize these data and present them in a timely, simplified, easily accessible and accurate manner, tactical and strategic decisions regarding the operations and long term sustainability of a mine site become very challenging (Mining Weekly, 2013). Some mining organizations are still not capable of reading the competitive trends and forces affecting the industry. Some mines cannot benefit from any form of intelligence, because it is not integrated, organized, processed and available to the right people in a format for decision making. There are isolated pools of data which are mainly influenced by the functional view of the business units rather than a broader, general management view of the whole mining organization. Some managers have limited access to corporate-wide data and mental models transformed into information and knowledge upon which they can effectively act with agility. Decisions are, in some cases, made on an event-by-event basis as opposed to being made within a set of strategic parameters (Buthelezi, 2013).

According to Kumari (2013), business intelligence is needed to evaluate the cost-benefit of existing and new operations and technologies, as well as to forecast future technological and operational discontinuities. Competitive intelligence is required to assess the development of competitive strategy over time through changes in competitors' structure, new product substitutes and new industry. Marketing intelligence is also needed by mine managers to provide the means of assessing the current and future trends in customers' preferences and needs, new markets and creative segmentation opportunities together with the main shifts in marketing and distribution.

There is a scarcity in empirical literature about the use of different types of intelligence in the mining sector. This prompted the research to investigate the use of business intelligence, marketing intelligence and competitive intelligence and how they contribute to business performance in the sector. This study will not only aim to improve understanding of these different types of intelligence, but also produce findings of practical relevance and value for the mining and other sectors. Therefore, this research seeks to contribute to both management practitioners and academics alike.

The research objectives of the study are outlined below.

3. Research objectives

The primary aim of this research study is to investigate the extent to which business intelligence, competitive intelligence and marketing intelligence

are utilized within the mining industry. The secondary objectives are:

♦ To empirically assess a correlation between business performance of the organization and the dimensions of business intelligence, competitive intelligence plus marketing intelligence.

♦ To determine the demographic differences in terms of geographic location of the organization.

The research methodology used for this study is discussed below.

4. Research methodology

4.1. Research design and sample. A survey design was used in which a selected sample was studied to make inferences about the population. The survey involved selecting a representative and unbiased sample of subjects drawn from senior management in the mining organizations in South Africa, Africa and globally. The researcher used a simple random sampling technique to select participants. Saunders et al. (2009) state that simple random sampling involves the selection of a sample at random from the sampling frame using either random number tables or a computer. A total of 300 mines were randomly selected from a population of 850. A response rate of 64% was achieved.

The survey questions were developed based on the existing literature with some questions adopted from a questionnaire from a study by Kruger (2010). The structured questionnaire used was divided into sections comprising the biographic information, items of business intelligence, competitive intelligence, marketing intelligence and perceived business performance which were measured using a 4-point Likert-type scale.

4.2. Statistical analysis. The data received from the completed questionnaires were captured and analyzed with the use of the statistical software program SPSS and STATISTICA with the assistance of the Statistical Consulting Services of the North-West University. Descriptive statistics and effect sizes were used to decide on the significance of the findings. The results are to be compared by way of mean and standard deviations. Confirmatory Factor Analysis (CFA) was used to verify the factor structure of the set of variables. Cronbach's Alphas were computed to assess the reliability of the measuring instrument. Pearson product-moment correlation coefficients were calculated to identify the relationships between the variables. The statistical significance level is set at a 95% confidence interval ($p \leq 0.05$). The cut-off point of 0.30 is used to determine practical significance of a medium effect. ANOVA was employed to determine differences between the groups in the sample.

5. Presentation and discussion of results

The results of the empirical study are reported and discussed below. Firstly, the results from the biographical questionnaire are discussed and, secondly, an interpretation of the data from the instrument used is presented.

Biographical information was reported for number of employees in the organization, level of employment, type of metal mined or processed, number of years the organization has been operating, and the geographic location.

A total of 193 questionnaires were received representing a response rate of 64%.

The majority of the respondents were working for the mines with more than 1000 employees (66%) followed by those in smaller operations with less than 499 employees (18%). The respondents from medium sized mines with 500 to 999 employees were about 16%.

The majority of respondents were managers (57%) followed by directors (34%) and CEOs (9%).

About 51% of the respondents were from the mines producing precious metals such as gold and platinum group metals. A number (17%) of the respondents were from coal mining organizations, while about 11% were from the steel industry. About 12% were from the mines producing non-ferrous metals such as copper and only 8% were in the industrial metal mines.

The majority of the respondents were from the mines with more than 20 years in operation (87%), which serves as a confirmation that most of the mines in the world have been operating for decades. Most of the respondents were from the South African mining operations (55%), other respondents were from the rest of Africa (23%), while the respondents from other continents such as USA and Australia formed only about 21% of all the respondents.

The results of descriptive statistics are presented in the next section.

6.1. Descriptive statistics. *6.1.1. Business intelligence.* One of the main objectives of this study was to measure the extent of the use of the business intelligence by the mining organizations. The results are presented in Table 1. The mean score for item F1 is above 3 indicating that about 75% of the mining organizations systematically collect information to assist in strategic decision making. The standard deviation for the question was relatively high indicating a high spread in terms of the responses. A significant number (25%) responded negatively to this question.

The mean score for responses to item F2 was also above 3 indicating that the majority (72%) of the participants agree that the availability of business intelligence has, to a certain extent, increased the effectiveness of decision making by the managers. A high standard deviation is also found for this item indicating a relatively large spread in terms of the responses. 28% of the participants responded negatively to this question. The mean scores for

questions F3 and F4 are 2.96 and 2.98, respectively. These mean scores are close to 3 and also indicate that most of the participants responded positively to these questions. Thus, the majority of the mining organizations have business intelligence tools which are used to manipulate data and also have some form of forecasting capabilities. About 20% of the organizations do not have such business intelligence tools or use them for these specific functions.

Table 1. Results of the questionnaire on business intelligence

		Strongly disagree	Slightly disagree	Slightly agree	Strongly agree	Mean	Std. deviation
F1	Information is systematically collected to assist in strategic decision making	13.5	11.9	32.1	42.5	3.04	1.043
F2	The availability of business intelligence has increased the effectiveness of managerial decision making	8.8	19.2	25.9	46.1	3.09	1.001
F3	Business intelligence tools are used to manipulate data, e.g., operational or/and historical data	9.3	14.0	47.7	29.0	2.96	.898
F4	The business intelligence tools have forecasting capabilities	7.3	10.4	59.1	23.3	2.98	.794
F5	Data gathered from business intelligence deployment is reliable	7.8	1.6	70.5	20.2	3.03	.728
F6	Knowledge generated from successful business intelligence deployment can be used to sustain competitive advantage	3.1	10.4	57.5	29.0	3.12	.711

Source: compiled by authors from survey results.

About 91% of the respondents agree that the data they gathered from BI deployment are reliable. However, about 9% completely disagree and believe that the data are not reliable. The mean score of 3.12 for the last question indicates that most (87%) of the participants agree that the knowledge generated from the deployment of BI systems can be used to sustain competitive advantage.

In general, a large proportion of the participants responded positively to the questions about business intelligence. This indicates that most of the mining

organizations are using some form of business intelligence in their strategic decision making.

The other objective of this study was to measure the extent of the use of competitive intelligence by the mining organizations. The results are presented and discussed below.

6.1.2. Competitive intelligence. The results of the questionnaire which was measuring responses for competitive intelligence in the mining organizations are presented in Table 2.

Table 2. Results of the questionnaire on competitive intelligence

		Strongly disagree	Slightly disagree	Slightly agree	Strongly agree	Mean	Std. deviation
G1	The company collects useful information about the competitors	3.6	7.8	65.3	23.3	3.083	0.674
G2	The company collects useful information about the competitive environment	3.6	7.8	47.2	41.5	3.266	0.757
G3	Competitive analysis is conducted in a coordinated manner by various units	14.0	39.4	29.0	17.6	2.505	0.943
G4	Competitive intelligence is used in decision making processes to improve performance	4.7	11.9	65.3	18.1	2.974	0.697
G5	The company has the ability to determine the future intent of a competitive force on which the strategies are based	18.7	13.0	62.7	5.7	2.563	0.854
G6	Competitive analysis is used to create a competitive advantage	9.8	14.0	58.5	17.6	2.839	0.831
G7	Competitive analysis is focused upon the strategic requirements of the company	5.7	8.3	64.8	21.2	3.026	0.712
G8	The competitive intelligence is distributed to management in a timely fashion	17.6	30.6	36.8	15.0	2.49	0.954
G9	Management is up to date with emerging technologies in their field of business	8.8	11.9	57.0	22.3	2.938	0.823
G10	The organization is cognisant of government legislation and legislative trends that impact it	4.2	2.6	38.5	54.7	3.438	0.742
G11	There is an organized effort to channel all information about competitive forces to a central repository	14.0	22.8	50.3	13.0	2.625	0.883

Source: compiled by authors from survey results.

The mean score for question G1 is above 3 with a relatively low standard deviation. This implies that a large proportion (89%) of the respondents agree that their mining organizations collect useful information about their competitors. A similar

number (89%) of the respondents also agreed that their organizations collect useful information about the competitive environment.

The mean score for question G3 is 2.5 with a relatively high spread. This is because 53% of the

participants responded negatively to this question. Thus, more than half of the respondents do not agree that various units do competitive analysis in a coordinated manner.

In spite of a mean score of 2.9 for question G4, a large proportion (83%) agrees that CI is used in decision making processes to improve the performance of their organizations. This is in agreement with 76% who agree that competitive analysis is used to create some form of competitive advantage for their organizations. The majority of the participants also agreed that competitive analysis is focused on the strategic requirements of their organizations.

The mean score for question G8 is 2.49 with a relatively high spread of the response values. This is due to the fact that 48% of the participants responded negatively to this question. This implies that almost half of the respondents do not agree that CI is delivered to management in a timely fashion. Thus, they believe that managers do not receive information as quickly as they should.

A large proportion (79%) of the respondents agreed that their managers are up to date with emerging technologies in their field of business. The responses also imply that 21% of the managers are not up to date.

About 93% of the mining organizations are cognisant of government legislation and legislative trends that affect their businesses. The mean score for question G11 is relatively low (2.6). In spite of this, the majority (63%) of the participants agreed that there is an organized effort within their organizations to channel all the information about

the competitive forces to a central repository. However, a significant number (37%) responded negatively to this question.

The other objective of this study was to measure the extent of the use of marketing intelligence by the mining organizations. The results are presented and discussed below.

6.1.3. Marketing intelligence. The results of the questionnaire which was measuring responses for marketing intelligence in the mining organizations are presented in Table 3.

About 70% of the participants responded positively to question H1 with a mean score of 2.788. This means that a large proportion of the respondents agree that their organization has a systematic way of gathering marketing intelligence. About 30% responded negatively implying that their organization has no systematic way of gathering marketing intelligence. A large proportion (79%) of the respondents also agreed that market analysis is used to identify key threats and opportunities. The majority of the respondents also agreed that marketing intelligence is used to understand the nature of the market requirements and also help their organizations to keep abreast of the ongoing emerging circumstances. Almost 20% of the respondents did not agree. The resulting information of the marketing intelligence contributes to the decision making process, according to about 74% of the respondents who responded positively to this question. However, 26% of the participants responded negatively.

Table 3. Results of the questionnaire on marketing intelligence

		Strongly disagree	Slightly disagree	Slightly agree	Strongly agree	Mean	Std. deviation
H1	The organization has a systematic way of gathering of marketing intelligence	7.3	22.8	53.9	16.1	2.788	0.798
H2	Market analysis is used to identify key threads or opportunities	7.8	13.0	35.8	43.5	3.15	0.926
H3	Marketing intelligence is used to help the company grow (to increase revenue, profit, or market share)	9.8	6.7	55.4	28.0	3.016	0.863
H4	Marketing intelligence is used in understanding the nature of the market requirements	9.8	8.8	34.2	47.2	3.187	0.961
H5	Marketing intelligence helps the organization to keep abreast of the ongoing emerging circumstances	5.7	17.6	28.5	48.2	3.192	0.924
H6	The resulting information of the marketing intelligence contributes to the decision-making process	6.7	19.7	30.1	43.5	3.104	0.946
H7	Marketing intelligence is distributed to management in a timely fashion	13.0	25.4	43.5	18.1	2.668	0.921
H8	There is an organized effort to channel all information about the markets to a central repository	20.2	24.9	34.7	20.2	2.549	1.03

Source: compiled by authors from survey results.

The mean score for question H7 is relatively low with a large spread. This is due to the fact that 38% of the participants responded negatively to this question and disagreed that MI is distributed to management timeously. The mean score for question H8 is also low with a high spread of the response values. About 45% of the participants responded negatively to this question and disagreed that there is an organized effort to channel all the information about the markets to a

central repository. The other objective of this study was to measure the extent of the use of information systems by the mining organizations. The results are presented and discussed below.

6.1.4. Information systems. The results of the questionnaire which was measuring responses for information systems in the mining organizations are presented in Table 4.

Table 4. Results of the questionnaire on information systems

		Strongly disagree	Slightly disagree	Slightly agree	Strongly agree	Mean	Std. deviation
M1	The company's management information system provides easy access to data	1.0	11.9	70.5	16.6	3.021	0.571
M2	Intelligence data are integrated across various corporate applications	10.9	22.8	60.6	5.7	2.613	0.759
M3	Technical abilities of the IT staff related to intelligence are good	11.4	19.2	47.2	22.3	2.801	0.919
M4	There are Extraction-Transformation-Load (ETL) tools for data transfer	23.3	16.6	56.0	4.1	2.408	0.895
M5	Data warehouses are used as repository for all data relevant to an organization	21.2	15.5	61.7	1.6	2.435	0.843
M6	On-Line Analytical Processing (OLAP) techniques are used to analyze and report data from huge data sources	15.5	14.5	69.4	.5	2.550	0.758
M7	The organization has data mining tools to identify patterns and relationships within a data warehouse and create detailed reports	17.1	29.0	43.5	10.4	2.476	0.899
M8	The organization has real-time intelligence capabilities	27.7	25.1	38.2	8.9	2.283	0.970

Source: compiled by authors from survey results.

A mean score of 3.02 with a standard deviation of 0.57 was obtained for question M1. About 87% of the respondents agreed that the information system in their organization provides easy access to data. Only 13% responded negatively to this question.

The mean for question M2 was relatively low due to the fact that almost 34% of the participants responded negatively indicating that the intelligence data are not integrated across various corporate applications in their organizations. About 69% of the respondents believed that the technical abilities of their IT staff related to intelligence are good whereas 31% believed their skills were not good enough. The rest of the questions had low mean score due to the following:

♦ About 40% of the respondents indicated that their organizations do not have ETL tools for data transfer.

♦ About 37% of the participant responded negatively to question M5 indicating that data warehouses are not used as repository for all data relevant to their organization.

♦ About 30% of the respondents do not use OLAP techniques in the organizations.

♦ About 46% of the respondents do not have proper data mining tools to identify patterns and relationships within a data warehouse.

♦ More than half (53%) of the respondents indicated that their organizations do not have real-time intelligence.

The data for the perceived business performance of the organizations are presented and discussed below.

6.1.5. Perceived business performance. The results for the overall business performance are shown in Figure 1.
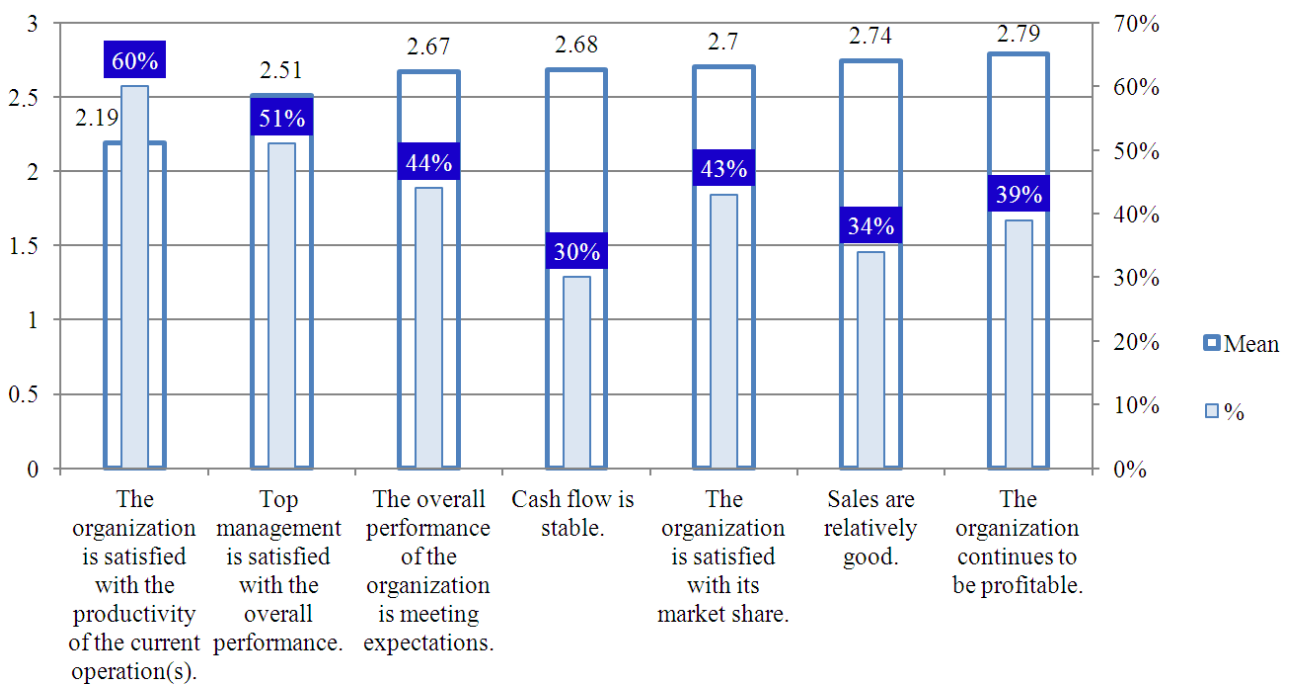

Fig. 1. Mean scores in ranking order for perceived business performance

Source: compiled by authors from survey results.

About 60% of the organizations were not satisfied with the productivity of their current operations. Top management was not satisfied with overall performance in 51% of the organizations. The overall performance of 44% of the mines was not meeting expectations, this is in agreement with the 39% whose organizations were not profitable. 43% of the mines were not satisfied with their current market share. A significant number (30%) of the mines indicated that their cash flows were not stable at all.

The other objective was to confirm the factor reliability of the dimensions which were used. The results are shown in the following section.

6.2. Factor analysis. An instrument is said to have high reliability if it can be trusted to give an accurate and consistent measurement of an unchanging value. Reliability was calculated and evaluated by means of Cronbach's Alpha. Sekaran and Bougie (2010) suggest that the Cronbach's Alpha coefficient should be greater than 0.70, for the data to be regarded as reliable and internally consistent. Factor reliability of the identified dimensions is presented in Table 5.

All the factors display satisfactory levels of reliability with Alpha coefficients ranging from 0.90 to 0.96.

Table 5. Results of factor reliability

Factor	Cronbach's Alpha	Cronbach's Alpha based on standardized items	N of items	Mean	Minimum	Maximum	Variance
Business intelligence	0.900	0.908	6	3.039	2.964	3.124	0.004
Competitive intelligence	0.943	0.946	11	2.886	2.490	3.438	0.099
Marketing intelligence	0.959	0.959	8	2.957	2.549	3.192	0.064
Business performance	0.946	0.946	7	2.613	2.192	2.788	0.042
Information systems	0.916	0.917	8	2.573	2.283	3.021	0.0564

Source: compiled by authors from survey results.

The number of items loaded on each factor are shown in the Table. The mean values are also shown. The highest mean score was obtained for business intelligence indicating that the largest proportion of participants responded positively to the items of this factor. The lowest mean was obtained for the information systems factor as it had the highest number of negative responses.

The other main objective is to determine if there are any positive relationships among the different constructs of intelligence and the performance of those organizations. The results of those correlations are shown and discussed below.

6.3. Correlations. The results of the product-moment correlation coefficients between the constructs are reported in Table 6.

Table 6. Correlation coefficients between intelligence and business performance dimensions

	Business performance	Business intelligence	Competitive intelligence	Market intelligence
Business performance	1.000	.796**	.723**	.826**
Business intelligence	.796**	1.000	.877**	.878**
Competitive intelligence	.723**	.877**	1.000	.826**
Marketing intelligence	.826**	.878**	.826**	1.000

**. Correlation is significant at the 0.01 level (2-tailed).
Source: compiled by authors from survey results.

The Table shows that business intelligence dimension is positively correlated to *business performance* (practically significant, large effect). *Marketing intelligence* is positively correlated to *business performance* (practically significant, large effect). *Competitive intelligence* is positively correlated to *business performance* (practically significant, large effect). All the dimensions of intelligence are positively correlated to the overall business performance of the organization (practically significant, large effect).

The other objective of this study was to compare the findings based on the demographic differences. This was achieved by using the ANOVA tools to establish if there were any significant differences in the responses based on the biographical information of the participants. The results are discussed below.

6.4. Differences according geographic location. The data indicated that mines in other continents have relatively higher means implying that they use these different types of intelligence more than those in SA and the rest of Africa. Lowest means were observed for mining organizations in Africa.

Conclusions

Conclusions regarding the specific theoretical objectives and the results of the empirical study are made.

Conclusions regarding the specific theoretical objectives. To answer the first objective of the study with regard to the conceptualization of different types of intelligence, from the literature review, the following came out.

Business intelligence technologies give historical, current and predictive insight of business operations and use technologies, processes and applications to examine mostly internal, structured data and business processes, whereas competitive intelligence collects, assesses and disseminates information with a topical focus on the rivals. Competitive and marketing intelligence are both involved with the development of a logical program for gathering, examining and handling external information and knowledge to enhance organizational decision making capabilities. Marketing intelligence is focused on the organization's markets, whilst competitive intelligence is mainly focused on the competition.

The mining industry, like other organizations, uses information to expand and maintain competitive advantage in the current information age in which knowledge is power. Collecting information and transforming these raw data into intelligence is an essential aspect of business. By utilizing information systems when generating intelligence, the wealth of available information can enable mining organizations to achieve competitive advantage to survive and succeed in the long term.

Conclusions regarding the specific empirical objectives. The other main objective was to determine to what extent the different types of intelligence are used within the mining industry.

Results of the factor analysis showed that all the factors displayed satisfactory levels of reliability. More than half of the respondents indicated that their organizations do not have real-time intelligence. About 46% of the respondents do not have proper data mining tools to identify patterns and relationships within a data warehouse.

The other objective was to determine the relationship between the dimensions of intelligence and the performance. The results indicated that 60% of the organizations were not satisfied with the productivity of their current operations. The overall performance of 44% of the mines was not meeting expectations. About 30% of the mines indicated that their cash flows were not stable at all.

The results also confirmed that a statistically and practically significant positive relationship with a large effect exists between business intelligence, competitive intelligence and marketing intelligence dimensions, and business performance.

The data also indicated that mines in other continents use the different types of intelligence more than those in SA and the rest of Africa.

Recommendations

Based on the review of literature and the empirical data generated in this study, the researcher makes the following recommendations to the managers of the mining organizations. The recommendations are, generally, applicable to any industry:

♦ Organizations need to systematically and continuously collect information from their own internal business operations, the competitive environment, the competitors and the markets to assist in operational, tactical and strategic decision making.
♦ All forms of intelligence need to be distributed to management in a timely fashion.
♦ The organizations need to make an organized effort to channel all the information gathered from all types of intelligence to a central repository.
♦ The organization's information system should be tailored in such a way that it provides easy access to the required data.
♦ Intelligence tools used by the organizations should have forecasting abilities.

The intelligence activities are a key input variable in all strategic decision making. As organizations seek sustainable growth in global business, it is essential for them to have accurate and timely intelligence concerning threats and opportunities in the international business environment. This is the reason why organizations have been found to use various types of intelligence systems to gather and process this intelligence. The integration of business intelligence, competitive intelligence and marketing intelligence is recommended and should be enabled as a strategic function of the organization to inform and improve the decision making process of the managers. Some of the benefits of such convergence would be innovation, marketing differentiation, anticipating new markets, avoiding cost, customer satisfaction, winning market share, and revenue prospect. In general, mining organizations need to structure their data so that they can find answers easily, share timely information, make better business decisions, improve productivity and allow flexibility for future growth.

Participants in different geographic areas responded differently to the questions about intelligence dimensions and business performance. Possible reasons for this can be established by further research.

The researcher has made a proposal for the integration of different types of intelligence; generation of more empirical data to support this can also be done by further research.

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