# THE BENEFITS OF IMPLEMENTING BUSINESS INTELLIGENCE SOLUTIONS IN A SOUTH AFRICAN BANKING INSTITUTION

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Business intelligence (BI) can be described as a "managerial concept" or "process." It is used to assist organisations to manage business information and information technology to make effective decisions. Measuring both tangible and intangible benefits of BI projects remains a significant challenge for South African banking institutions. The output of BI projects is intelligence, which makes the assessment of value difficult. The aim of this study was to gain an understanding as to what are the benefits of implementing BI solutions for a single South African banking institution, Absa.

A phenomenological research methodology was used to collect, analyse and interpret the data. A combination of questionnaires and semi structured interviews was used for data collection purposes. The research gauged the BI users' perceptions of what are the benefits associated with various BI solutions and how they could be measured.

Results showed that Absa uses numerous approaches to calculate the benefits of its BI implementations. The research also identified various tangible and intangible benefits of BI solutions in Absa. Furthermore results suggested that there was a genuine need to capture and measure these benefits however, users of these BI solutions required assistance in the form of a guideline or tools to calculate them. Financial metrics such as ROI, was only partially serving this purpose for Absa. These findings together with insights gleaned from the literature review were then be used to suggest a process for the measurement and identification of BI benefits in Absa. Further recommendations and suggestions for future study are stated in the concluding chapter of the research.

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University.

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**JEETESH VANMARE**


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I wish to express my sincere thanks and appreciation to:

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This section contains a glossary of terms. These terms are the researcher's definitions, aided by understandings obtained through the literature review, as well as interviews with various individuals who are currently employed by Absa and are directly working within the field of business intelligence and information management.

| | |
|---|---|
| Business Intelligence (BI) | Business intelligence within Absa can be described as the process of collecting the available internal data for the bank. Internal data includes customer information, transaction data and relevant external data, such as competitive intelligence and market related information. This data is then converted into useful information to support business users in making their decisions. |
| Business Case | Remenyi (1999) provides a definition for a business case. He states that a business case is a justification for pursuing a course of action in an organisational context to meet stated organisational objectives or goals. It involves assessing the value of an investment in terms of its potential benefits and the resources required to set it up and sustain it. For purposes of the study a business case is a document which facilitates a management decision to proceed with a project-initiative, and to approve and commit the furnishing of the necessary resources to complete the project. |
| Balanced Scorecards (BSC) | The Balanced Scorecard is an organisational framework for implementing and managing strategy at all levels of an organisation. This is done by linking objectives, initiatives, and measures to the organisation's strategy. The scorecard provides a view of the organisation's overall performance. It integrates financial measures with other key performance indicators around the customer perspective, internal business process, and the learning & growth (resource) perspective. |

| | |
|---|---|
| Customer Relationship Management (CRM) | Cust[...] about finding, getting, and retaining customers. CRM is at the core of any customer-focused business strategy and includes the people, processes and technology questions associated with marketing, sales and service. |
| Competitive Intelligence (CI) | Competitive intelligence is the process of collection, analysis and dissemination of intelligence. The intelligence should be accurate, relevant, specific, current and visionary. In addition it must be related to the company, to the business environment and to the competitors. CI also entails managing information about the external business environment that can affect a company's plans, decisions and operations. |
| Data Marts | A data mart is a repository of data. Defined further, data marts are a focused collection of operational data that is usually confined to a specific aspect of a business. Absa's data marts are used to support specific applications, including reporting, balanced scorecards, analytics, a geographical information system and a customer master file. |
| Data Warehouse (EDW) | Absa's enterprise data warehouse referred to as the EDW, is the single source of consolidated group information for analytics, performance reporting and other applications. The EDW is a central repository for information in Absa. Over 50 million records a day are sourced from 48 internal and external systems. The warehouse is the source for over 400 reports and has 172 direct users who, have access to the data warehouse and dependant data marts. |
| Enterprise Risk Management (ERM) | ERM refers to the management of information from any or all of an organisations customers, suppliers, business partners and employees. ERM systems allow companies to track order status, inventory and customer service in real time. ERM is a software driven technique that is intended to optimise the use and allocation of resources. |

| | |
|---|---|
| Information Management | Infor[mation Management is the process] by which an organisation maximises the efficiency which with it plans, collects, organises, uses, controls, and disposes of its information. The Information Management division in Absa was created as result of the amalgamation of various units from Absa's IT and marketing divisions. The purpose of the division is to provide the Absa group with information, derived from data stored in the EDW. CRM tactical initiatives are also a key service offering of this area. |
| Net Present Value ( NPV) | The net present value is the calculation of the project's cash inflows and outflows discounted to the present time using a pre-selected project discount rate or cost of capital. The difference between the discounted inflows and outflows is the net present value (Mogollon and Raisinghani, 2003). |
| On-Line Analytical Processing (OLAP) | OLAP is defined as the use of computers to analyze an organization's data. OLAP is the term for multidimensional analysis software. It was developed to distinguish data warehousing activities from on-line transaction processing, which is the use of computers to run the on-going operation of a business. |
| Performance Management (PM) | Performance management is a process of managing the execution of an organisation's strategy. Business Performance Management (BPM) is closely linked to this in that BPM is an organisational approach to assess and monitor performance in relation to the set goals and objectives. BPM is also known to as CPM or corporate performance management. PM can be used for the following purposes: decision making, control, guidance, education and learning, and external communication. |
| Payback Period | A payback period calculation determines the amount of time required for a project to break even or recoup its initial investment. |

More and more South African companies are turning to business intelligence (BI) to address issues around legislation, compliance and governance. South African banks have realised the importance of BI in both strategic and tactical decision making and are investing large amounts of money in BI applications, data warehouses and data marts to meet their business specific needs. Of all the industries, the banking sector has intimate access to their customer's behavioural and economic information. Banks know how much their clients earn, where and how they spend their income, where they shop and even, when their clients go on holiday. As one of the largest South African banking institutions, Absa houses a data warehouse in trillions of bytes. Utilising this information intelligently creates great potential for truly understanding customers and their specific needs.

Measuring the benefits of these BI projects remains a challenge for Absa bank as traditional evaluation techniques have difficulty in identifying and quantifying the soft, intangible benefits often provided by effective use of BI. The need arises to identify both tangible and intangible business benefits associated with these BI implementations and to select an appropriate financial metric, which can be used to measure the benefits. With the introduction of a vast array of new technologies in the banking industry, there is a greater need to evaluate the cost versus the benefit of undertaking such BI projects.

## 1.1    Background to the research

Information assists management by providing them with key insights related to all aspects of their business, such as the organisation's profits, human resources, performance measurement and customer behaviour. However most data captured or

information available
imited capacity to make

decisions of strategic, operational or even of tactical nature (Davenport,1999). Even though we live in an information age, organisations often struggle to understand what their data means. Hamel and Prahalad (1994) state that companies should concentrate, accumulate, complement, conserve or recover its resources as it could build competitive advantage for different organisations. Information is an important corporate resource, as it helps define the organisations assets, as well as its effectiveness. The effective use of information and information technology can lead to increased business profit and returns (Sachs and Elslon,1994).

Marchand, Davenport and Dickson (2000) state that information is derived from data, and knowledge from information. Often business owns large amounts of information, such customer accounts and data, but they are unable to produce actionable information or knowledge from their data stores. Companies are now focusing on structuring and analysing their data to produce intelligence about the state of their business and the behaviour of their customers (Wells and Sevilla, 2003).

Wells and Sevilla (2003) also state that by increasing the value of the organisations information, the organisation gains significant advantage over competitors, who fail to do the same. Likewise when competitors find ways to enhance their information assets, some organisations fall behind, hence the effective use of information can provide competitive advantage as well.

De Ville and Cronin as quoted in Gao, Chang and Han (2005) state that BI is a process for increasing the competitive advantages of a business. This is done by collecting the information available about the business and then using it intelligently, to make decisions. Today organisations need not just collect data, but also need to know how to use it, for a wealth of information is of little value unless it can be used

for competitive advan  bove problem, by making meaningful and relevant information available to the greater organisation. To assist the reader in trying to understand these concepts, the following diagram has been complied, depicting the flow of information and data through a typical organisation (figure 1).

Figure 1: Depicts the flow of information and data through a typical organisation
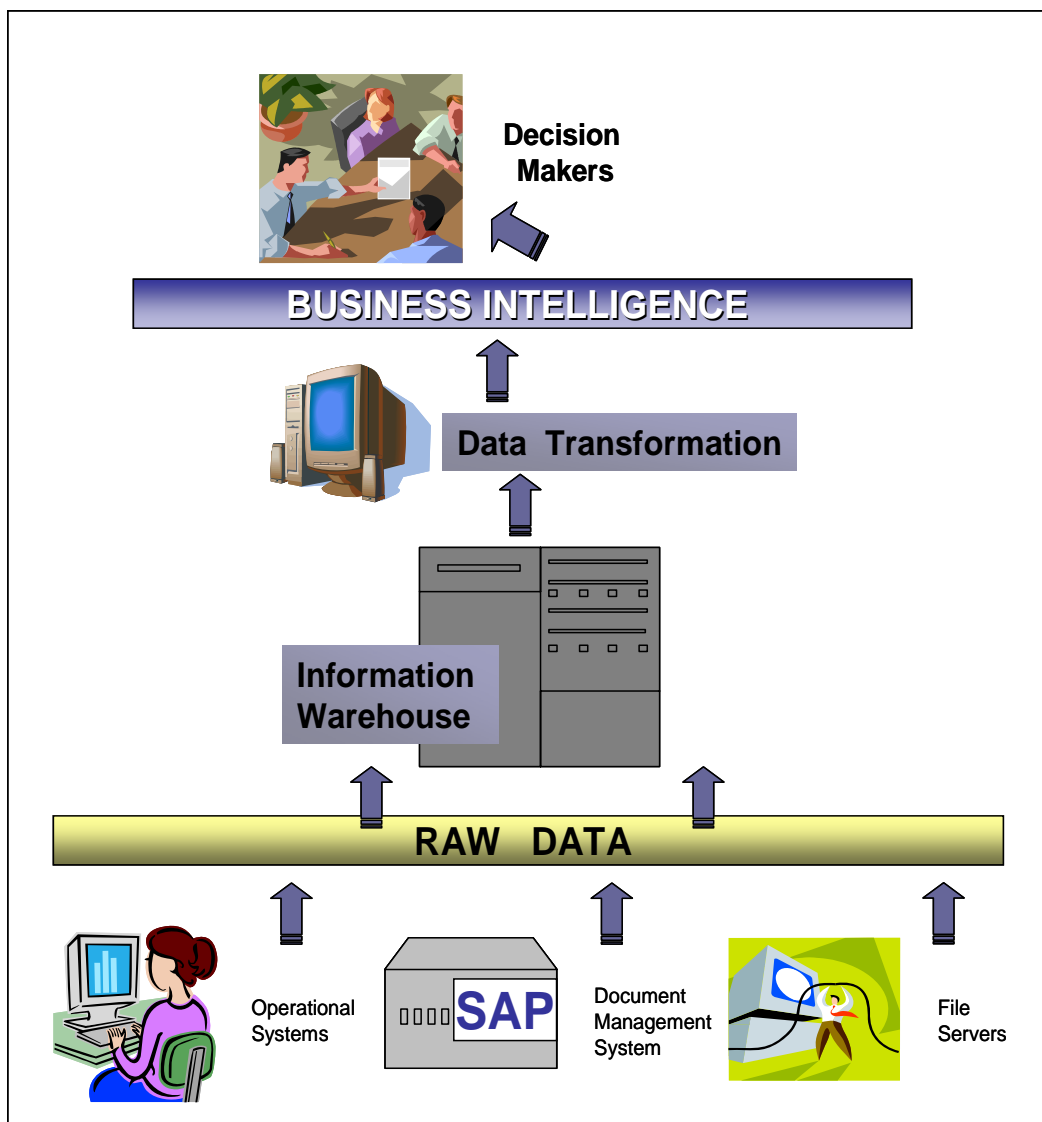


Source: Adapted from Cokins (2004)

In reference to figure sources including product systems and file servers to be stored in a central repository. This data is then transformed into information and intelligence by various BI applications and processes. This information is then used for decision making purposes. Demand for BI applications continues to grow even at a time when demand for most information technology (IT) products is slow (Vesset, Blumstein and Morris, 2004). South African banks have realised the importance of BI in both strategic and tactical decision making and are dedicating large percentages of their IT budgets into BI applications, data warehouses and data marts to meet their business specific needs (Cronje, 2004).

## 1.2    The research problem

With IT budgets being tied to company-wide business and strategic initiatives, the cost justification for any expenditure, including BI projects, must have a clear bottom line. This has resulted in a need to evaluate the cost versus the benefit of undertaking such BI projects. Pirttimäki, Lönnqvist and Karjaluoto (2006,p.84) argue thus: "Measuring the benefits of these BI investments remains a significant challenge for organisations as traditional evaluation techniques have difficulty in identifying the soft, intangible benefits often provided by effective use of BI."

BI vendors including Oracle, SAS and Cognos suggest several financial metrics which can be used for the calculation of BI benefits. These include the internal rate of return (IRR), net present value (NPV), payback period and the commonly accepted return on investment (ROI). Gibson, Arnott and Jagielska (2004) contend that these traditional methods measure tangible value, and not intangible benefits.   Another

view expressed by Ha██████████████████████aditional financial metrics do not take into consideration possible time lags between the implementation of BI solutions and production of intelligence. This intelligence could lead to financial gains.

A further short-coming of using traditional financial metrics, such as ROI, is that the calculation requires a value to be attached to the output of the project or application. Complication arises when the output or "return" of the BI process is intelligence or some kind of processed information, making the assessment of the value of information difficult. With so much emphasis being placed on the measurement of the benefits of these BI implementations, the use of financial metrics has gained popularity amongst BI professionals and management. This results in the neglect of intangible inputs into the investment decision making process. This gives rise to the debate as to whether or not intangible benefits must be included in any calculations concerning the cost vs. benefit of BI implementations.

The tangible benefits of implementing BI solutions include savings in terms of time and money, increased revenues and reduced IT cost (Pendse, 2003). He also found that the intangible benefits of implementing BI solutions were increased customer satisfaction, improved decision making, and improved team work. With a limited amount of academic research available on what are the benefits of BI solutions and how should they be calculated in a South African banking institution, the need arises to identify both tangible and intangible business benefits associated with BI implementations. The above approach creates a challenge in terms of the selection of an appropriate financial metric, which can be used to measure the benefits. Another problem presents itself when trying to select which tangible or intangible benefits should be incorporated into these calculations.

The aim of this study was to gain an understanding as to how a South African banking institution calculates the benefits of implementing BI applications. Furthermore it was intended that this research, identify both tangible and intangible benefits of implementing BI solutions. Findings of the research would be used to suggest a process for the measurement and identification of BI benefits.

A case study approach was chosen which focused on Absa bank (referred to as Absa).

This research attempted to answer the following questions:

➢ *Research question 1: How does Absa calculate the benefits of implementing BI applications?* The answers to the above question provide the current view of how this banking institution calculates the benefits of its existing BI applications.

➢ *Research question 2: Is Absa using standardised financial metrics, such as ROI to calculate the benefits of their BI implementations and if so which financial metric / s?* The basis of these questions was to investigate whether Absa uses financial metrics such as ROI or NPV or any other metrics to calculate the benefits of their BI implementations.

➢ *Research question 3: Do BI application users in Absa follow certain procedures or use certain methodologies to calculate the benefits of their BI implementations?* This question aimed to understand if Absa was using common accounting definitions, calculations, formulas, policies and best

> *Research question 4: What benefit or benefits is Absa gaining from implementing or using these BI applications?* This question facilitated the identification of both tangible and intangible BI benefits in Absa.

> *Research question 5: To what extent does Absa include intangible benefits, identified in this study, to calculate the benefits of their BI implementations?* This question clarified whether or not the bank was measuring or identifying any intangible benefits of implementing these BI applications, and if so, whether or not they were being included in the calculation of the benefits of these BI implementations.

> *Research question 6: What measurement processes and approaches can Absa adopt to calculate the benefits of their BI implementations?* This research tested the perceptions of Absa's managerial and professional staff with regard to their experiences with, BI implementations and the calculation of its benefits. In essence the intention of the research was to provide a process or an approach to calculating the benefits of implementing BI solutions in Absa.

1.4     **Motivation for research**

For a South African banking institution, like Absa, the value of their many implemented BI applications is poorly understood, as there is limited knowledge as to how these applications actually support different decisions and processes (Victor,

2006). This research [provides an] approach for calculating the benefits of future BI implementations. The research also provided users of the various BI applications, with an opportunity to state their perceptions of the effect of implementing these BI applications on their work and their working environment. The study also represented the first attempt by Absa to identify the intangible benefits associated with their BI investments and provides a basis for further research to be conducted in the areas of balanced scorecard deployment, data warehousing and Analytics. BI is the researcher's passion, and the fact that the researcher currently works in Absa allowed for easy access to the sample population and experts in the field of information management.

As BI becomes increasingly prevalent in the South African market space, it is no longer a question of whether or not a company should invest in BI technology but when. At the very least, BI will become another must-have for South African organisations. There is a generous body of literature discussing BI technologies and BI applications; however most literature is either vendor or industry focused. Furthermore vendors tend to present a view which supports their products or services. Hence with a growing market for BI, the need for academic research increases.

### 1.5.1    **An introduction to Absa**

The final consolidation of Absa's amalgamation process, which had started in 1991, was the formation of a single commercial bank, called Absa bank. Absa has in excess of R52 billion in assets, 7 million customers, 11 million accounts, 31 000 employees, 675 branches and 5000 ATMs. Its strength lies in domestic retail banking in South Africa. Absa has a complex business model with fragmented information management environments, silo processes and disparate systems. Absa's vision is to position itself in targeted market segments, and the core-operating model is based on segmenting their client base (Absa Bank, 2006).

### 1.5.2    **Absa Information Management division**

The Information Management division (IM) in Absa was created as result of the amalgamation of various sub-business units from Absa's IT and marketing divisions. The purpose of the division is to provide customer analytics reports; management information, and customer relationship management (CRM) reports to Absa's array of strategic business units. It also implements balanced scorecard type projects across the Absa group.

This service includes the provision of certain BI tools and applications to users across the bank, since IM is solely responsible for the maintenance of Absa's data warehouse and the creation of new data marts. The mission of the division is to innovate, strategise and empower Absa units by unlocking the hidden value of information in order to improve business results across the group (Donkin, 2006).

Watson and Donkin (2005, p.1) state thus: "For many years it was assumed that North American firms were the leaders in the use of information technology (IT). Recent trends however suggest that outstanding work in IT related fields are being conducted globally." Absa received international recognition from both, The Data Warehousing Institute (TDWI) and Gartner for outstanding work in BI and data warehousing practices (Watson and Donkin, 2005). Absa has invested heavily in information infrastructure and software solutions which enables business to automate document generation, data analysis and data collection (figure 2). It uses various BI applications such as Oracle Discoverer and Oracle Balanced Scorecard, SAS tools and IBM tools that allows users to exploit the information they receive.

Figure 2: The Absa information management architecture
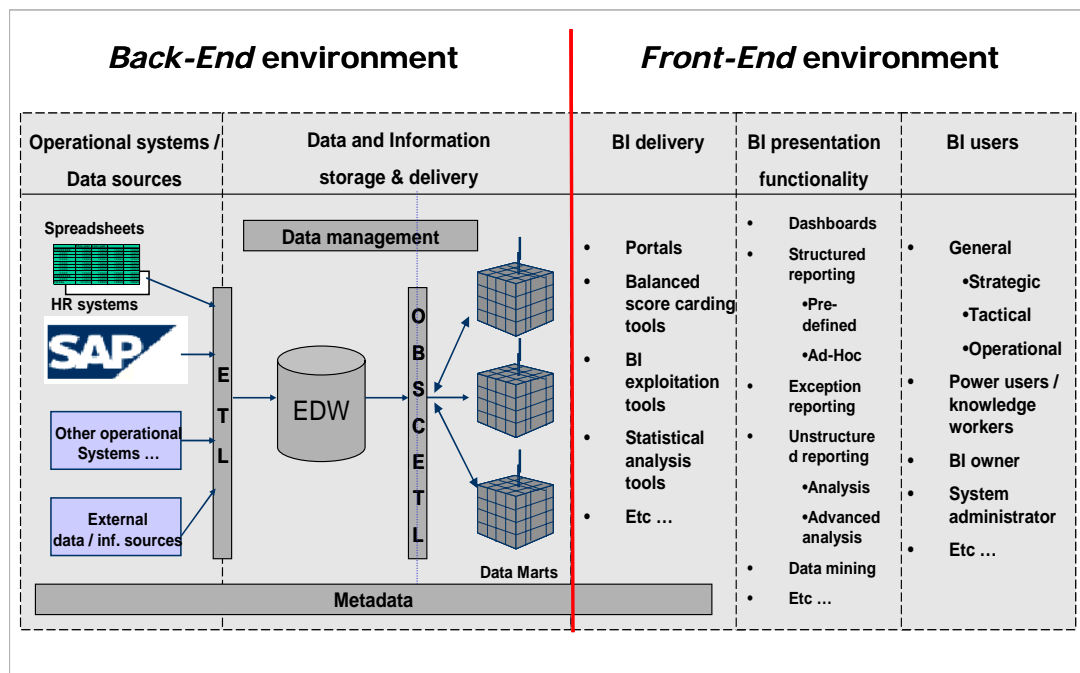


Source: Absa Information Management division (Victor, 2005, p.6)

According to Victor ████████████████████ ntralised data warehouse architecture since 2000. This is referred to as the enterprise data warehouse or (EDW) in figure 2. This warehouse acts as a central repository, storing data related to customers, products and services offered by the bank. This data is transformed into information by numerous technologies and processes to provide users with information in the form of reports, analytics, dashboards and analysis about customers, competitors, the industry and performance of the business (Watson and Donkin, 2005). This type of BI delivery is achieved through the effective use of the balanced scorecard methodologies, statistical analysis and data mining.

Prior to 2000, Absa's 50 business units routinely produced more than 1,200 business reports. Management was quoted saying that the problem wasn't a lack of information, but making sense of it and acting on it (Victor, 2005). Absa's investment in Oracle BI and SAS BI, as well as a consolidated Oracle data warehouse solution, provided the bank with a single view of the customer and a single version of truth (Victor, 2005). Absa IM currently provides information to a variety of users, all of which are customers of the central data warehouse. BI delivery is accomplished through a variety of channels including portals and BI application tools. These are listed in table 1.

Table 1: BI applicatior

| BI delivery | Purpose and functionality |
|---|---|
| Balanced Scorecards | ➢ Monthly updates via the scorecard portal<br>➢ Performance measurement type graphs & reports<br>➢ Strategy formulation and war room formulation |
| Management Information Systems | ➢ Adhoc reports via an information help desk<br>➢ Monthly management reports & dashboards<br>➢ Customer leads and customer information<br>➢ SAS extracts |
| Analytics | ➢ Profiling and strategic analysis<br>➢ Predictive modeling<br>➢ Statistical modeling<br>➢ Spatial analysis |
| Data Warehouse | ➢ Data extracts for various reporting requirements<br>➢ Data Marts for individual business units |

Source: Absa Information Management division (Victor, 2005)

Measuring the benefits obtained from the implementation and usage of these BI applications stated in table 1, is a challenge for Absa's business units and the IM division. Little effort has been made by Absa to identify or quantify these benefits (Victor, 2005). Evaluation techniques such as ROI and IT business cases neglect the "hard to quantify" benefits often provided by effective use of BI in their departments.

1.6    **Structure of the research report**

This research report deals with the identification of tangible and intangible benefits associated with BI implementations in a South African banking institution. Chapter 1 provides a background to the research topic, as well as, an introduction to the various research questions being asked. Details are provided about Absa as well. This

chapter is followed by cher attempts to provide a definition of BI and its' link to performance measurement. A brief literature review of BSCs, Analytics and MIS systems, is provided to ensure that there is a logical link between these BI applications and the subjective intangible benefits associated with them. The research method and design is stated in chapter 4. This chapter includes a justification as to why the research methodology was chosen and elaborates on the data collection methods used in the research study. The results of responses to the research questionnaire and semi structured interviews are discussed in chapter 5 and research findings explained in chapter 6. The report ends with recommendations and suggestions for future studies in the areas of BI and BI benefit measurement.

## 1.7 Conclusion

This chapter has provided an overview of the research conducted, as well as details of the purpose and structure of the report. It highlighted the need to identify business benefits associated with these BI implementations in a South African banking institution. Previous studies have shown that, intelligence gained from information derived from BI processes could lead to considerable competitive advantage. The chapter also highlighted the need to select an appropriate financial metric, which can be used to measure the benefits of BI. Absa became a suitable case study candidate since it was implementing or had implemented numerous BI applications in various business units in the past. Furthermore, Absa was finding it challenging to identify and measure the benefits of their BI applications. The next chapter will outline a detailed literature review.

## 2.1 Overview of the literature review

The literature review has been split into three specific sections which cover the key concepts associated with the research problem. These are:

> ➢ Section 2.2: The theory base associated with BI and its distinction from competitive intelligence.

> ➢ Section 2.3: The theory base associated with BI tools, BI applications and performance measurement approaches.

> ➢ Section 2.4: The theory base associated with financial metrics and approaches to BI benefit measurement.

The literature review highlights the different views of many authors with regard to the definition of BI and its software applications. It highlights the importance of BI in performance measurement and outlines previous studies with regard to BI benefit measurement. Furthermore it identifies financial metrics which can be used to measure these benefits. The literature review aims to share with the reader the results of other studies that are closely related to the research being reported and provides a framework for the importance of the study. The chapter ends with a summary of the key factors obtained from the literature review.

## 2.2 The theory ~~of business intelligence and~~ its distinction from competitive intelligence

### 2.2.1 Introduction

A global survey of 1300 CIOs by Gartner, found that, CIOs plan to increase spending on BI by an average of six percent in 2005 (Furlonger, Landry and Parker,2004). CIOs also believe that the strategic use of BI, combined with a focus on improving business processes, will be most significant in delivering IT's contribution to business growth in 2005 through to 2008.

According to Vesset *et al* (2004), the worldwide BI market stood at $15.1 billion in 2004. The two major segments of the market include:

- Analytic applications ($4.2 billion)

- Business analytics tools ($10.9 billion)

At a growth rate of 12% per annum, the worldwide BI market is expected to reach $20 billion in 2007.

According to a recent study by consulting firm Deloitte & Touché, sixty three percent of the US financial service companies have deployed BI tools to more than half of their work force (Malykhina, 2006). Extracts of this study are found in figure 3.

Figure 3: Extracts of the [University of Pretoria logo] king.

| Tech Innovation — A snapshot of tech deployment inside banking and financial services companies | Inside Banking & Financial Services | |
|---|---|---|
| Service- oriented architecture: 49% / 42% | **6%** | of Industry's Annual Revenue Devoted to IT |
| Linux tools or applications: 49% / 40% | **41%** | of IT Budget Devoted to New Projects |
| Encrypted customer records: 29% / 50% | **69%** | of Companies Expecting 2006 IT Spending to Exceed 2005 |
| Business Intelligence tools: 31% / 63% | Business Change | |
| Wireless e-mail: 31% / 61% | **72%** | Creating New Products/Services for Customers in 2006 |
| ● Limited  ○ Widespread | **30%** | with Global Supply Chain |
| Note: Multiple responses allowed. By widespread, we mean that more than half of all workers have access to it. | **32%** | Deploying Business Intelligence Tools to Raise Productivity |
| | Data: InformationWeek Research survey of InformationWeek 500 executives | |

Source: Adapted from Malykhina (2006)

Thompson (2004), referring to Pendse (2003), explains that approximately 19 percent of companies implementing BI claim to have met or exceeded their business goals. He highlights the business benefits associated with BI investments into a table 2.

Table 2: Results of a I

| Benefits from BI | % Companies realizing benefits |
|---|---|
| Faster, more accurate reporting | 81 |
| Improved decision making | 78 |
| Improved customer service | 56 |
| Increased revenue | 49 |
| Savings in non-IT costs | 50 |
| IT savings | 40 |

Source: Adapted from Thompson (2004)

The above body of literature highlights the importance of BI in organisations.

### 2.2.2 Business intelligence – A multifaceted term

The relationship between the key concepts of data, information and knowledge are important in understanding the concept of BI. According to Wilson (1996) by selecting and analysing data, we can produce information and by selecting and combining information we can generate knowledge. Marchand *et al* (2000) also provide a similar argument, that information is derived from data, and knowledge from information, as depicted in figure 4.

Figure 4: The distincti[...]d data

| From data to knowledge | | | |
| --- | --- | --- | --- |
| | **Data** | **Information** | **Knowledge** |
| **Content** | Events | Trends | Expertise |
| **Form** | Transactions | Patterns | Learnings |
| **Information task** | Representation | Manipulation | Codification |
| **Human element** | Observation | Judgment | Experience |
| **Organisational intent** | Automation | Decision-making | Action |
| **Value test** | Building block | Uncertainty reduction | New understanding |

Source: Marchand *et al* (2000, p.21)

Both information and data play an important role in defining the term BI. Ghoshal and Kim as cited by Pirttimäki *et al* (2006) refer to BI as a managerial philosophy and a tool used to help organisations manage and refine business information with the objective of making more effective business decisions. Vitt, Luckevich and Misner (2002) provide a similar view that BI is an activity that supports business strategy. It is a rational approach to management, which is fact-based and analysis-based, converting data into information, and empowering organisations to make better decisions faster (Vitt *et al*, 2002).

Opposing views are presented by Gao *et al* (2005). Gao *et al* (2005) quoting de Ville and Cronin, define BI as a process for increasing the competitive advantages of a business by the intelligent use of available information collection for users to make wise decisions. Gartner defines BI as follows: An interactive process for exploring and analyzing structured and domain-specific information to discern trends or patterns, thereby deriving insights and drawing conclusions (Hostmann, Schlegel, Bitterer and Burton, 2006). The BI process explained includes communicating

findings and effecting ![logo] additional insight into the definition of BI by referring to BI as the process for increasing the competitive advantage of a company by intelligent use of available data in decision-making. A key concept supporting all arguments is that organisations need data to produce meaningful information.

Neef (1999) suggested that most companies use databases or data warehouses to store information about their current customers, previous customers, business partners, and potential customers. Knowledge creation from data is an important tool in increasing competitive products in the marketplace (Neef, 1999). Bergerou (2004) points out that the challenge lies in finding a way to harness the useful information contained within these high volume databases in order to produce intelligent business solutions.

An analysis of the literature shows that there are two distinct discussion areas evolving around the definition of BI. One chain of thought provides a view that BI is a managerial concept of sourcing information and providing it to users to make decisions. The other classifies BI as the actual process employed to collect the data. BI is a combination of both approaches. It is both a managerial tool and a process, allowing users to make decision based on knowledge acquired from information. This view is supported by Lessner and Mayo (2003) who state that BI can be described as applications that support organisational decision making by turning historical and transactional data from various sources into actionable information. This is explained further in figure 5.

Referring to figure 5, compelling argument that BI consists of sourcing the data, filtering out unimportant information, analysing the data, assessing the situation, developing solutions, analysing risks and then supporting the decisions made.

Figure 5: The BI and analytical value chain
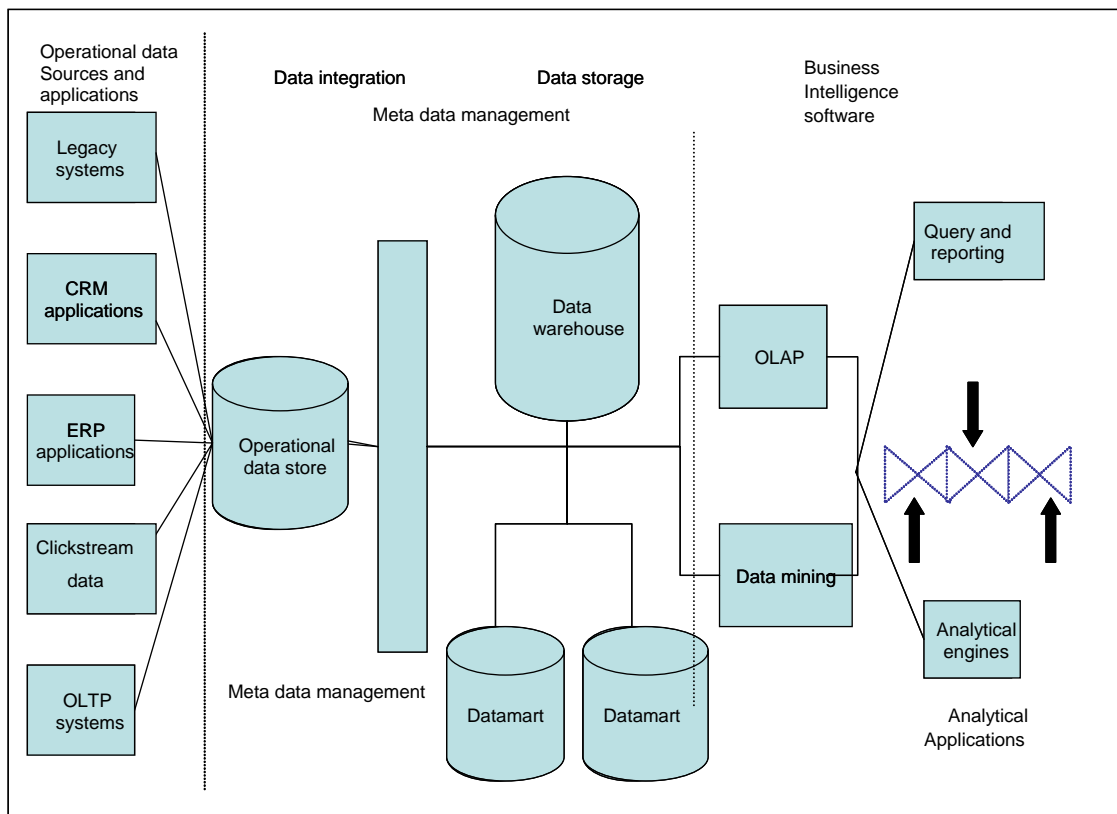


Source: Adapted from Lessner and Mayo (2003)

Armstrong, Coffing and Hanusa (2000) also provide evidence that BI relies on data warehousing (a data repository designed to support an organisation's decision making). Without an effective data warehouse, organisations cannot extract the data required for information analysis, in time to facilitate expedient decision-making. Besides data warehousing, BI is also segmented into four components of query and reporting, OLAP, data visualisation and data mining. The boundaries between these

components are bec[...]he view supported by a number of BI vendors (Gonzales, 2006). Thomsen (2003) suggest that BI as a term replaced decision support, executive information systems, and management information systems.

Perhaps the best view of BI systems is presented by Negash (2004) which states that BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal, competitive information to planners and decision makers. "Implicit in this definition is the idea (perhaps the ideal) that business intelligence systems provide actionable information delivered at the right time, at the right location, and in the right form to assist decision makers. The objective is to improve the timeliness and quality of inputs to the decision process, hence facilitating managerial work" (Negash, 2004, p.177).

In summary, the literature review has highlighted two approaches to defining BI. The first being, a process approach of gathering data from various sources and then, analysing it to generate meaningful information. The second approach entails a technology approach which supports the process. Regardless of the approach adopted the common idea across both approaches is that:

➢ The core of BI is information gathering, analysis and use, and

➢ The goal of BI is to support the strategic decision-making process.

For purposes of this study, BI is defined as the process of collecting the available internal data and relevant external data and then converting it into useful information to support business users in making their decisions.

The Society of Competitive Intelligence Professionals (SCIP) defines CI as the process of collection, analysis and dissemination of accurate, relevant and visionary intelligence related to the organisation, to the external business environment and to competitors.  The definition differs from that of BI in that there is a clear distinction between information and intelligence. According to Sharp (2000) the focus of information in CI is on external type information about competitors and markets as compared to the internal (company related) focus of BI. CI is about how "intelligence" not simply information, can flow through a company for the benefit of everyone.

BI targets any information in the business universe that affects a firm's ability to compete (Sharp, 2000). Ackerman and Wickens (2001, p.8) state that: "Customer intelligence is the actionable output from an intelligence ecosystem." This shows that BI, with its broader perspective, targets developments beyond the current competitors. It targets developments in the immediate industry to anticipate significant marketplace changes that affect both a given industry and a particular competitive market arena.

It has been clearly demonstrated that CI focuses on the external type information about competitors and markets as compared to the internal company related focus of BI. Boundaries become more fluid when BI tries to uncover threats from unlikely sources. In summary all references to BI in the research will exclude CI as BI is internally focused.

**2.3** **The theory ~~...~~ ls, applications and**

**performance measurement approaches**

An attempt will be made to link the critical concepts of BI tools, applications and performance management by explaining the technology aspects of BI. Thereafter performance measurement is discussed showing its relation to BI applications.

### 2.3.1 Business intelligence tools

According to Lessner and Mayo (2003, p.15) thus: "BI is an ambiguous term referring to a broad and ill defined family of applications surrounding the data warehouses." The use of software tools enables business users, to see and use large amounts of complex data stored in a data warehouse.

Figure 6: BI solution architecture
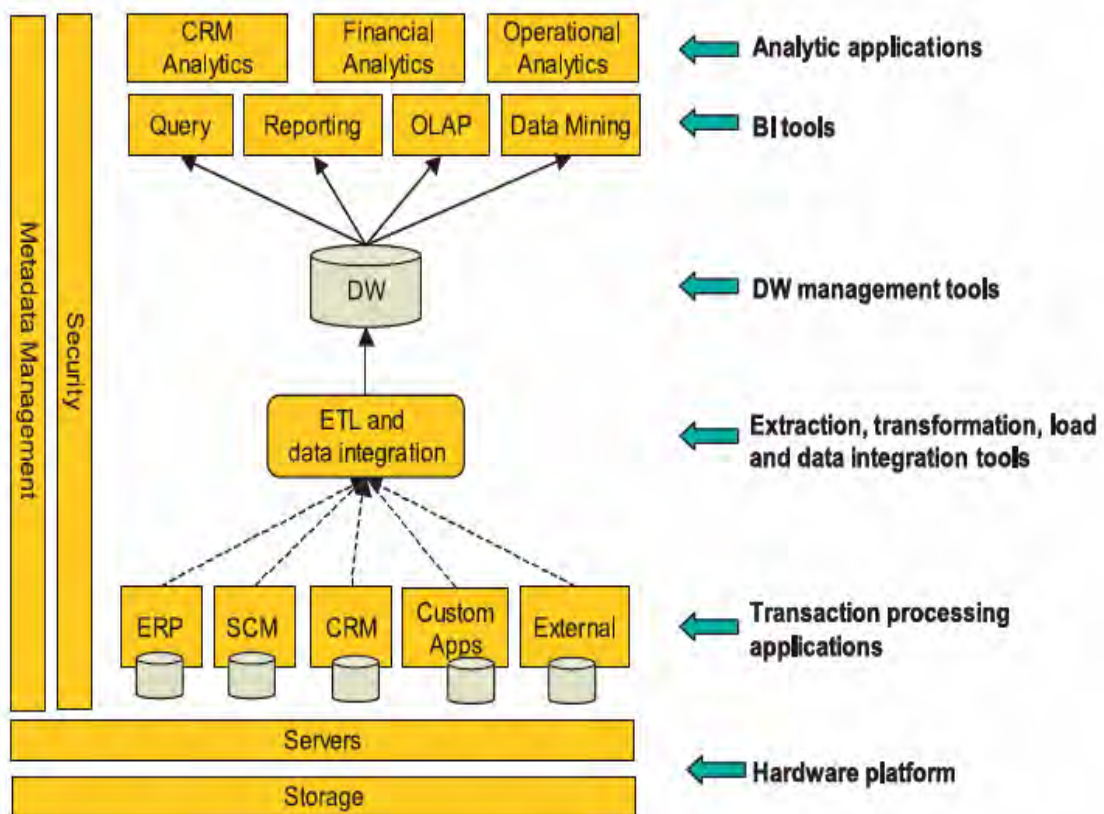


Source: Eastwood, Vesset and Morris (2005, p.3)

Eastwood *et al* (2005 [logo] ritical BI technology stack includes not only the BI, data warehouse management, and data integration software, but also a robust hardware foundation that can support scalability both from the data and user perspectives (as depicted in figure 6).

Olszak and Ziemba (2006) provide a similar view that the most important components of the BI infrastructure consist of:

  ➢ Key information technologies that are related with data acquisition and storing i.e. ETL. (Extraction-Transformation-Load) tools and data warehouses;

  ➢ Information technologies potential that mainly refers to analyses of data, and presentation of data, i.e. OLAP (On-Line Analytical Processing) techniques and data mining; and

  ➢ BI applications that support making various decisions on production, sales, competition monitoring, finance, etc.

This is depicted in figure 7.

Figure 7: BI systems infrastructure that supports decision making.
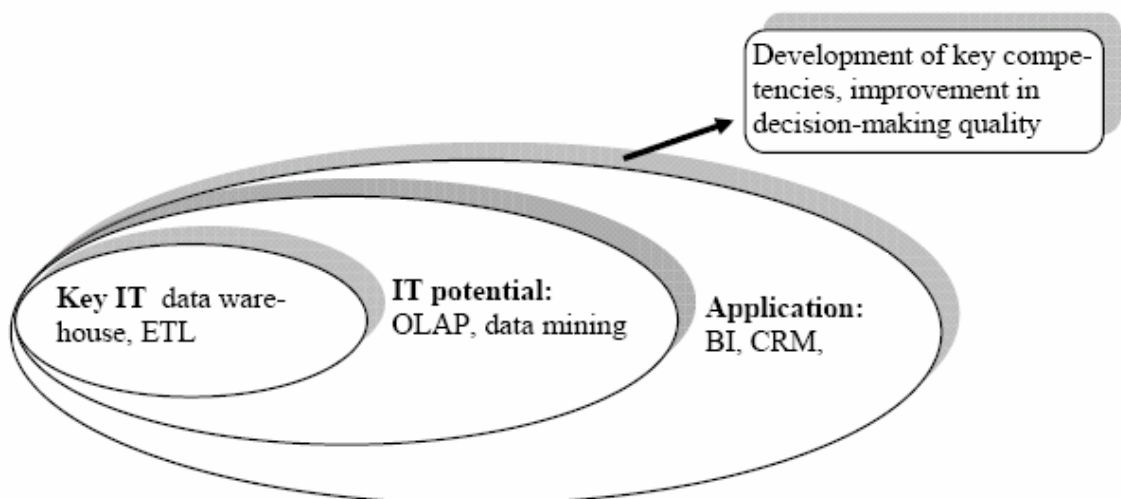


Source: Kalkaota and Robinson in Olszak and Ziemba (2006, p.48)

BI users are not fam̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶̶ ̶̶̶̶̶ne BI solutions provided. Olszak and Ziemba (2006) highlight the need for BI tools to support BI applications. A BI application is the only visible portion of the information value chain as depicted in figure 7. It becomes clear that without an effective data warehouse, organisations cannot extract the data required for information analysis in time to facilitate expedient decision-making. Gray and Watson (1998) define data warehouses as collections of subject-oriented, integrated, non-volatile, historical data that support organisational decisions. Braams (2004) suggests an alternate approach to the BI stack suggested by Eastwood *et al* (2005). Braams (2004) refers to BI as an umbrella term, which covers a whole range of concepts. The model which he presents suggests that three layers of BI tools surround a data warehouse. These layers are queries and reports, online analytical processing and data mining. His approach to BI tools tends to exclude the supporting extract, transform and load (ETL) layers and the hardware and software components. The view presented by Braams (2004) is debatable since BI applications require high quality data to support it.

Lessner and Mayo (2003) also segment BI into four different components: query and reporting, OLAP, data visualisation and data mining. These BI tools are explored in greater detail below. Additional comments from other authors have been included to explain the use of each BI tool. Reference has been made to these tools for completeness; however the focus of the literature review will be BI applications and not BI tools.

➢ According to Lessner and Mayo (2003) query and reporting products act as the end-user interface into the data warehouse and enable users to gain an interactive view of data, build their own queries and get answers based on data stored in the data warehouse. Braams (2004) adds that computer

languages are

➢ OLAP is a term used to explain multidimensional analysis software. Olszak and Ziemba (2003) state that multi-variant analyses carried out on historical data, stored in data warehouses allow for predicting future trends, setting trends and customer behavior.

➢ Data mining is defined as "the exploration and analysis, by automatic or semi automatic means, of large quantities of data in order to discover meaningful patterns and rules" (Berry and Linoff, 1997, p.33). Lessner and Mayo (2003) support this view by adding that data mining represents the "analytics" component of BI.

In summary, the concepts such as data warehouses, data mining and OLAP are equally important in the BI implementations, however the end user primarily makes decisions on information obtained via BI applications, referred to as "front ends." BI applications can not function effectively without an additional layer of BI tools in the BI stack (Lessner and Mayo, 2003). This thinking is explored further in section 2.3.3.

2.3.2   **Business performance management**

As highlighted in section 2.2.2, information is derived from data, and knowledge from information. By using information from multiple sources, including customer databases, financial databases, source systems, and applying experiences and assumptions, the end user can develop an accurate understanding of business dynamics.

Organisations employ tools and information systems to help them monitor the

company's performan[...] [...]mpetitive and challenging business environment, organisations need to continually assess and redirect their actions in order to survive and remain profitable.

Business performance measurement can be referred to as the encompassing term for PM and CPM. Marr and Schuima (2003) define performance measurement as the organisational approach to assess and monitor performance in relation to set goals and objectives. It encompasses methodologies, frameworks and indicators that are used to help organisations in the formulation and assessment of the strategy, to motivate people and to communicate performance to external stakeholders.

Cokins (2004) states that PM is the process of managing the execution of an organisation's strategy. He further includes metrics, processes, software tools, and systems that manage and measure an organisation's performance in the definition of PM. This supports Gartner's view with regard to PM. It can be concluded that BI applications assist with the management and measurement of the organisations performance. The importance of PM in an organisation has been emphasized by many authors.  Pirttimäki and Lönnqvist (2006) quote Simons, suggesting that PM can be used for the following purposes: decision making, control, guidance, education and learning, and external communication.

According to Marr, Grey and Neely (2003), there are three general reasons why organisations use PM.  They are to:

1. Implement and validate their strategy,

2. Influence employees' behavior, and

3. Report externally on performance and corporate governance.

PM allows organisati [logo] inst business strategy to ensure that they are aligned at all levels across the organisation.

Cokins (2004) states that in order for an organisation to be effective, PM requires an infrastructure that links people, information, and decision-making processes throughout the organisation. From a technology perspective, PM is not BI. PM however places demands on BI and data warehouses to deliver the right information to the right people at the right time. Eckerson (2004) describes PM as a four step closed loop process detailed in figure 8 below. The first two steps constitute the strategy while the last two steps define how to execute the strategy. He further states that each step is driven by technologies and enabling techniques on the peripherals of integrated data. This includes BSC, MIS and various other techniques such as forecasts and models.

Figure 8: Performance measurement as a four stage process

| Strategy | |
| --- | --- |
| 1. Strategize | 2. Plan |
| Strategic Plans<br><br>Strategy Maps | Plans, Budgets and Scenarios<br><br>Projects / Initiatives |
| Integrated Data | |
| 4. Act and Adjust | 3. Monitor |
| Forecasts and models<br><br>Agents, offers and Actions | Scorecards / Reports / Analysis<br><br>Alerts |
| Execution | |
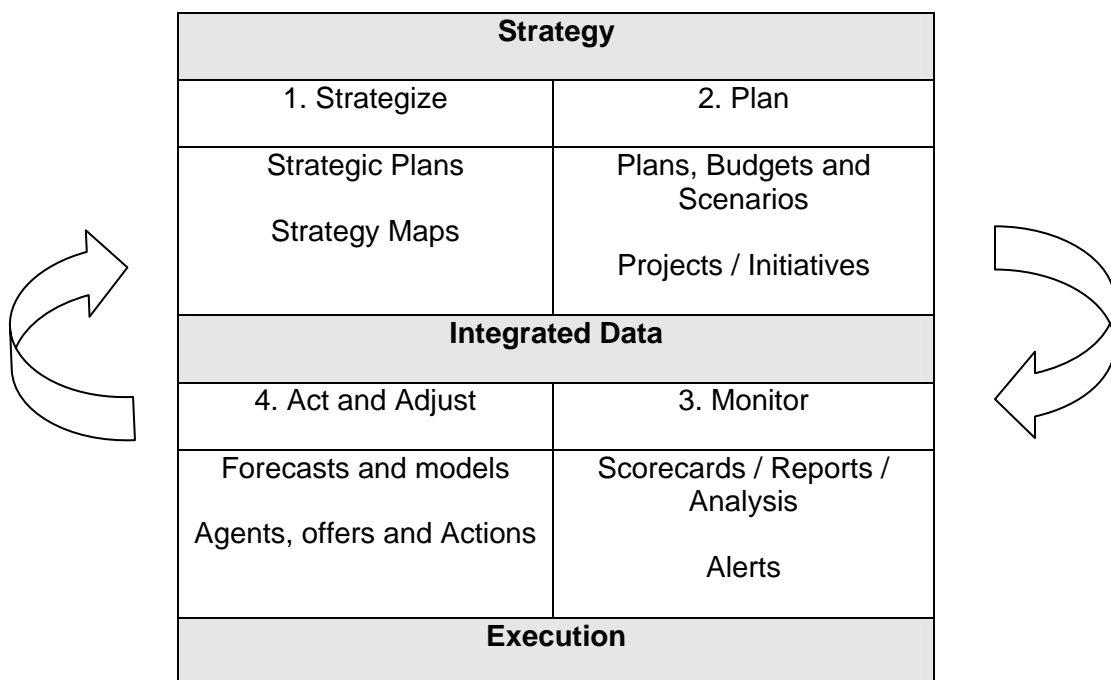
Source: Adapted from Eckerson (2004)

It has been clearly de[...] [...]at BI applications enable PM in organisations (Cokins, 2004 and Eckerson, 2004). Attention will now be turned to BI applications.

### 2.3.3 Business intelligence applications

This section of the literature review attempts to provide further detail with regard to BI applications and how they enable PM in an organisation.

#### 2.3.3.1. Balanced Scorecards (BSC)

Kaplan and Norton (1996a) offer a framework for translating strategic objectives into a set of key performance measures that apply at all organisation levels. Kaplan and Norton (1996b) explained later that the key to executing corporate strategy is to ensure that individuals and teams within an organisation understand and focus on achieving explicit strategic goals. Amaratunga, Baldry and Sarshar (2001) propose a multidimensional framework for describing and implementing a company's strategic intent at all levels of an organisation.

Figure 9: The BSC system for strategic implementation
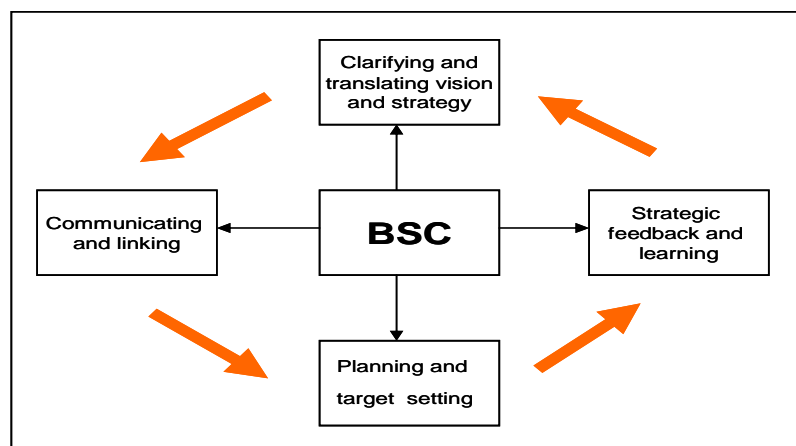


Source: Adapted from Kaplan and Norton (1996b)

From a technical per
uilt using OLAP systems. Although PM systems focus on departmental or functional business analysis and reporting, BSC focuses on managing and communicating strategic initiatives across an organisation. The scorecard provides a feedback loop that lets individual employees examine how or whether their efforts are contributing toward the organisation's goals. It also requires a reward system aligned with the strategic objectives.

Figure 10: BSC systems linked to BPM across four perspectives:
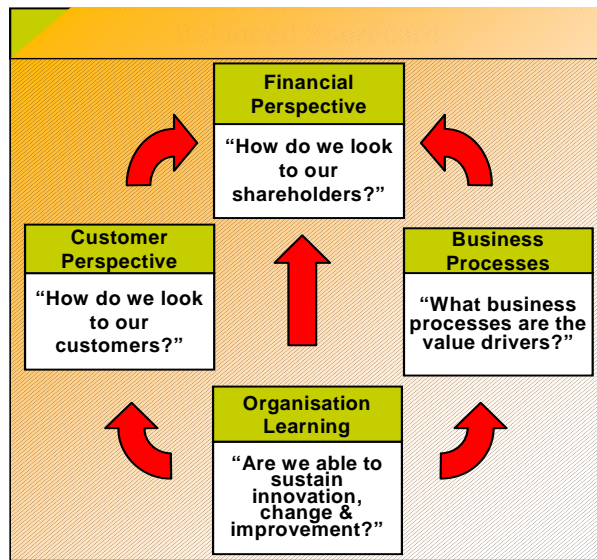


Source: Adapted from Kaplan and Norton (1996b)

BSCs are not meant to replace current departmental or functional decision-support systems. It is used to manage and control business activity. Instead, the BSC coexists with these systems, using the data warehouse as a source of data and serving as a communication and management tool for strategic initiatives (Cokins, 2004). Kaplan and Norton (1996a) also state that the scorecards purpose is to translate strategy into measures that communicate the executive's vision and mission to the organisation.

Executives and decision makers also require a view of financial performance and accounts. Transactions that pass through enterprise systems offer little insight into the business (Cokins, 2004).

As explained in section 2.2.2, when data is properly aggregated and analysed, it can be transformed into actionable information. Actionable information can increase sales and profitability, provide competitive advantage or deepen customer and vendor loyalty (Davenport, 1999). According to White (2004) a combination of factors such as the weakened economy, the introduction of the Sarbanes-Oxley act and the continuing globalisation of world markets is changing the way corporations view PM. Share-holders and regulators are becoming increasingly demanding with comprehensive reporting standards and more emphasis is now being placed on operational information and reporting. A distinction can now be made between strategic and operational information. This is explained below:

➢ Strategic information focuses on competitive advantage, is forward looking and creates outputs such as differentiation and cost advantages.

➢ Operational information focuses on control and management, looks at historical or current operational performance and is the primary driver of efficiencies, resource allocations, planning and budgeting and accounting.

Cokins (2004) provides a view that information users in organisations dictate the type of information required and how it should be sourced.  Business operations and operations management will require operational system information, while higher levels of tactical and strategic management rely more on management and executive

information systems (   ) de business decision type request, business insight request and research reports (Marchand *et al*, 2000).In summary, a distinction is made between operational and strategic reporting. BSC deals with the strategic type information and MIS with the operational and tactical type information.

### 2.3.3.1. Customer relationship management

Williams and Williams (2003) contend that investment in IT during the 1990s focused on enterprise resource management (ERM), supply chain management (SCM) and customer relationship management (CRM). ERM, systems allowed companies to track order status, inventory and customer service in real times, SCM systems provided supply chain planning functions and CRM systems provided sales pipeline and call centre management tools. Technological advances and innovation on the side of vendors allowed for the expanded use of data warehousing and enterprise applications, to create varied BI applications, which have surfaced in many organisations today (Williams and Williams, 2003).

Ackerman and Wickens (2001) presented this view as well, stating that BI in the context of the above business imperatives provided the mechanism for taking data from the operational systems behind SCM and ERM and presented information that could be used to understand and manage shareholder value. They further argue that CRM is both a provider of information and a user of customer intelligence.

Pringle (2004) argues that analytical CRM is becoming increasingly important in financial services. This is primarily due to customer loyalty decreasing and the battle for customers increasing. Various surveys prove this fact. Pringle (2004) further

states that analytical <span>[logo]</span> nterprise evolution as it is the active collection, concentration and analysis of data gathered about the customer.

"Analytics" or analytical customer relationship management (aCRM) can be used to segment the customer base, model customer behavior and discover patterns (Ackerman and Wickens, 2001). Research points to aCRM as a concept as well as a technology, with ETL tools, data warehouses and BI tools further supporting this argument. Berry and Linoff (2000) suggest that data mining has the following generic uses: classification, estimation, prediction, affinity grouping, clustering and description. This catergorisation can be contrasted by those mentioned by Lee & Siau (2001). They provide four generic categories for data mining: predictive modeling, database segmentation, link analysis and deviation detection. BI applications in terms of CRM include: cross sell and up sell, customer retention, customer segmentation and customer profitability.

In summary both Pringle (2004) and, Ackerman and Wickens (2001) highlight the growing demand and market growth of Analytics in financial institutions. The above body of literature has highlighted the importance of CRM, Analytics, PM and financial analysis, BI type applications. Nicolaou (2004) argues that information systems effectiveness is defined as the perceptions of decision makers' of the usefulness of information available to them, which meets their "business intelligence" requirements.

**The importance of measuring BI**

Pirttimäki *et al* (2006) state that there are two main purposes for measuring BI. Firstly the valuation of BI in order to prove that it is worth the effort and secondly the measurement of BI activities in order to help manage a BI process. This implies that both quantitative and qualitative benefits of a BI project need to be evaluated before a BI project is undertaken. Remenyi (2001) refers to the use of IT business case models, as a way to calculate the value of IT investments, but also adds that there is a high degree of subjectivity associated with it. Braams (2004) also supports the business case argument and states that business cases are meant to support the investment decisions, as well as explain why one has made a certain decision after that decision was made. It is clear from the above literature that business case models can be subjective.

Williams and Williams (2003) explain that in economic terms, the business value of an investment (as asset) is measured at the net present value of the after tax cash flows associated with the investment. This implies that any BI investment has to create an asset that must be used to generate incremental after-tax cash flow, and that the business benefit is useless unless converted into incremental after-tax cash flow. Drucker (2001) provides compelling evidence that information can create business value. This is graphically represented in figure 11. According to Drucker (2001) every company pursues some combination of the strategies below.

Figure 11: Four ways  s value
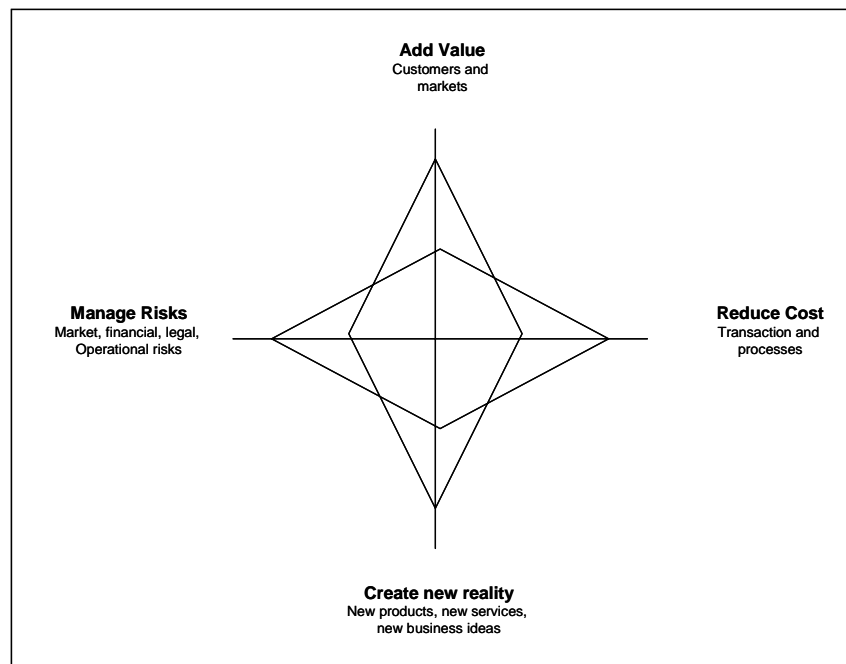
Research has shown that BI applications cause a reduction in cost and assist in the creation of new business ideas (Pendse, 2003). Sullivan (2000) states that value is the measure of the usefulness of something, and is different from cost, which is a measure of the amount of resources required to produce it. There are real differences in opinion as to how to value BI investments. Davison (2001) was able to calculate the cost of CI using a CI measurement model (CIMM) however, it must be noted that measuring the benefits is more complicated. Hannula and Pirttimäki (2003) found that many of the benefits associated with BI consist mostly of non-financial, and even intangible, issues such as enhanced quality and timeliness of information.

Williams and Williams (2003) state that the business value of BI lies in its use within management processes that impact on operational processes that drive revenue or reduce cost or in its use in operational processes themselves. These are listed below:

➢ Management processes include, planning, controlling, measuring, monitoring

and changing to increase revenues or reduce cost, or both.

> Operational processes include sales campaign execution, customer order processing, purchasing and accounts payables, allowing the business to increase revenues or reduce cost, or both.

Another approach to measure the effects of BI is subjective measurement of effectiveness. It is based on the concept of perceived customer satisfaction, (e.g. decision-maker or end user). In practice, the users of BI products are asked questions regarding the effectiveness of the products (Davison 2001). A positive aspect of subjective measurements is that the results show how effective the users consider the intelligence products. However, Williams and Williams (2003) argue that subjective measurements do not establish any monetary value for the effects of BI.

## 2.5 The measurement of the benefits of BI solutions.

### 2.5.1 Tangible benefits of BI solutions

There are several financial metrics which could be used to measure the tangible benefits of BI. Wu (2000) suggests several financial measures which can be applied such as the payback period, net present value (NPV) and return on investment (ROI). A typical method for assessing the monetary value of any investment is to calculate the ROI. For purposes of this research, the term "return on investment" is used as the benefit generated by a project or investment, regardless of whether it is measured by payback period, NPV, or internal rate of return (IRR).

Brigham and Houston i (2003) suggest six steps to evaluating the capital budgeted for a project. These are:

1. Determine the cost of the project.

2. Estimate the expected cash flow from the project, including the salvage value of the assets at the end of the projects expected life.

3. Estimate the project's risks.

4. Determine the project cost of capital based on the project's risk.

5. Calculate the present value of the expected cash flow.

6. Compare the present value of the expected cash flow with the required outlay. If the present value of the cash flow exceeds the cost, the project should be implemented.

Simply put, ROI can be calculated using the following formula

ROI = Project return

Cost to implement the project

Mogollon and Raisinghani (2003) propose a method for measuring the ROI for Ecommerce applications, stated below, however they do not adequately define the "other benefits" portion of the formula. This impedes the process of adapting the formula suggested to BI applications.

ROI = (Current process cost – New process cost + Other benefits) per year

Initial investment + (Operation and maintenance per year)

Mogollon and Raisinghani (2003,p.66)

Negash (2004) summ [...] rojects as the sum of all hardware cost, software cost, implementation cost and personnel cost. Pirttimäki *et al* (2006) argue that the measurement of the project returns or benefits is not as easy as calculating the cost of the projects. They explain this by stating that many of the effects that BI is assumed to create, consist primarily of non-financial and even intangible benefits. Traditional ROI calculations also do not take into consideration possible time lags between the implementation of solutions and production of intelligence, which could lead to financial gains.

Gibson *et al* (2004) also present their argument that the intangible benefits resulting from the use of BI systems could be significant and failure to identify and measure these benefits could result in decreased executive support. Boehm (1981) provides a solid foundation for understanding ROI in the IT software context. The problem in calculating the ROI for BI is that the output of the BI process is intelligence or some kind of processed information, making the assessment of the value of information difficult. The above argument is also evident in the calculation of the project NPV or payback period.

Williams and Williams (2003), state that capturing the business value of BI depends on being able to look beyond the initial rollout phase. They add that most BI benefit capture stops once the project is implemented or initial BI asset creation completed. Drury (1996) states that projects cost tend to accumulate at the start of the project and then decrease as the project nears completion. A period of a loss is evident before reaching the project break even point. Positive cash flows accrue while the project is being implemented. This approach is explained in figure 12.

The outputs of a proje ⬛ the project commences or when the project is completed. Various factors could influence the time taken to complete the project, influencing the project revenues or outputs.

Figure 12: Project cost vs. timeline analysis
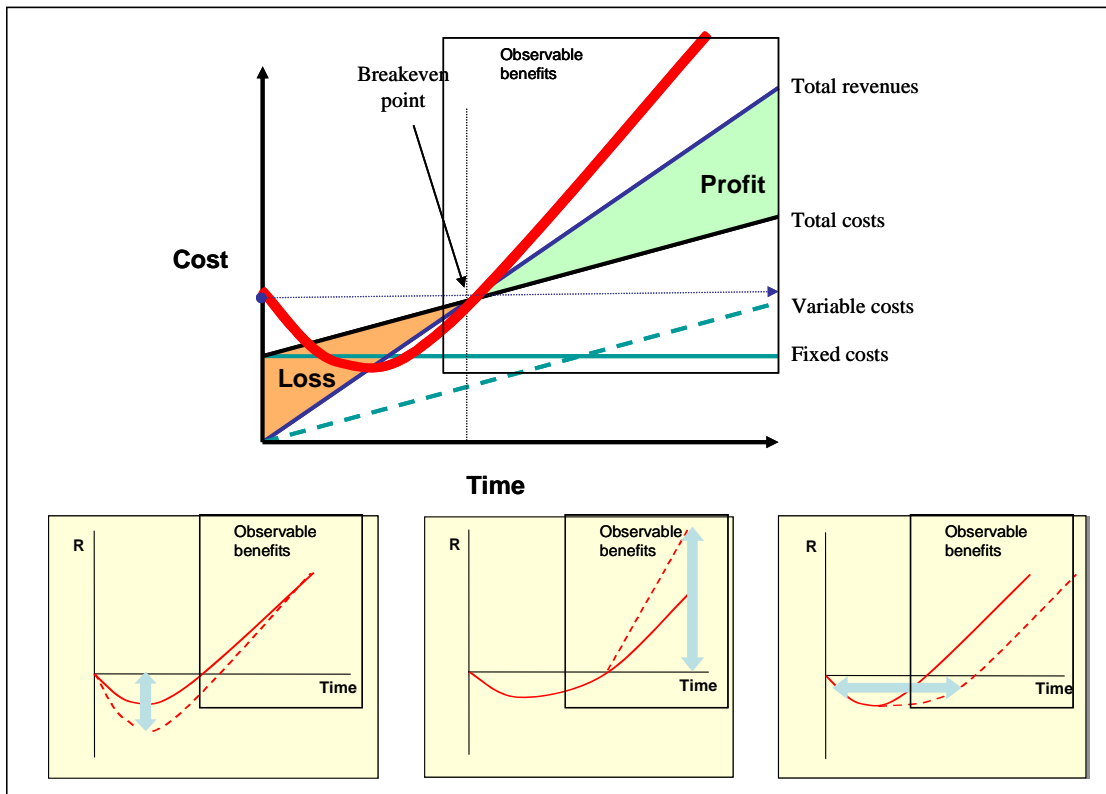
In summary this section of the literature review provided opposing arguments as to the suitability of ROI as the best financial metric to use when calculating the tangible benefits of BI implementations. The following section will now explore the intangible benefits of BI applications.

Sullivan (2000) states that in the case of intangibles, its value is dependant on the firm's view of itself and on the realities of the marketplace. This can be restated as follows, a firm exists within a context (both internal or external) that shapes its view of what is or is not of value. This implies that value is dependant on what the organisation or the individuals employed by the organisation defines as valuable. Gibson *et al* (2004) provides a comprehensive consolidated view of various evaluation techniques and methods that can be used to evaluate intangible benefits of various operational systems, however they do state that difficulty arises when trying to evaluate the intangible benefits from strategic systems, such as BI. (Appendix one). They provide the following reasons as to why BI evaluation is difficult:

> ➢ The strategic nature of BI.

> ➢ The dispersion of benefits throughout the business.

> ➢ The effect of BI on the business culture.

It is evident that there are many approaches that can be adopted to measure the benefits of BI; however they have to be adapted from other related research fields.

A similar challenge arises when trying to identify the intangible benefits of BI implementations. To highlight the difficulty in identifying the intangible benefits of BI, the results of four different studies have been selected and combined to form a consolidated academic view of BI measurement. Research conducted by Hannula and Pirttimäki, (2003) identified two intangible, benefits which are an improvement in quality and the timeliness of information, associated with BI implementations. Pirttimäki *et al* (2006, p.84) add thus: "Although these intangible benefits should lead

to financial outcomes ~~...~~ ~~...~~ between the production of the intelligence and the financial gain could exist making measurement of these benefits quite difficult."

The second set of research findings are adopted from Mogollon and Raisinghani (2003) who presented various intangibles which could be used to calculate the "other benefits" portion of the ROI calculation provided in section 2.5.1. However they state that it will take considerable time and effort to determine the value of these intangibles. These findings are presented in table 3 below.

Table 3: Tangible and intangible benefits in E-commerce applications.

| Tangible benefits (measurable and a monetary value can be assigned) | Intangible benefits (measurable but difficult to assign a monetary value) |
|---|---|
| <ul><li>Sales increase</li><li>Production increase</li><li>Reduction in operating cost</li><li>Reduced network downtime</li><li>Increased mean time before failure</li><li>Reduced time to configure a data network</li></ul> | <ul><li>Customer satisfaction</li><li>Customer retention</li><li>Managerial know-how</li><li>Employee retention</li><li>Stronger channel ties</li><li>Increased customer base</li><li>Improved employee morale</li></ul> |

Source: Mogollon and Raisinghani (2003, p.66)

The third set of research results which can be used is that from Pendse (2003). His survey on benefits associated from BI implementations revealed that BI caused more accurate reporting, improved decision making, improved customer service and increased revenue for almost half of the companies part taking in the BI survey. Lastly a comprehensive framework of business benefits was presented by Shang and Seddon (2000) for organisations using enterprise systems. The various enterprise

system benefits prese ... e consolidated across five

benefit dimensions, as illustrated in table 4.

Table 4: Framework for intangible benefits from ERP systems

| Dimension | Sub-dimension | Explanation |
|---|---|---|
| **Operational** | ➢ Cost reduction<br>➢ Cycle time reduction<br>➢ Productivity improvement<br>➢ Quality improvement<br>➢ Customer services improvement | ERP systems automate business processes and enable process changes. Therefore one would expect ERP systems to offer all of these types of benefits. |
| **Managerial** | ➢ Better resource management<br>➢ Improved decision making and planning<br>➢ Performance improvement | With a centralised data base and built in data analysis capabilities, it seems likely that ERP systems will provide informational benefits to management. |
| **IT Infrastructure** | ➢ Build business flexibility for current and future changes<br>➢ IT cost reduction<br>➢ Increased IT infrastructure capability | Enterprise systems with their integrated and standard application architecture provide an infrastructure that could support this dimension. |
| **Organisational** | ➢ Support organisational changes<br>➢ Facilitate business learning<br>➢ Empowerment<br>➢ Build common visions<br>➢ Change employee behavior<br>➢ Better employee morale and satisfaction | The integrated information processing capabilities of enterprise systems could affect the establishment of organisational capabilities. |

Table 4 – continued.

| Dimension | Sub-dimension | Explanation |
|-----------|---------------|-------------|
| **Strategic** | ➤ Support business growth<br>➤ Support business alliance<br>➤ Build business innovations<br>➤ Build cost leadership<br>➤ Generate product differentiation (including customisation)<br>➤ Build external linkages (customers and suppliers)<br>➤ Worldwide expansion<br>➤ Enabling e-commerce | Enterprise systems with their large scale business involvement and internal and external integration capabilities could assist in achieving these strategic benefits. |

Source:  Adapted from Shang and Seddon (2000)

The literature review has revealed various intangible benefits associated with BI implementations, however some researchers do not agree with the accuracy of these findings. Pirttimäki, *et al* (2006) used the alternative approach suggested by Davison (2001) to reveal the effects of BI more accurately, namely the subjective measurement of effectiveness. In practice, the users of BI products are asked questions regarding the effectiveness of the products. The questions may enquire about the change in confidence of the decision makers as a result of new information being provided by BI. It may also test the users' satisfaction regarding the insightfulness or the timeliness of the intelligence provided.

In summary both the measurement and identification of these intangible benefits provides a challenge to many BI professionals alike. There is however numerous methods and benefits already identified in literature. Little BI research has been

conducted on South A [logo] f subjective measurement of effectiveness for BI solutions can be applied in the banking industry to identify the intangible benefits of BI.

2.6    **The integration of theory bases**

The key concepts from the literature review, as stated in section 2.2, 2.3 and 2.4, are now merged to produce an integration of the ideas and theory bases stated. BI applications such as BSC, MIS and Analytics enable PM in organisations. These concepts are represented in a diagram presented in figure 13.

Figure 13: BI tools and applications integration framework
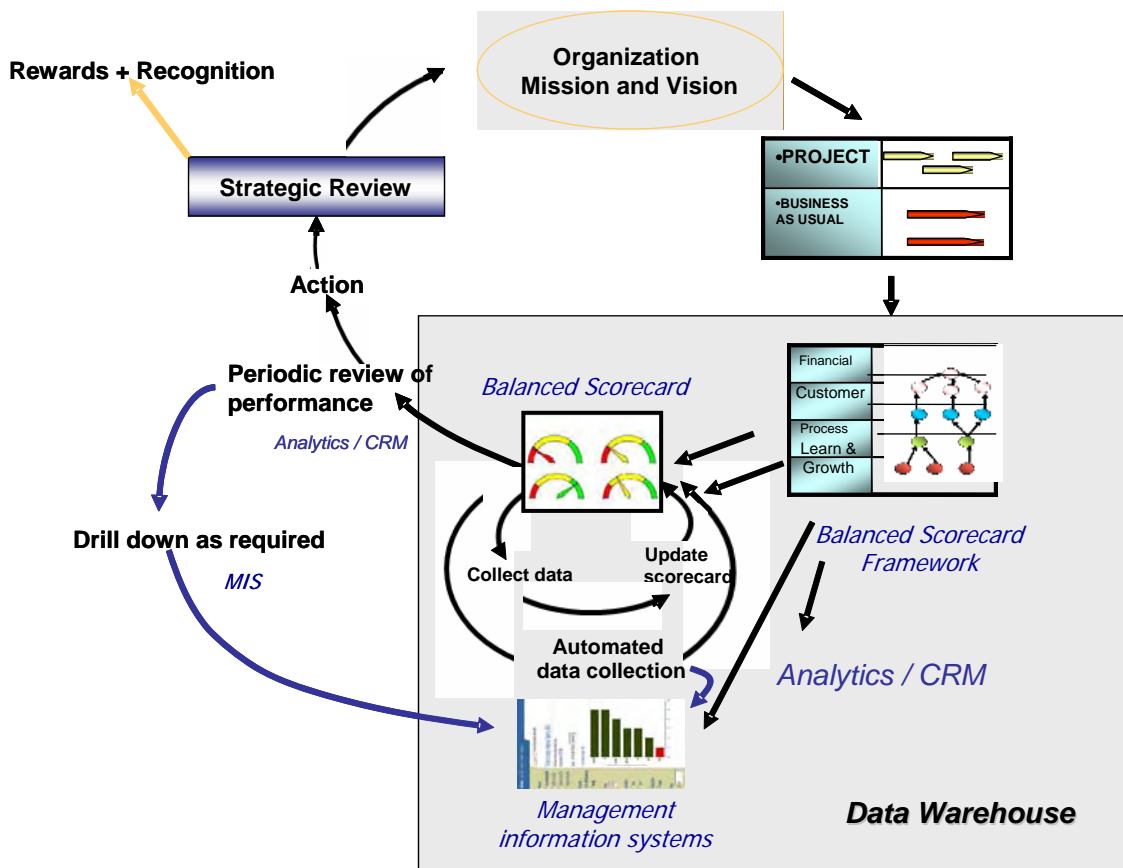


Source: Adapted from Cokins (2004)

The importance of PI ⬛ ᴜɴɪᴠᴇʀsɪᴛᴇɪᴛ ᴠᴀɴ ᴘʀᴇᴛᴏʀɪᴀ / ᴜɴɪᴠᴇʀsɪᴛʏ ᴏғ ᴘʀᴇᴛᴏʀɪᴀ / ʏᴜɴɪʙᴇsɪᴛʜɪ ʏᴀ ᴘʀᴇᴛᴏʀɪᴀ ᴀsised by many authors, however it is also apparent that PM is driven by technologies and enabling techniques on the peripherals of integrated data. In reference to figure 13, a data warehouse supplies data to various BI applications allowing business users to make business decisions. These decisions could impact on the organisations mission and vision and cause action in the form of project initiation or impact on the business as usual activities.

It has been clearly demonstrated that various BI applications such as CRM, profitability analysis and customer profitability analysis type calculations are the BI components which decision makers in Absa are exposed to. As a consequence this research has focussed on the benefits of BSC, MIS and Analytics applications in Absa, as highlighted in section 2.3.3. The literature review has confirmed that the identification of intangible benefits remains a challenge for many BI practitioners. The focus of this literature review was therefore strongly biased towards BI applications and the calculations of the benefits of such BI applications.

This creates the context of the study in terms of benefit identification. The research intended to measure the perceptions of the front end users as to what are the benefits of implementing BI solutions in a South African banking institution. This research was aimed at decision makers directly linked to the use of BI applications and confirmed whether or not intangible BI benefits identified in previous IT studies are also evident in a South African banking institution. These intangible benefits are summarised in table 5. The literature review also focused on the measurement of BI benefits and these concepts are used to form an opinion as to how these benefits could be measured in a South African banking institution.

Table 5: List of intangi [UNIVERSITEIT VAN PRETORIA logo] review.

| Type of benefit | Confirmed by literature review |
|---|---|
| ➢ Increased customer satisfaction and retention<br><br>➢ Greater customer reach<br><br>➢ Increases in the customer base<br><br>➢ Reduction in customer support requirements<br><br>➢ Reduced fulfilment and customer response errors<br><br>➢ Increased employee retention and employee morale<br><br>➢ Resultant streamlining of knowledge<br><br>➢ Improved information accuracy | Highlighted by Mogollon and Raisinghani, 2003 and Braams, 2004 |
| ➢ Improved customer knowledge and training<br><br>➢ Improved business alignment and increased efficiency<br><br>➢ Cost reduction in terms of time<br><br>➢ Cost reduction in terms of resource usage<br><br>➢ Improved information access | Highlighted by Pendse 2003; Shang and Seddon, 2000 |
| ➢ Decreased time to market<br><br>➢ Improved communication | Highlighted by Negash (2004) |
| ➢ Improvement in business processes<br><br>➢ Increases in business knowledge<br><br>➢ Improved decision making<br><br>➢ Improved work processes | Highlighted by Gibson *et al* (2004) |

Source: Extracts from the literature review.

## 2.7　Conclusion

The literature review highlighted the fact that there is little consensus on the definition of BI. Furthermore, two approaches to defining BI become apparent. The first being a process approach of gathering data from various sources and the second approach being a technology approach which supports the process. The common ideas across both approaches are that the core of BI is information gathering and analysis. While the goal is to support strategic decision-making processes. Entwined in the definition of BI, are related concepts of CI and the legacy of SCM, ERP and CRM.

The theory base associated with BI tools, applications and PM also highlighted the need for a well defined BI architecture. BI applications enable PM and the use of BSC, MIS and Analytics allows for organisations to report on strategic and organisational issues. This is made possible by data being drawn from a data warehouse. The literature review also provides insights on how the BI benefits should be measured and identified, however most research has not been directed at South African banking institutions.

The next chapter outlines the aim of the study and also restates the various questions which this research intends to answer.

## 3.1 **Introduction**

The aim of this study was to gain an understanding as to how a South African banking institution calculates the benefits of implementing BI applications. Furthermore it was intended that this research, identify both tangible and intangible benefits of implementing BI solutions. Findings of the research would then be used to suggest a process for the measurement and identification of BI benefits.

A case study approach was chosen which focused on Absa bank (referred to as Absa).

The research attempted to answer the following questions:

- ➢ *Research question 1: How does Absa calculate the benefits of implementing BI applications?* The answers to the above question provide the current view of how this banking institution calculates the benefits of its existing BI applications.

- ➢ *Research question 2: Is Absa using standardised financial metrics, such as ROI to calculate the benefits of their BI implementations and if so which financial metric / s?* The basis of these questions was to investigate whether Absa uses financial metrics such as ROI or NPV or any other metrics to calculate the benefits of their BI implementations.

- ➢ *Research question 3: Do BI application users in Absa follow certain procedures or use certain methodologies to calculate the benefits of their BI implementations?* This question aimed to understand if Absa was

using common ~~[obscured]~~ formulas, policies and best accepted practices to perform the above mentioned BI calculations?

➢ ***Research question 4: What benefit or benefits is Absa gaining from implementing or using these BI applications?*** This question facilitated the identification of both tangible and intangible BI benefits in Absa.

➢ ***Research question 5: To what extent does Absa include intangible benefits, identified in this study, to calculate the benefits of their BI implementations?*** This question clarified whether or not the bank was measuring or identifying any intangible benefits of implementing these BI applications, and if so, whether or not they were being included in the calculation of the benefits of these BI implementations.

➢ ***Research question 6: What measurement processes and approaches can Absa adopt to calculate the benefits of their BI implementations?*** This research tested the perceptions of Absa's managerial and professional staff with regard to their experiences with, BI implementations and the calculation of its benefits. In essence the intention of the research was to provide a process or an approach to calculating the benefits of implementing BI solutions for Absa.

The next chapter outlines the research methodology employed, to answer the above questions and highlights the limitations of the research.

4.        **CHAPTER 4 Research Methodology**

## 4.1     Introduction

This chapter will discuss the research methodology chosen, the reasons for its selection and outlines the process used to gather and analyse all the information. The sections in this chapter describe the population, sample, research instruments, as well as data collection and analysis. A section is also dedicated to the statistical techniques used to analyse the data. This chapter ends with a description of limitations to the research.

## 4.2     Research methodology

For purposes of this research a combination of qualitative and quantitative methodologies were chosen.   The researcher justifies this approach in the sub sections below.

### 4.2.1     Research paradigm

The term paradigm refers to the progress of scientific practice based on people's philosophies and assumptions about the world and the nature of knowledge (Collis and Hussey, 2003). According to Hussey and Hussey (1997) there are two main research paradigms – positivist and phenomenological. The research paradigms described above suggest a structure "comprising of an accepted set of theories, methods and ways of defining data" (Hussey and Hussey, 1997, p.47).

Hussey and Hussey (1997) state that a positivist paradigm, is a research philosophy founded on the natural sciences and accepts or makes the assumption that science is value free. Furthermore, the world is perceived as an external entity, independent of researchers and is free from human beliefs and interests. Using the positivist approach the researcher maintains reality is independent of the individual's experience of it (Welman and Kruger, 2001). The positivist define their approach as the study of observable human behaviour, with an aim of uncovering general laws in relationships and/or causality that apply to all people and at all times (Welman and Kruger, 2001).

### 4.2.3    Phenomenological paradigms

The phenomenological approach deals with the experience or understanding of human behaviour (social and psychological phenomena) from the perspective of the researcher involved (Welman and Kruger, 2001). It is qualitative in that it is usually exploratory in nature and concerned with understanding patterns of behaviour rather than seeking to measure the research in any way (Hussey and Hussey, 1997).

### 4.2.4    Research methodology choice

Methodology refers to the approach to the research process from the theoretical underpinning to the collection and analysis of the data (Hussey and Hussey, 1997). A subjective approach to value measurement by testing the perceptions of banking staff with regard to their experiences with BI and the calculation of its benefits was proposed. As a consequence, a phenomenological research methodology was chosen to collect, analyse and interpret the information.

4.3 **Research n**

The aim of the study was to understand how the benefits of BI applications could be calculated for a South African banking institution. To meet the objectives of the research project, a case study research methodology was selected. According to Yin (1994) a case study does not have to define a universal principle but can be used to demonstrate its applicability of theory to the practical environment. He states that it is then the duty of the research community to decide whether or not the case has broader application.

A single case study approach on Absa was chosen for the following reasons:

- ➢ The researcher was employed by Absa allowing for easy access to the sample population and experts in the field of information management.

- ➢ Absa was implementing or has implemented numerous BI applications in its various business units.

- ➢ Absa received international recognition from both, The Data Warehousing Institute (TDWI) and Gartner for outstanding work in BI and data warehousing practices (Watson and Donkin, 2004).

Methods refer to the various means by which data can be collected and / or analysed (Collis and Hussey, 2003). To ensure that both the quantitative and qualitative requirements of the research were met, a combination of questionnaires and semi structured personal interviews were used.

> ➤ A literature review was conducted.

> ➤ This allowed for a draft questionnaire to be created, using information gleaned from the literature review.

> ➤ The questionnaire was then pre-tested with a sample audience.

> ➤ The questionnaire was then distributed to the sample population.

> ➤ Semi structured personal interviews were only considered after senior management in the organisation requested this. This type of data collection method ensured deeper insight generation than the self completion questionnaires.

> ➤ The researcher then conducted semi structured personal interviews with senior managers of Absa.

The use of a combination of research methods enabled the study to overcome the different weaknesses inherent in both methods.

## 4.4    **Population of relevance**

According to Welman and Kruger (2001) the target population of a study is the population to which one wishes to generalise the findings of the study. The population of relevance was considered to be all individuals who are employed in an information gathering and dissemination capacity at Absa and who had access to the various BI applications implemented by Absa.

The following proceduation of relevance:

- Individuals who had "access" to the various BI solutions were defined as Absa employees with a unique employee number and password allowing them entry and the permission to use of the various BI solutions implemented in Absa.

- A central database of all BI users is maintained by the IM department in Absa.

- Determination of the individual's "access" to the BI applications seems fairly easy, however to determine a persons level of understanding and knowledge of BI application is difficult to understand. For this reason a proxy was used in the study.

- Only individuals classified as professional and managerial staff were included in the population. The use of a proxy ensured that the target population would provide meaningful information.

- The population of relevance was extracted from the Oracle and SAS databases of Absa's information warehouse division using job band indicators, departmental roles descriptions and individual job descriptions.

The population of relevance spread across all Absa's strategic business units, however most individuals were situated primarily in the vicinity of the Absa head office in Johannesburg, Gauteng. The size of the population of relevance was estimated between 200 and 250 staff members. This is depicted in figure 14.

Figure 14: Absa pyrar
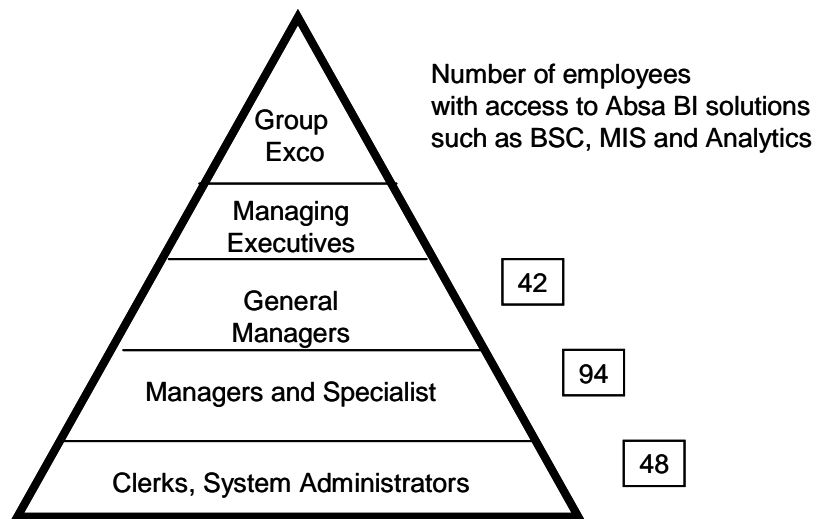


The composition of the population of relevance therefore consisted of Absa general managers, managers and BI professionals only.

## 4.5 Size and nature of the sample

The sample method chosen for the survey was stratified sampling. Stratified sampling was preferred as the sample involved dealing with different levels of management. Stratified sampling also allowed for the selection of a smaller representative sample, making the study scope feasible. Overall, the sample represents a set of managers and professionals from the functional departments involved in decision making and information gathering capacities at Absa.

Based on a population of relevance of between 200 and 250 respondents, the sample size was expected not to exceed 50. Senior managers, managers and professionals were contacted via email and asked to complete the questionnaire. Respondents then emailed their completed questionnaires back to the researcher.

Seven members of the [logo] e interviewed. These key informants belonged to the general management structures in the Absa Information Management area.

The key informants who were interviewed for this part of the research were:

➢ Head of Absa IM

➢ Head of business enablement Absa IM

➢ Head of analytics division Absa IM

➢ Head of information architecture Absa IM

➢ Head of enterprise data warehouse Absa IM

➢ Both managers of the CRM unit of Absa IM

Semi structured interviews were conducted with these key informants to gain an understanding of new and existing issues pertaining to the research topic. These interviews were conducted in order to record the participants verbally articulated opinions on various issues related to the questionnaire.

## 4.6    Data collection

The creation of the questionnaire, compellation of the semi structured interview questions and the distribution of the questionnaire is discussed in this section.

### 4.6.1    Self-completion questionnaire

As mentioned in section 4.3, a self-completion questionnaire was used for this study (see Appendix two for an example of the questionnaire).

An electronic questionnaire was distributed via the Absa email to respondents.

Standardisation was allowed for results to be aggregated and analysed. The questionnaire was descriptive based on fact gathering. Numerical analysis of the responses was used to answer the research questions posed. Questionnaires were based on a self-completion format and where appropriate based on a 5 point Likert scale. Each questionnaire consisted of thirty eight closed ended questions which were used to facilitate standardised responses and statistical analyses. One single open-ended question was included at the end of the questionnaire to allow for greater depth of responses (see Appendix five for summary of responses from respondents). All questions were designed to be short, relevant and concise.

The questionnaire was also pre-tested with three individuals, who have some experience with BI applications. The pre-test identified problem areas in terms of length and time to complete the questionnaire, as well as ambiguous questions. A cover note explaining the purpose of the study and instructions to complete the questionnaire accompanied all questionnaires. (See Appendix three for a sample of the research letter).

### 4.6.1.1. Structure of questionnaire

The questionnaire comprised of an introduction which stated the aim of the research. This was followed by a set of instructions, four questions about the personal profile of the respondent and thirty four technical questions. (See Appendix two)

The questions were g    [University of Pretoria logo]

- ➢ Section 1: Personal profile of respondents

- ➢ Section 2: BI applications usage

- ➢ Section 3: Intangible benefits of BI

- ➢ Section 4: Benefit calculation

Section two type questions, were structured around Absa's current approach to measuring benefits of the BI implementations in the various divisions. These questions were focused on the tangible financial metrics associated with measurement. Other questions in this section established if there is a standardised approach to calculating the business benefit of BI implementations in Absa. Section three, established if any of the intangible benefits of BI implementations, are currently being measured or observed in Absa. These questions were formulated from benefits listed in table 5, section 2.6. Respondents were required to answer these questions using a five point Likert scale. Questions listed in section four explored the perceptions of BI users towards the use of financial metrics in BI benefit calculations. Furthermore questions were directed at the current extent of measurement of intangible benefits in Absa. The questionnaire concluded with the respondents being asked to suggest a solution to the problem in a single open ended type question. After completing the questionnaire, respondents were then asked to save the Excel based file and email it back to the researcher.

Semi structured interviews with open ended questions were conducted to ensure deeper insight generation than the self-completion questionnaires. Answers were not pre-empt but rather encouraged an informal discussion in an attempt to understand how key informants see a solution to the research problem. Broad themes were suggested like "BI benefit vs. cost" or "Intangible benefits" and then led on with related questions from the interview guide. This data was vital in ensuring that results obtained were correctly understood. (See Appendix four for a sample of the interview guide). Handwritten notes were taken for all interviews.

## 4.7    Data analysis

In general, the data from the survey was processed using quantitative analysis. The data collected from questionnaires was captured and analysed using descriptive statistical methods appropriate for this type of study. Content analysis was used for the qualitative data.

### 4.7.1    Data analysis of questionnaires

Hussey and Hussey (1997) point out that data collected by means of a questionnaire using a Likert scale does have some limitations. The data obtained from a Likert scale is ordinal data; however it was assumed that there was a uniform distance between categories, allowing the data to be treated as interval data. Validity of the questionnaire was established by the use of "face validity."

This allowed for the use of interval data statistics, such as means and standard deviations. The mean, median and modes were calculated to determine the central tendency of the response data. Widely dispersed values indicated low reliability of

the central value or m  data was also determined using standard deviation. Measure dispersion provided additional information to test reliability of the mean. This was done be investigating the distribution of individual data around a mean.

### 4.7.2 Data analysis of semi structured interviews

The qualitative data from the interviews was analysed by capturing the common themes for each of the questions asked. These themes were then grouped into high level issues and used to explain some of the observations made in the quantitative analysis. The results of theses interviews are summarised in section 5.3 and discussed further in chapter 6.

### 4.8 Research limitations

The following were some of the limitations that were taken into account during the research project.

- ➢ Case study approach: The research will be specific to one organization and therefore would not constitute the industry as a whole.

- ➢ The responses elicited from individuals who do not experience similar work environments and this may impact on the findings.

- ➢ The research is targeted at competitive intelligence, performance measurement and financial measurement type BI solutions. It does not include risk and fraud reporting which may limit the application of the findings.

- ➢ The population of relevance only consists of managerial and professional staff.

4.9     **Conclusion**

This chapter has explained why a phenomenological research methodology was used to collect, analyse and interpret the data. To meet the objectives of this research project, a case study research method was selected. Once the population of relevance was determined, a combination of questionnaires and semi structured personal interviews was used to collect data. Details of the process of data analysis were also provided. The research limitations of the study were then specified.

The results of responses to the research questionnaire and semi structured interviews will be discussed in the next chapter.

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## 5.1 **Introduction**

The results obtained from the research are presented in this chapter. The analysis of the research data and interviews will be presented in the following sequence:

> ➢ Data analysis of questionnaire (sub sections 5.2.1 to 5.2.5)
> ➢ Insights from semi structured interviews (section 5.3)

This chapter concludes with a summary of the most relevant results which lead to the discussion of the findings and answers to the research questions in chapter 6. All research data has been summarised and provided in the body of the report, however for completeness purposes, key graphs and information have been provided in Appendix six.

## 5.2 **Data analysis of the questionnaire**

This section presents the data collated from the questionnaires and provides some findings of the results. The data is presented in a graphical format to facilitate greater understanding of the responses. Data was analysed using descriptive statistics, in particular, percentage of respondents, standard deviation and also arithmetic mean. Column graphs and tables were chosen to present the data in the main body of the report.

A total of seventy three completed questionnaires were received from respondents, which equals a response rate of thirty seven percent. Two questionnaires were discarded because they were not completed in totality. The remaining seventy one questionnaires were acceptable for analysis. The sample size represented twenty

Data from the seventy one questionnaires was entered into a spreadsheet and analysed to create the graphical representations found in this chapter. The analysis is categorised in accordance with sections of the questionnaire. (Refer to Appendix two for a sample of the questionnaire). Each section will be discussed in more detail below.

### 5.2.1 **Profile of respondents**

This section of the questionnaire consisted of four questions preceded by a brief introduction. Respondents were asked about their position, gender, division and number of year's service in Absa.

Table 6: Respondents position in Absa

| Position | Frequency | Percent |
|----------|-----------|---------|
| Managerial | 33 | 46 |
| Professional | 35 | 50 |
| Technical | 2 | 3 |
| Administrative | 1 | 1 |

Table 6 shows that respondents belonged to either professional or managerial levels in Absa. This is a limitation of the research; however it is acceptable due to the fact that the questionnaire was only made available to professional and managerial staff. The responses from the technical staff have been classified as professional responses.

Figure 15, highlights [text obscured by logo] [r]espondents, in Absa. The various divisions of Absa are also well represented in the study, with at least two respondents from each division having participated. There was no response from two divisions (GBEE and ACMB); however this is acceptable as the ACMB division merged with the BBS division in the weeks preceding the data collection exercise. The GBEE division consisted of two staff members who were not available during the data collection period. The spread of respondents per division is illustrated in figure 9.6.1 (Appendix six).

Figure 15: Years of service of respondents in Absa

| | Years 1-2 | Years 3 -5 | Years 6-10 | Years 11-15 | Years 15 and more |
|---|---|---|---|---|---|
| Series1 | 18 | 15 | 19 | 6 | 13 |

Number of respondents

Number of years service in Absa
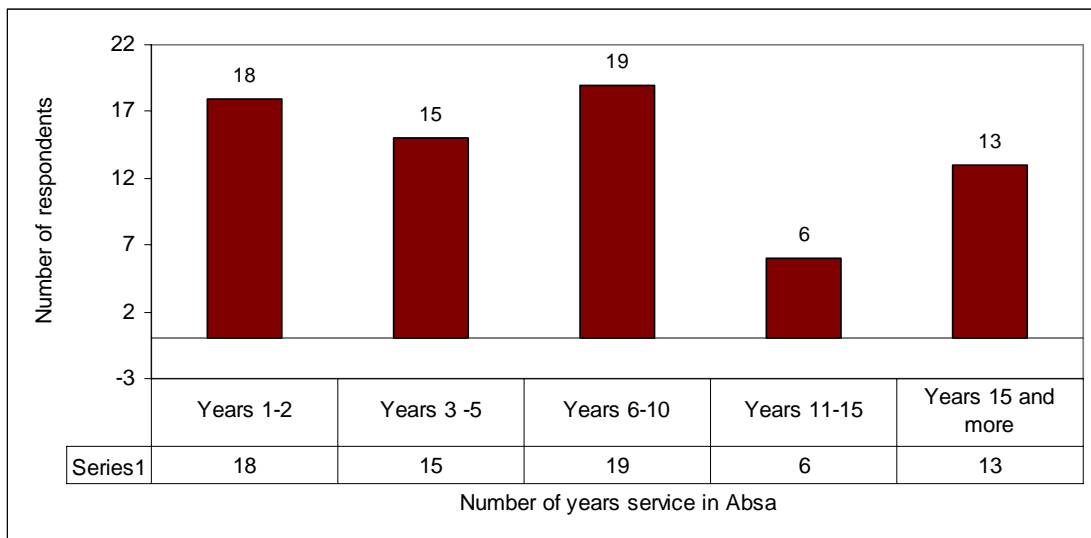
### 5.2.2 BI applications being used by respondents

This section of the questionnaire allowed respondents to select the type of BI application their division was currently implementing or using for decision making purposes. A breakdown of the total sample is provided in figure 16.
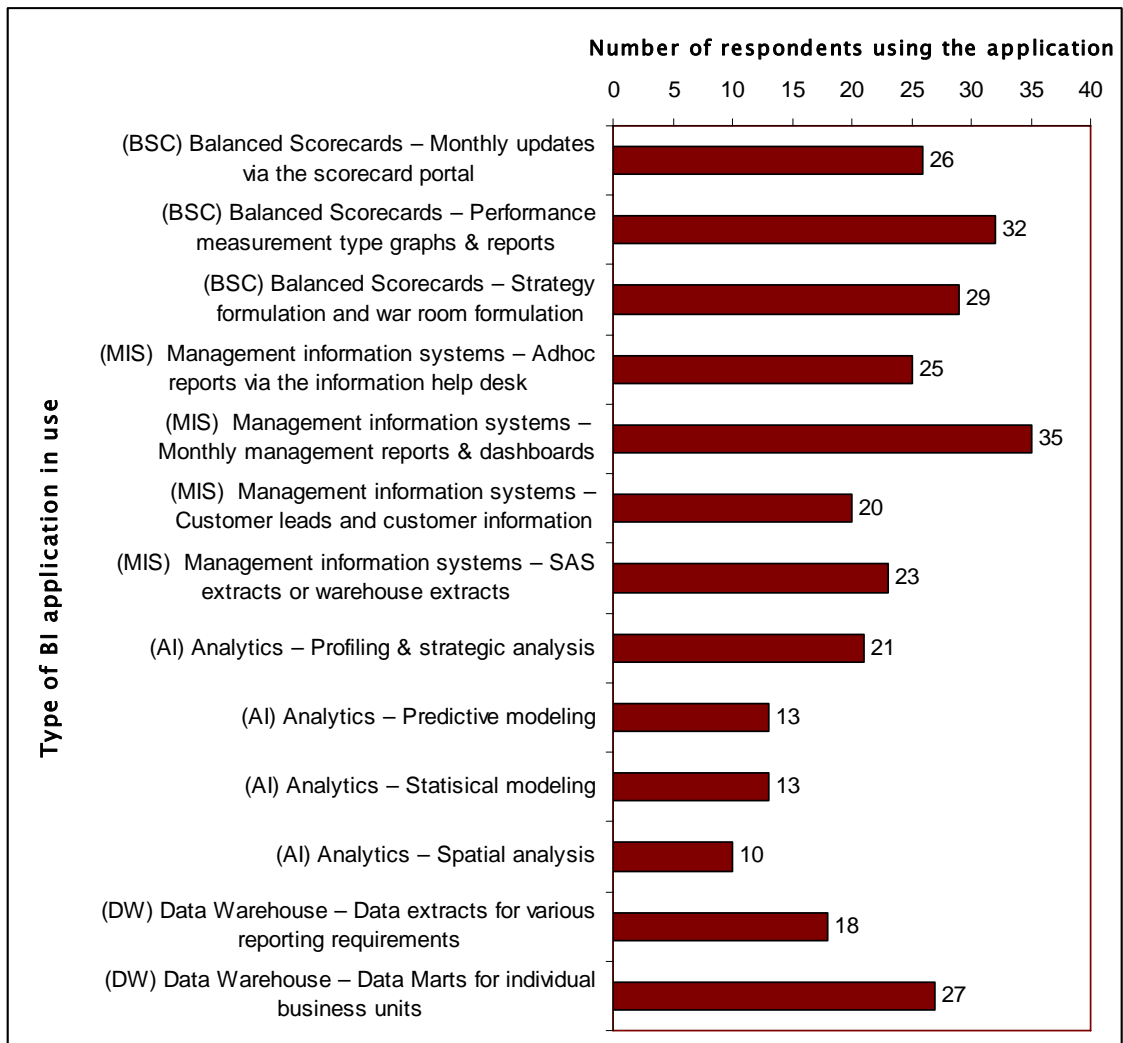
Results show that respondents selected multiple applications from the options contained in the questionnaire. This implies that "front end users" are not using a single application for decision making, but rather an array of BI applications. Three distinct respondent type clusters were found in the analysis. Twenty one percent of the respondents use BSC in conjunction with some MIS type applications and data warehouse extracts. Little emphasis was placed on Analytical type BI applications by these users. The second cluster of respondents, forty two percent, uses MIS in conjunction with BSC, data warehouse extracts and some Analytics. The last cluster

of respondents, thirty ~~UNIVERSITEIT VAN PRETORIA~~ ns including Analytics to a high degree.

Respondents were asked if their division measures the business value of implementing BI applications. Results are shown in table 7.

Table 7: Responses to the measurement of business benefits

| Position | Frequency | Percent |
|----------|-----------|---------|
| Yes | 27 | 38 |
| No | 30 | 42 |
| Not sure | 14 | 20 |

Thirty eight percent of the respondents stated that they currently measure the benefits of these BI applications. Forty two percent answered no or not at all. Twenty percent of respondents were not sure. Respondents were then asked to choose, from a list of detailed financial metrics, which metric do they use to measure the benefits of these BI applications. These results are shown in figure 17.
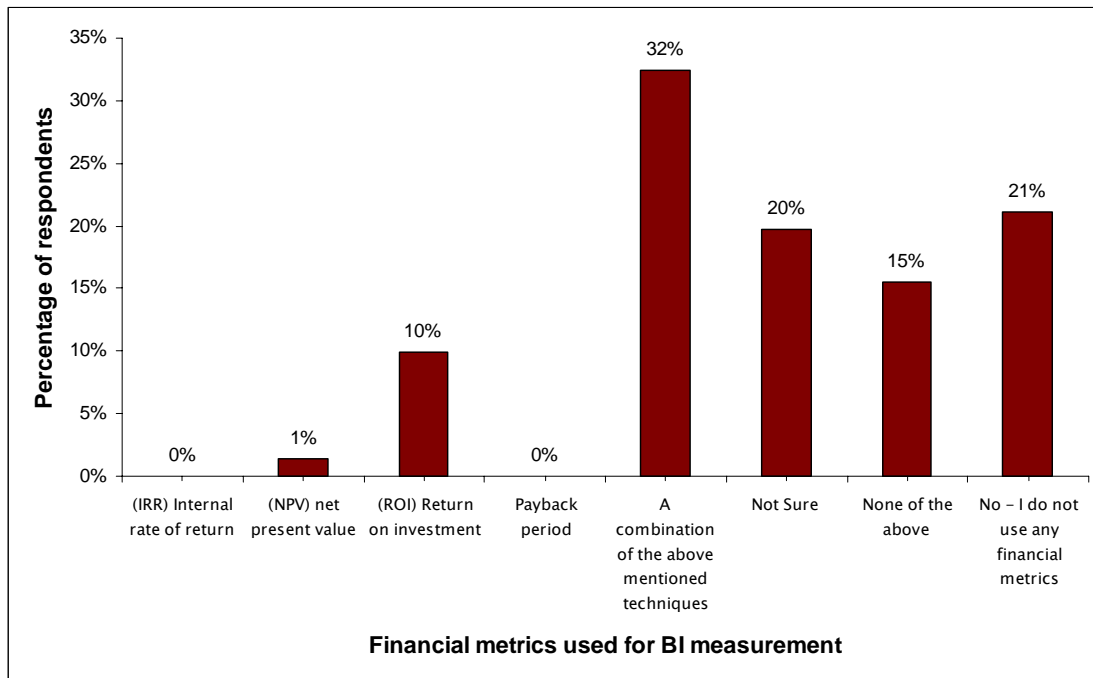
The majority of respondents, fifty six percent, were either not sure, never use metrics, or use another type of financial metric in their calculations. Thirty two percent of respondents used a combination of the financial metrics presented, while ten percent preferred to use ROI. These results suggest that respondents do not have a clear understanding of the use of the financial metrics. To follow on from this line of questioning, the respondents were then asked if they use any financial or organisational tools for guidance on how to capture the benefits of these BI applications. Some pertinent results from this category are included in figure 18.

Figure 18: Financial t̶
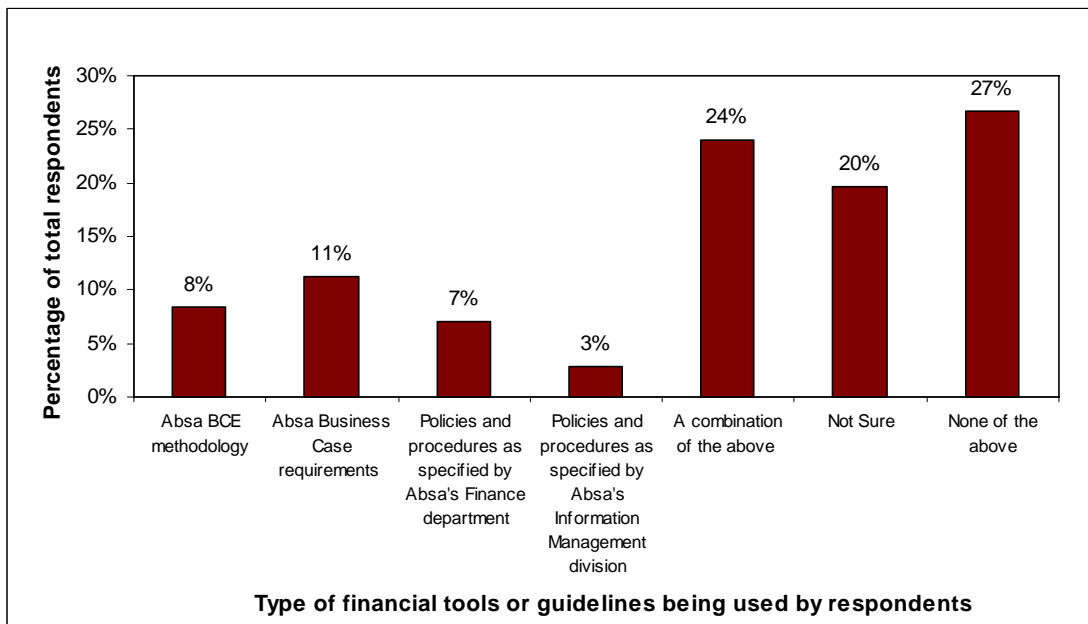


Forty seven percent of respondents were either not sure or choose none of the above when asked if they use a guideline or tool for BI benefit measurement. Twenty four percent of respondents answered that they use a combination of the various tools or Absa policies. The Absa business case tool was also a common choice with eleven percent of respondents selecting this as a BI benefit measurement guideline. Insight gained from the semi structured interviews provided further detail as to why such results have occurred. These results will be discussed in chapter 6.

**The importance of BI measurement:** Eighty percent of the respondents felt that the measurement of BI is of high importance to Absa. This is in contrast to the seventeen percent of respondents who feel that it is of low importance to measure the benefits of BI applications. These results are depicted graphically in figure 19.
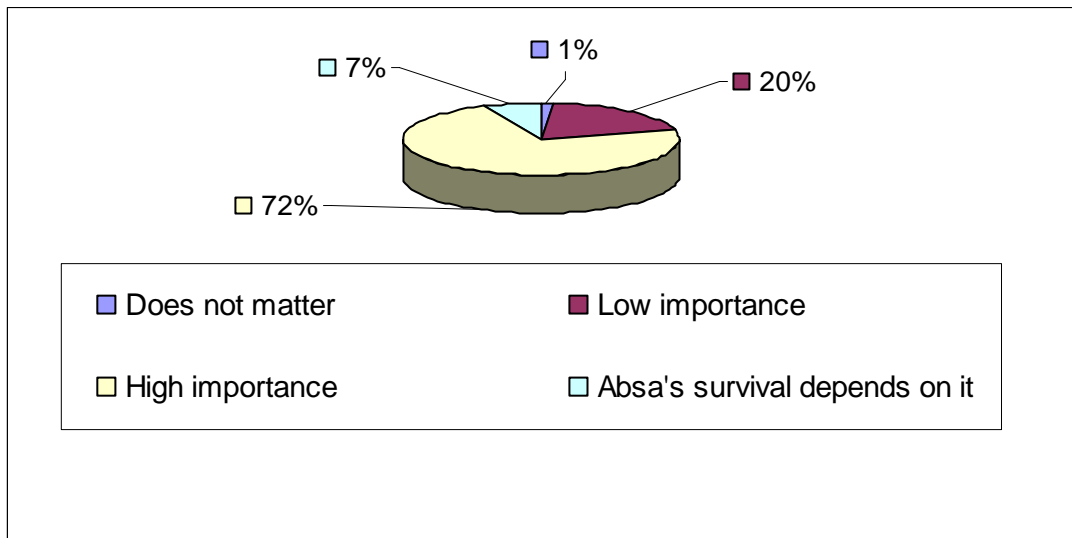
### 5.2.3 The identification of intangible benefits of BI

A total of twenty three questions formed part of this section. For purposes of this research report and analysis the Likert scale rating on the questionnaire was converted to a numerical rating as follows:

| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|:---:|:---:|:---:|:---:|:---:|
| 1 | 2 | 3 | 4 | 5 |

A variety of descriptive statistics was used to analyse the set of data obtained from these questions. Table 8 shows the percentage response to questions asked about intangible benefits of BI implementations. Questions highlighted in yellow, had the following characteristics when analysed:

> ➢ Yielded a high frequency of responses which agreed with question posed

> ➢ Yielded positively skewed graphs in all instances

➤ Produced a n

These results were represented graphically in section 9.6.4 of Appendix six. Trend lines have been added to all the graphs for completeness.

Table 8: Presentation of findings showing percentage of response to questions

| Question | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| 10. There has been increased customer satisfaction | 0.0% | 8.5% | 31.0% | 50.7% | 9.9% |
| 11. There has been increased customer retention | 1.4% | 11.3% | 33.8% | 52.1% | 1.4% |
| 12. There is greater customer reach | 0.0% | 5.6% | 31.0% | 50.7% | 12.7% |
| 13. There is an increased customer base | 0.0% | 11.3% | 42.3% | 40.8% | 5.6% |
| 14. There is reduced customer contact / support requirements | 2.8% | 32.4% | 43.7% | 19.7% | 1.4% |
| 15. There is reduced fulfillment and customer response errors | 0.0% | 18.3% | 52.1% | 28.2% | 1.4% |
| 16. There is increased employee retention | 1.4% | 28.2% | 54.9% | 9.9% | 4.2% |
| 17. There is an improvement in employee morale | 0.0% | 18.3% | 43.7% | 32.4% | 5.6% |
| 18. There is improved customer or employee knowledge and training | 1.4% | 8.5% | 18.3% | 63.4% | 8.5% |
| 19. There has been an improvement in business processes | 1.4% | 15.5% | 16.9% | 52.1% | 14.1% |
| 20. There is a decreased time to market | 1.4% | 18.3% | 36.6% | 38.0% | 5.6% |
| 21. There has been an observable increase in the business knowledge | 0.0% | 8.5% | 15.5% | 64.8% | 11.3% |
| 22. There has been an acceleration in decision making | 1.4% | 15.5% | 23.9% | 53.5% | 5.6% |
| 23. There is improved work processes | 0.0% | 12.7% | 36.6% | 49.3% | 1.4% |
| 24. There is more effective relationships between departments / divisions  and staff | 1.4% | 14.1% | 29.6% | 45.1% | 9.9% |
| 25. There is better business alignment | 4.2% | 9.9% | 15.5% | 67.6% | 2.8% |
| 26. There is improved communications | 1.4% | 12.7% | 23.9% | 52.1% | 9.9% |
| 27. There is increased efficiency | 1.4% | 11.3% | 26.8% | 52.1% | 8.5% |
| 28. There is additional cost savings in terms of time spent to produce reports | 1.4% | 19.7% | 28.2% | 39.4% | 11.3% |
| 29. There is additional cost savings in terms of resource usage | 2.8% | 21.1% | 31.0% | 35.2% | 9.9% |
| 30. There is improved information access | 2.8% | 8.5% | 9.9% | 66.2% | 12.7% |
| 31. There is a resultant streamlining of knowledge | 1.4% | 8.5% | 21.1% | 60.6% | 8.5% |
| 32. There is an improvement in the information accuracy | 2.8% | 15.5% | 14.1% | 56.3% | 11.3% |

The mean and mod[...]n in this section. These calculations are shown in section 9.6.3 of Appendix six. Measure dispersion of the data was also calculated using standard deviation. Results revealed that a large percentage of questions showed a mean between 3.5 and 4. Responses to questions not highlighted in yellow in table 8, showed means lower than 3.4. It was concluded that these benefits could not be classified as benefits of the BI implementations in Absa as a consequence of the varied responses to the questions asked.

It was also found that there is no correlation between the different business unit user cluster types described in figure 16 and differences in perceptions highlighted in yellow in table 6. All BI groups, regardless of which BI application they use, agreed to varying degrees that the BI benefits, highlighted in yellow in table 6, are evident in their work environments. When results were analysed for differences between managerial and professional responses to the questions, no significant differences were found as well.

### 5.2.4 Intangible benefit calculation

This section explored the perceptions of BI users towards the use of financial metrics in BI benefit calculations and the current extent of measurement of intangible benefits in Absa. A single open-ended type question was included in the questionnaire asking respondents to suggest a solution to the problem.

**Has effort been made to capture the benefits of the BI applications?** Figure 19, shows that fifty three percent of the respondents feel that an effort is being made to capture the intangible benefits of the BI applications (figure 20). Seven percent stated that this happens often. In contrast nineteen percent of respondents felt that it never happens at all. Twenty one percent of the respondents say that the capture of the

benefits rarely happer

Figure 20: Has effort been made to capture the benefits of the BI applications?
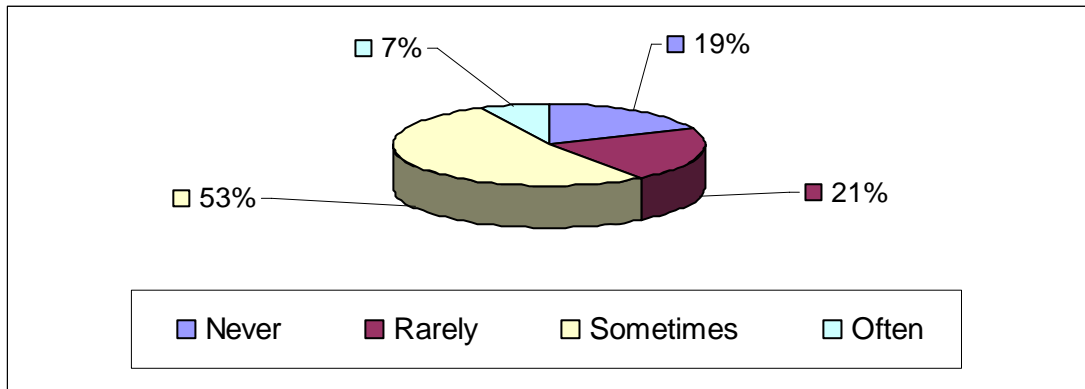
Almost eighty percent (consolidated response) of respondents do feel that there is some kind of capture of these benefits, however not at regular intervals.

**Measurement of the intangible benefits of BI:** Seventy eight percent of the respondents felt that measurement of the intangible benefits of BI is of high importance to Absa (figure 21). This is in contrast to the one percent of respondents who felt that it is not important to measure the intangible benefits of BI applications. This confirms the results of question 9. A high percentage of respondents feel that benefits, both tangible and intangible are very important to Absa.

Figure 21: The importance of measuring the intangible benefits of BI applications.
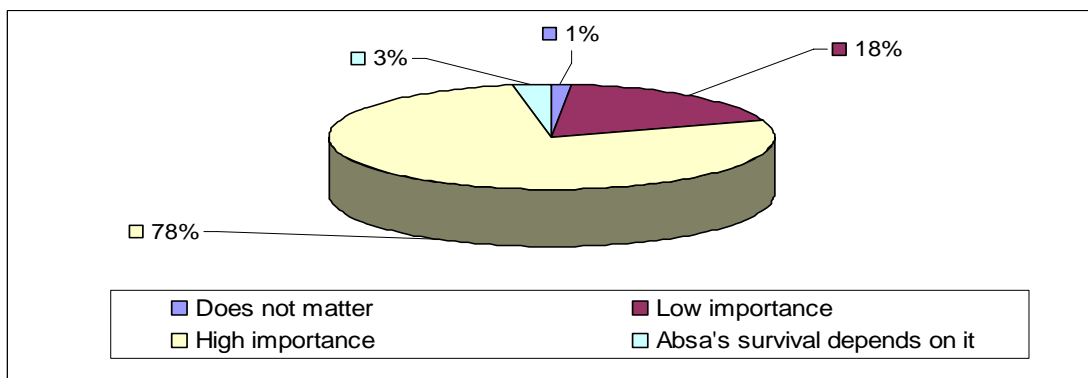
When respondents w ... should be included in BI benefits calculations, question 35, ninety percent agreed, with zero percent disagreeing. Ten percent of respondents remained neutral.

**The provision of a guideline for BI benefit measurement:** Ten percent of respondents strongly agreed that a guideline will assist Absa staff in calculating the benefits of BI applications. A further seventy two percent agreed. Thirteen percent of the sample strongly disagreed with the question (figure 22).The responses to this question highlight responses to questions 7 and 8 of the questionnaire. BI users in Absa are using various methods in calculating the benefits of BI, since there is no standardised approach or process to perform the calculation. This implies that there is no uniformity of measurement across the organisation. The provision of a guideline or process would assist with the problem of BI benefit measurement.

Figure 22: Provision of guidelines to calculate the benefits of BI applications



Question 36 : Should a guideline be provided by Absa for BI benefit calculations?
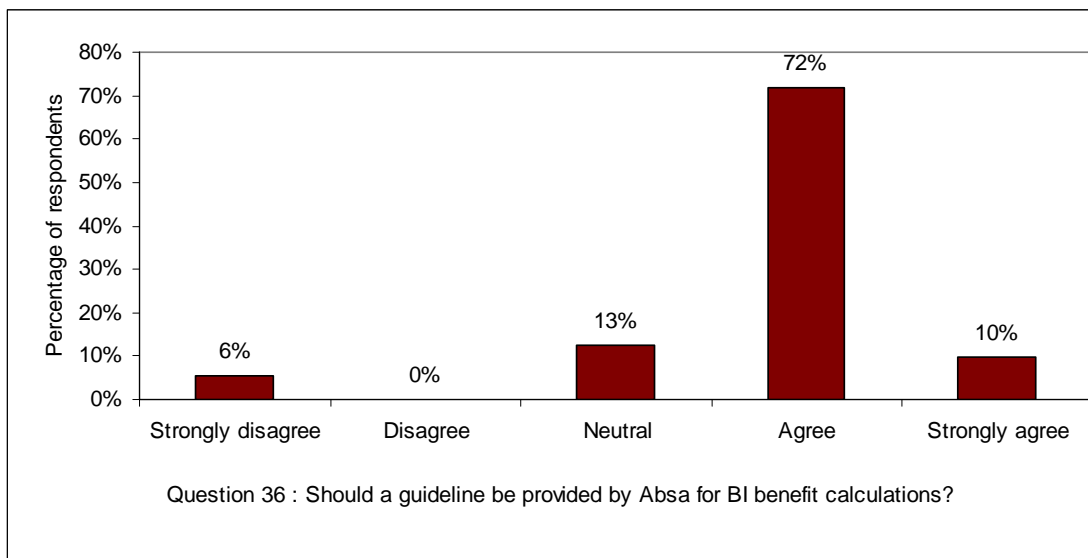
| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|--------|------|------|---------|----------|-----|-----|-----|
| 4 | 4 | 3.80 | 0.84 | 0.70 | 5 | 1 | 71 |

**The importance of F [logo] strongly agreed that ROI** is an appropriate financial metric to use for BI benefit measurement. Forty four percent agreed. Four percent of the sample strongly disagreed with the statement, while twenty eight percent disagreed. The remaining respondents remained neutral. This provides a compelling argument to most BI professionals, that ROI may not be the most appropriate financial metric to use. Results indicate that is it not a common choice for respondents (figure 23).

Figure 23: Is ROI the most appropriate financial metric that can be used to calculate the benefits of BI applications?



Question 37: Is ROI the most appropriate measure for BI benefit measurement?
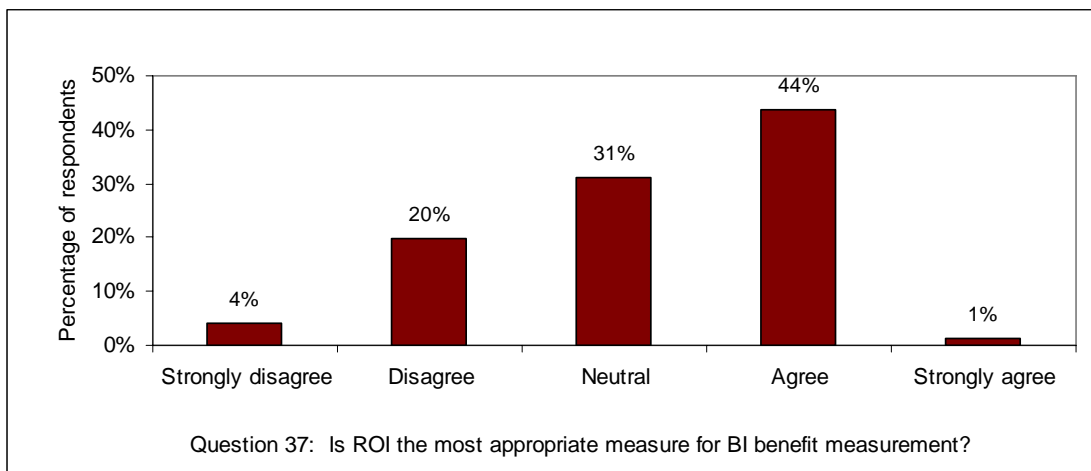
| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|--------|------|------|---------|----------|-----|-----|----|
| 3 | 4 | 3.18 | 0.91 | 0.83 | 5 | 1 | 71 |

A possible reason for the inappropriateness of ROI calculations is that it does not take into consideration possible time lags in the production of this intelligence. Respondents were asked if they believed if this is true. Seven percent of respondents strongly agreed. Sixty percent of respondents were in agreement. Seven percent of the sample disagreed with the statement, while twenty five percent remained neutral. This provides additional evidence that ROI may not be the most appropriate financial

metric to use in the ca [logo] are shown in figure 24.

Figure 24: ROI calculations do not take into consideration possible time lags in the production of this intelligence.



Question 38: "ROI does not take into consideration possible time lags in the creation of benefits"
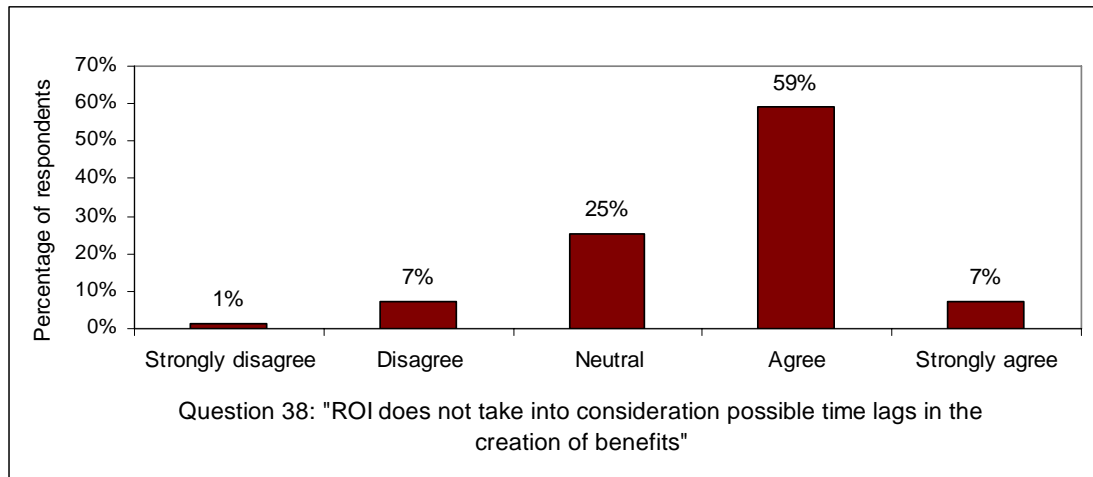
| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|--------|------|------|---------|----------|-----|-----|----|
| 4 | 4 | 3.63 | 0.77 | 0.61 | 5 | 1 | 71 |

### 5.2.5   **Responses to the open ended question**

Respondents were asked to propose a solution to calculating the benefits of BI implementations in Absa. Sixty percent of respondents responded to the open ended question. Key comments have been captured in Appendix five, while only key themes and notable suggestions are summarised in table 9.

Respondents may have interpreted this question incorrectly, with some responding about Absa's strategy with regard to BI implementation, as well as, some respondents commenting on the way these BI solutions are currently being implemented. A large percentage of respondents stated that it is very difficult to calculate the value of these BI solutions.

| Number | Key themes and suggestions captured from responses |
|--------|----------------------------------------------------|
| 1 | A standard approach is required across the Absa group. Clearly defined measures as to what to measure and what not to. A properly defined process applied throughout Absa but customised to suit the individual divisions needs. |
| 2 | A combination of financial metrics should be used which includes ROI, NPV and payback period. |
| 3 | All information is not useful. The usefulness of information should be tested on a regular basis. Benefits should be tracked before and after the implementation of the BI initiative. |
| 4 | Benefits are difficult to quantify. There needs to be a clear link to Absa objectives, i.e. retention, cross sell, acquisition. Then it becomes necessary to quantify the contribution to increase in sales or the contribution to the reduction in expenditure. |
| **Number** | **Suggestions to help solve the problem** |
| 1 | "Only include intangible benefits which are a direct result of the implementation of a BI solution. If a strategic decision is made using a balanced scorecard or MIS and it results in a bottom line impact to Absa, credit should be given to the BI system. This could be the return on the investment." |
| 2 | "Rather than measuring the ROI, do some random testing of the amount of users, their dependency on the information and decisions that were taken based on the BI supplied. Then calculate the cost of producing this information on a monthly basis. A decision must be taken whether to continue or make changes to, or stop the production of the information completely." |

Table 9 continued.

| Number | Suggestions to help solve the problem |
|---|---|
| 3 | "Where possible, a discounted cash flow (e.g. NPV) should be used. The benefits are likely to be over numerous time periods while the initial investment will probably be a once-off expense." |
| 4 | "The benefits calculated should be linked to the strategic objectives of the organisation i.e. the cost of the BI implementation should be balanced against the success of 3 main strategic objectives namely:<br><br>1. Customer Acquisition: Can be measured by increase / decrease in new customer relationships.<br><br>2. Customer Retention - Can be measured by an increase / decrease in account closures.<br><br>3. Customer Relationship Management / Customer Satisfaction - Can be measured by an increase / decrease in customer complaints." |
| 5 | "My suggestion to Absa would be to provide guidelines on how to measure, but to leave enough room for the specialist to adopt the method to suit the specific, highly specialised area in which he operates." |
| 6 | "One could also look at the time saved by automating these processes e.g. John Smith currently spends 40 hours a month on manual BI @R100 per hour rate. You could work back and say that you could save 40*100 = R4000 of John's strategic business unit (SBU) as he can now focus on SBU's core functions. Obviously this cannot be used in isolation you also need some financial measures." |
| 7 | "We have to start including the non financial benefits in the calculations. What about the opportunity cost of not investing in BI. Would Absa be in the position it is today if it had not invested heavily in BI years ago?" |

This section is aimed at discussing the results of the semi structured interviews and observations made during the research process. A total of six semi structured interviews were concluded from the initial sample of seven (time constraints did not allow for a senior manager to re-schedule his interview date). The rationale for interviewing senior management of the information management area of Absa was that they, as heads of their respective business areas/units, exert strong influence on the operational and strategic aspects of all BI implementations for the bank.

Questions were designed to understand how senior management measure the success of certain IT related investments, as well as BI investments and also their perceptions of the intangible benefits of BI applications. (Refer to Appendix four for the interview guide).

The qualitative data was analysed by tabulating the common themes for each set of questions and then grouped into high level issues. The high level issues were then used to explain some of the observations made in the quantitative analysis.

### 5.3.1    **The cost versus benefit of BI projects**

All key informants confirmed that small portions of the IT budget were being spent on BI projects within the bank. This is attributed to the high cost of these implementations which includes spending on hardware, software, licenses and labour cost. They also confirmed that the time taken to implement these solutions effect the total cost of all BI implementations. Some BI projects span between 3 months and 5 years in the banking environment. The project cost can be easily tracked or captured over time, however the benefits of these BI projects only becomes evident some time

after the project is cor

When key informants were asked how they calculate the benefits of these projects for project funding and business cases requirements, most responded by saying that "gut feel" is used more often than the actual figures. Future benefits or potential benefits of these projects are estimated and submitted however no effort is made within the bank to confirm initial benefits promised or realised after BI projects are implemented.

Key informants observed the following benefits of BI solutions:

➢ Investments in BI technology allowed for the automation of tedious task. This decreased the manual human intervention required, as well as time spent by staff on such tasks. This resulted in savings of staff salaries.

➢ Increases in business knowledge and knowledge transfer.

➢ Improved efficiency, work processes and communication in various areas of the bank.

➢ There were increases in information access across the bank, as more staff had access to reports and information. Key informants believed that this is one of the key contributors to quicker decision making in the bank.

➢ CRM initiatives and Analytical type reports do impact on customer retention, via cross sell and up-sell initiatives. Some key informants believed that "leads" generated by BI applications assist sales staff in increasing sales and product marketing campaign success rates.

The potential financial
the cost justifications for BI investments are :

- ➢ Cost savings in terms of staff salaries (e.g. reduced headcount due to automation)

- ➢ Equipment and consumables savings (e.g. less paper usage reduces operating cost)

- ➢ Time to be saved (e.g. time saved for staff members due to reduced process time)

This highlights the extent to which business case justifications are more subjective.

### 5.3.2  Which financial metrics are used in the BI calculations?

Key informants mentioned numerous methods such as ROI, IRR and also earned value analysis (EVA). However there was no clear choice or preference of financial metric. Absa business cases require that ROI be submitted for each project and each business case justification. The ROI referred to above was defined as project returns divided by project cost. As stated in section 5.3.1, the potential project returns are highly subjective and do not take into consideration any of the intangible benefits of BI solutions. Great emphasis is being placed on tangible outcomes such as a reduction in operating cost and increases in sales figures.

In some cases, key informants mentioned that the value attached to project returns in a BI project include the total amount of revenue generated by the sale itself. Explained further, if a client of the bank successfully registers a mortgage loan as a consequence of a bank salesperson contacting the person from a leads based extract, then total revenue to the bank can be attributed to the production of the lead. This provides exaggerated ROI figures as the cost of the BI project do not include

salaries of sales staff ⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛ erating cost and any other bank expenses.

### 5.3.3 BI guidelines and methodologies

Key informants welcomed the idea of a guideline or method for calculating the benefits of BI solutions. However they remained sceptical if it could be done in Absa. They confirmed that there is currently no initiatives or guidelines for such a calculation. Other factors such as organisational culture, knowledge of BI and governance were mentioned as critical success factors in compiling such a guideline.

Key informants also confirmed that although Absa has numerous IT guidelines and methodologies at its disposal, there was little specific for BI. One of the contributing reasons for this is that key informants do not see a distinction between IT and BI. Five of the six interviewees said that there was no difference between BI and IT projects. This resulted in BI projects not being ring fenced from IT projects.

Most key informants believed that staff was not adequately trained on BI benefit calculations. In the absence of clear direction and guidelines, BI professionals used a multitude of methods and approaches to calculate the BI benefits. It was also stated that the Absa business case methodology is primarily completed by project management professionals. Almost all business case justifications in the bank are the responsibility of either project managers or general managers. BI users would only be the recipients of the newly implemented solution.

### 5.3.4 Intangible and tangible benefits of BI

Key informants said that little effort is being made to measure the intangible benefits of BI. Since intangible benefits were difficult to quantify, they are often not included in

BI benefit calculations.  fits are important to Absa and agreed that it should be included in all BI benefit calculations. Key informants did confirm that efforts have been made in the past to attach some sort of monetary value to the intangible benefits; however this process was very subjective.

Key informants provided the following suggestions to help solve the research problem:

➢ The benefits of BI must be assessed before and after the BI project implementation. An effort should be made to track benefits after the project has been completed.

➢ An effort should be made to quantify intangible benefits created by the BI project. Once a monetary value is attached to the intangible benefit, it can be included in the various BI project justification processes. Benefits could be rated as high, medium or low impact benefits for the organisation.

➢ BI solutions should be ring fenced. Once ring fenced an accurate study could be conducted to identify which benefits are relevant to the solution and what impact they have on business.

➢ A scorecard could be used to track intangible benefits. Surveys could be used to test perceptions of front end users on a regular basis as to whether there are observable improvements in decision making or operational processes in the business.

5.4    **Conclusion**

The research results from both the semi structured interviews and questionnaires have been stated in this section. Results showed that most respondents were familiar with the concepts and challenges presented by BI benefit measurement. A partial analysis of the results revealed that there are no common processes or standardised approaches to BI benefit measurement in Absa. Various tangible and intangible BI benefits were identified from the data analysis. Respondents felt that these benefits should be included in BI calculations as they were of high importance. Measurement of the benefits is equally important to respondents and the provision of a guideline or process would assist in the BI benefit calculation.

Key themes and suggestions from the open-ended question in the questionnaire were collated. Insights from the semi structure interviews were also stated in this chapter. These results are discussed in greater detail in the next chapter.

## 6.1 Introduction

In this chapter the research findings with regard to the research questions are discussed and interpreted. This section also relates back to the literature review, where applicable. This discussion is structured in the following sequence:

➢ Findings on the research questions (sub sections 6.2.1 to 6.2.6)

➢ Conclusion

## 6.2 Findings on the research questions

This section serves two purposes. Firstly the discussion of the results will establish whether this research project has answered the research questions posted in chapter 3. Secondly, to establish whether it supports or challenges the information stated in the literature review.

### 6.2.1 Research question 1

**How does Absa calculate the benefits of implementing BI applications?**

Results from both the self-completion questionnaires and semi structured interviews revealed that there are numerous methods and processes being used to calculate the benefits of these BI applications in Absa. A large percentage of respondents were either not sure or did not measure the business benefits of these BI implementations, as stated in table 7 and figures 18 to 19. This view was also confirmed by results obtained from the questionnaire when a portion of respondents, responded by saying that they use a combination of financial metrics for BI measurement. Results also showed that Absa staff used a combination of tools or guidelines when calculating BI

benefits. This could ![University of Pretoria logo] respondents are using a combination of financial metrics to calculate the benefits of BI applications. Different guidelines suggest a variety of financial metrics for different purposes. In the absence of proper frameworks, standards and templates, BI users, opt for financial metrics which they are familiar with. This would not be the case if BI staff were instructed to use a single set of guidelines for the task.

Results also indicate that BI measurement is occurring in "divisional pockets", where certain divisions are following a set of pre-defined rules and others not. Although Absa has a centralised reporting structure in terms of information management, the governance of BI policies and procedures was uncoordinated.

Research data also confirmed that very little effort was being made by Absa to identify and capture the intangible benefits of BI. As stated in section 1.4, this study represented the first effort by Absa to identify the intangible benefits associated with their BI investments. As a consequence these benefits are often overlooked when calculating the benefits of BI applications. Absa employs a similar BI solutions architecture to that proposed by Eastwood *et al* (2005) (refer to figure 6). However Absa has broken up the BI value chain into individual components. As a consequence BI tools are viewed in isolation from the data warehouse and hardware applications.

This implies that BI benefits are calculated for each of the components of the BI value chain, such as a data warehouse initiative or BSC initiative. This results in a dilution effect on BI benefits, as users then focus on specific areas of the BI value chain and specific BI benefits, as opposed to the entire BI value chain. This was explained by

Lessner and Mayo (2 ... op a perception around a specific BI application, whether it is BSC, MIS or Analytics, without understanding the process of data collection or how information was derived from a data warehouse or source system (depicted in figure 1).Key informants confirmed this by saying that BI users tend to judge BI applications by the front end application which they use, as opposed to the process of collecting, filtering and producing meaningful information to decision makers.

Another factor which impedes the calculation of BI benefits is the fact that BI is not view separately from IT. Key informants do not believe that there is a distinction between BI and IT projects, and as a consequence BI projects are not ring fenced from IT projects. As with most IT projects in Absa, ROI calculations are required for any investment to be made. Research data shows that respondents have a perception that ROI may not be the most appropriate metric to use for the calculation of BI benefits. This confirms statements made by Pirttimäki *et al* (2006) and Boehm (1981).

In summary, Absa uses numerous methods or metrics to calculate the benefits of its BI implementations. This could mean a combination of financial metrics employed or a combination of Absa policies and procedures as well. This is primarily due to the absence of a set of tools or guidelines which staff could use for direction and assistance when required. Little effort is being made to measure the intangible benefits of BI, even though most respondents agreed that it important to do so. Lastly BI is classified as "IT expenditure" in Absa. BI projects are not ring fenced from other IT projects, resulting in ROI calculations taking precedence over other financial metrics. Key informants have a perception that intangible benefits are difficult to

quantify, which results ked.

### 6.2.2 Research question 2

**Is Absa using standardised financial metrics, such as ROI to calculate the benefits of their BI implementations? If so which financial metric / s?**

Research data suggests that Absa is using standardised financial metrics to a certain extent (depicted in figures 17 and 18). Respondents prefer to use a combination of metrics which includes ROI and NPV. This could be as a result of the absence of an Absa framework or guideline specific for the calculation of BI benefits. This was confirmed by key informants as they believed that staff was not adequately trained on BI benefit calculations. There was no indication that there existed appropriate mechanisms and processes for training or coaching of staff in any of the divisions sampled. Results from the questionnaire confirmed that ROI was not an appropriate choice for BI benefit calculations as respondents believed that ROI does not take into account possible time lags in the production of BI, as shown in figure 24.

The results of the semi structured interviews revealed that ROI was calculated differently for each BI project. Firstly ROI calculations are performed before a project begins and contained estimated project cost and potential BI benefits. Once projects are completed, the project cost was re-conciliated against the original ROI submission. Project returns were not tracked across the project lifecycle or after the project was completed. Key informants confirmed that the time taken to implement these solutions effect the total cost of all BI implementations. Some projects may take between 3 months and 5 years to complete and the actual benefits of the BI solution only becoming visible after this time period. As stated in section 2.5.1, ROI requires a value to be attached to the output of the project or application. Complication arises

when the output of the [...] information, making the assessment of the value of information difficult (Boehm, 1981).

Secondly, the ROI referred to above was defined as project returns divided by project cost. Key informants confirmed that intangible benefits are not included in these calculations, as quantification of these intangible benefits remains a challenge for Absa.  It was suggested by some key informants that NPV be used instead of ROI, however although NPV recognises the time value of money, the calculation of project cash flows remains a challenge for many. Key informants felt that payback period calculations did not provide adequate information on how the investment performs beyond the pay back period and does not take into consideration project cash flows. This was highlighted in section 2.5.1 of the literature review.

In summary, the research results confirmed that ROI is being used as an approval tool for projects. ROI should be used to measure benefits throughout the project lifecycle as well. ROI is also being used by a selected few, as apposed to all in Absa. BI users are using a combination financial metrics including NPV and payback period to measure the benefits of BI implementations. Research data confirmed that ROI may not be the best metric to use for BI benefit calculations as it does not take into consideration possible time lags in the production of intelligence.

**Do BI application users in Absa follow certain procedures or use certain methodologies to calculate the benefits of their BI implementations?**

Results showed that BI users use a variety of methodologies or procedures to calculate the BI benefits. This includes the Absa project management (BCE) methodology; however key informants confirmed that this methodology is used mainly by Absa project management professionals. A percentage of respondents and most of the key informants showed familiarity with the Absa business case requirements guideline, as shown in figure 18. A requirement for completing a business case is that a detailed ROI calculation be prepared for the project to be approved. A small percentage of Absa BI staff chose to calculate the benefits of BI implementations using policies and procedures supplied by either the finance or information management areas in Absa.

Responses from the questionnaires and findings of the semi structured interviews confirmed that business case models are highly subjective. This thinking is congruent with the literature review (Remenyi, 2001). Key informants explained that in some cases, "gut feel" is used to produce potential project revenues. The research data obtained did not allow for a dissection of which methodologies are being used in combination however key informants believed that experienced BI professionals integrate BCE and business case methodologies to obtain better outputs. Measurement of benefits of BI applications, both tangible and intangible is important to Absa, as shown is figures 19 and 21. However the research results suggest that users of the BI applications have no guidelines or tools to help capture or identify these benefits. Key informants confirmed this by saying that no such guidelines or

processes exist.

Responses to the questionnaire (depicted in figures 18 and 19) also highlighted the fact that respondents agreed that the provision of a guideline or process could assist the organisation with uniformity of measurement and help deal with the disparate approaches to BI benefit calculations. A frequent suggestion from the open-ended question of the questionnaire was that Absa provide a properly prepared process or guideline to assist staff in calculating the benefits of BI implementations.

In summary results showed that Absa staff used a combination of methodologies or guidelines when calculating BI benefits. This includes BCE methodologies, Absa business cases and policies and procedures supplied by specialised areas of the bank. This occurs due to the fact that there is no standard or guideline currently available for Absa staff to use.

### 6.2.4 Research question 4

**What benefit or benefits is Absa gaining from implementing or using these BI applications?**

Results are explained according to tangible and intangible benefits identified by the study. Results show that Absa is using several financial metrics to measure the tangible benefits of BI. Research data and insights gained from key informants confirmed that Absa is gaining the following tangible benefits from BI initiatives. (See table 10).

Table 10: Tangible BI

| Type of benefit | Confirmed in the literature review |
|---|---|
| Increases in sales of products and services | Mogollon and Raisinghani, 2003 Shang and Seddon, 2000 |
| Increases in productivity | |
| Reduction in operating cost | |
| Increased revenue | Pendse, 2003 Shang and Seddon, 2000 |
| Improved customer service | |

Results showed that BI implementations do not cause additional cost savings in terms of resource usage. Research data for this question did not provide a clear indication that this could be a benefit to Absa. Although there was some agreement that BI implementations caused additional savings in terms of time spent to produce reports, twenty percent of respondents disagreed and twenty eight percent of respondents preferred to remain neutral.

Key informants believed that the decreased time spent to produce reports should be one of the main benefits of BI implementations, as the automation of reports leads to additional cost saving for Absa. Research data suggested otherwise. Key informants were also sceptical whether the various benefits from Absa BI systems could be classified into five benefit dimensions, as seen in Shang and Seddon (2000). They argue that in Absa, the lines between different dimensions are extremely blurred and hence it would not be of any value to do so as well.

Results from the questionnaire revealed the following intangible benefits occurring due to the implementation of BI solutions in Absa (table 11).

Table 11: Intangible B

| Type of benefit | Highlighted in the literature review |
|---|---|
| Increases in customer satisfaction<br><br>Increases in customer retention<br><br>Greater customer reach<br><br>Increases in the customer base<br><br>Resultant streamlining of knowledge<br><br>Improved information accuracy | Mogollon and Raisinghani, 2003; Braams, 2004 |
| Improved customer knowledge and training<br><br>Improved business alignment<br><br>Increased efficiency<br><br>Improved information access | Pendse, 2003;<br>Shang and Seddon, 2000 |
| Improved communication | Negash (2004) |
| Improvement in business processes<br><br>Increases in business knowledge<br><br>Improved decision making<br><br>Improved work processes | Gibson *et al* (2004) |

Both the results of the semi structured interviews and responses from the questionnaires revealed that employee retention was not a benefit of implementing BI solutions in Absa. Respondents remained neutral or disagreed with questions posed in the questionnaire. Respondents also felt that BI implementations do not result in reduction of customer support requirements and customer response errors. A large percentage of the respondents either remained neutral or tended to disagree with the research statements posed.

A large portion of res[...] a decrease in the time to market, as a consequence of implementing BI solutions. Although there was some agreement that BI implementations increase staff morale (Mogollon and Raisinghani, 2003;Shang and Seddon, 2000), research data for this question showed a lower mean score than other BI benefits identified. Key informants did allude to the notion that organisation culture contributes to the identification of certain intangible benefits.

Results of the semi structured interviews yielded similar results to those obtained from the questionnaire however more emphasis was placed on business processes and information access by the key informants. Very little reference was made to customer satisfaction and retention. It was further revealed that most customer satisfaction reporting emanates from a specialised division within Absa and key informants would not be able to comment on any trends or observations related to BI in these areas. The research results presented could not be used establish any monetary value for the effects of BI, confirming the argument by Williams and Williams (2003).

In summary, using the approach of subjective measurement of effectiveness adapted from Davison (2001), this research was able to identify various tangible and intangible benefits of BI solutions. These were listed in tables 10 and 11. Results showed that in addition to benefits already identified by Absa, other intangible benefits have now been identified by this research. These include improved information access and increased business knowledge.

**To what extent does Absa include intangible benefits, identified in this study, to calculate the benefits of their BI implementations?**

Absa includes intangible benefits to a minimal extent in most BI calculations. Feedback received from question 39 of the questionnaire suggests that the quantification of these intangible benefits is challenging. Respondents and key informants have great difficulty in attaching a monetary value to benefits such as increase business knowledge and work processes. This was highlighted by numerous authors in the literature review (Hannula and Pirttimäki, 2003; Pirttimäki *et al, 2006*; Gibson *et al*, 2005). As a consequence of the inability to quantify these intangible benefits, means that they are either ignored or erroneously represented. The ROI calculation required by the business case methodology refers to the following formula: project returns divided by project cost. The formula for project returns does not allow for other benefits such as intangible benefits to be included in these calculations.

As stated in section 5.2.4, a large portion of respondents do feel that there is some kind of capture of the intangible benefits in Absa, however not at regular intervals. Respondents, including key informants said that these intangible benefits important to Absa. Ninety percent of respondents believe that intangible benefits should be included in BI benefit calculations. In summary, Absa includes intangible benefits of BI implementations only to a small extent. This is primarily due to challenges with regard to the quantification of these benefits and the inability of respondents to attach a monetary value to such benefits. Staff believes that these benefits are important and that they should be included in the calculation of the benefits of BI

### 6.2.6 **Research question 6**

**What measurement processes or approaches can Absa adopt to calculate the benefits of their BI implementations?**

Short-comings of the existing approaches to BI measurement identified by this research are highlighted and suggestions are made to improve on the existing processes. A process model has been recommended in section 7.2. The answers to research question 6 could also be classified as recommendations to stakeholders based on the research findings.

**Governance**

All BI projects and BI project calculations need overall governance. As stated in section 1.2, IT budgets are being tied to company-wide business and strategic initiatives, and the cost justification for any expenditure, including BI projects, must have a clear bottom line. Responsibility has to be assigned to ensure that there is accuracy and transparency in these BI calculations. Furthermore the overall cost of these projects has to managed and controlled. BI programs require a vision and strategy. Governance structures could assist with the provision of guidelines and standards to BI users.

**Increase awareness of the BI implementations**

Internal awareness and training sessions are essential in the calculation of the benefits of BI solutions. It was highlighted by key informants that BI staff was not adequately trained to calculate the benefits of BI solutions. Awareness can be raised via workshops, training sessions and presentations. It is also suggested that

organisations leverag ~~...~~ cts, by sensitising staff to intangible benefits of BI. It was stated in chapters 1 and 2 that the soft intangible benefits of BI implementations are often hard to identify.

**Optimise the BI project management infrastructure**

The establishment of a BI project office would assist with BI functions in terms of methodologies, quality assurance, and BI benefit calculation standardisation. It is also suggested that a central repository be established to increase access and store information related to BI and BI project implementations. The BI project office will assist with the development of a comprehensive set of policies to govern BI projects and BI benefit calculations. Quality assurance processes will ensure that overall methodologies are followed and updated on a regular basis.

**Cultural changes**

The identification and measurement of BI benefits requires the involvement and participation of business staff, management and BI professionals throughout the project lifecycle. There needs to be a feedback loop allowing project owners to capture and track improvements in processes or benefits related to BI projects across the projects lifecycle and after. Effort has to be made to quantify the intangible benefits of the BI solutions.

Lastly it is suggested that an as-is analysis on existing BI benefits, in areas which will be impacted by the implementation be performed. It is also suggested that while the BI projects are being implemented, efforts should be made to monitor any notable increases or decreases in efficiencies identified in the business case justification. This implies that BI benefits should be tracked while the project is being implemented

and after it has been i

The research findings and answers to the research questions have been combined to produce a process / model which could be used to calculate the benefits of BI implementations in Absa. This is proposed in section 7.2 of chapter 7.

## 6.3 Conclusion

This chapter discussed the results and findings of the study in detail. Results showed that Absa uses numerous approaches to calculate the benefits of its BI implementations. It also confirmed that ROI is being used as an approval tool for projects by a small portion of Absa staff. This research identified various tangible and intangible benefits of BI solutions in Absa. These benefits are important to Absa and should be included in the calculation of the benefits of BI implementations. Short-comings of the existing approaches to BI measurement identified by this research were highlighted and suggestions were made to improve existing processes.

The concluding chapter provides a summary of the research study and includes recommendations based on the findings. Suggestions for future studies in the field of BI are also presented.

This chapter highlights the conclusions made from the research findings and will be presented in four sections. The first section summarises the entire study and highlights the main findings of the research report. The second section provides recommendations based on the results obtained. Section three focuses on suggestions for future research in the field of BI. The chapter ends with a concluding section.

## 7.1    Main findings of the research

Measuring the benefits of BI projects is a challenge for South African banking institutions as traditional evaluation techniques have difficulty in identifying the soft, intangible benefits often provided by effective use of BI. The aim of this study was to gain an understanding as to how one such banking institution, Absa, could calculate the benefits of implementing BI applications. One of the primary objectives of this study was to identify both tangible and intangible benefits associated with the BI implementations and then use the results obtained to propose a process or guideline to assist BI users in calculating the benefits of BI in Absa.

A background to the research topic was provided, as well as, an introduction to the various research questions being asked. The relationship between information, data and BI was discussed further highlighting the importance of BI in banking institutions and its importance for a company's competitive advantage. A brief introduction and background to Absa was also provided in chapter 1.

The introduction was followed by a literature review, where the researcher attempted to provide a definition of BI and its' link to performance measurement. Literature on BSC, Analytics and MIS, was also included for completeness. This provided a link

between BI applicatio [University of Pretoria logo] fits associated with them. Once the research questions were restated, motivation with regard to research method and design was stated.

The results of the responses to the research questionnaire and semi structured interviews were then discussed and research findings explained in chapter 6. Results showed that Absa uses numerous approaches to calculate the benefits of its BI implementations. This is primarily due to the absence of a set of tools or guidelines which staff could use for direction and assistance when required. It was also confirmed that ROI is being used as an approval tool for projects by a small portion of Absa staff. The research results showed that ROI may not be the best metric to use for the calculation of BI benefits as it has several shortcomings.

The research identified various tangible and intangible benefits of BI solutions in Absa. Respondents of the study were of the opinion that these intangible benefits should be included in BI benefit calculations. The next section will discuss recommendations to Absa with regard to the BI implementations.

7.2    **Recommendations**

As BI and BI activities become increasingly prevalent in the South African market space, it is no longer a question of whether or not a company should invest in BI technology but when. Suggestions and approaches have been highlighted in section 6.2.6 of the research report which can be used to calculate the benefits of BI implementations in Absa.

The key findings of this research were brought together and represented in a process model, as illustrated in figure 25. Simultaneously, the academic literature on BI

benefit calculations ~~...~~ suggestions have been incorporated into the model. The key areas of the model are:

1. The classification of the project as either an IT or BI project.

2. The completion of the required business case.

3. The implementation of BI benefit tracking initiatives.

4. The establishment of a BI project office.

Each step is discussed in detail below:

*Step 1:* *Determine whether the project is a either a BI project or an IT project.*

At the beginning of the process, the nature of the project has to be determined. It is necessary to distinguish whether the project is either a BI or IT project. This process should be used primarily for BI projects and not IT projects. To distinguish the BI project characteristics from IT projects, the following questions can be applied:

➢ BI can be defined as either a managerial concept or process. The definition of BI can be used to decipher its difference from IT projects. Does the project show the characteristics of BI? (as explained in section 2.2.2) If yes it should be classified as a BI project.

➢ Will the project impact on any of the applications or components of the BI solution architecture presented by either Eastwood *et al* (2005) or Lesser and Mayo (2003). (as depicted in figure 6). If so it should be classified as a BI project.

Once the project is classified as a BI project, certain BI benefits identified in this

research report could  ement.

*Step 2:* Initiate the business case justification for the project.

The business case document facilitates management's decision to proceed with a project initiative, and is used to approve and commit the furnishing of the necessary resources to complete the project. During the building of a business case the following activities are suggested:

- ➤ Interviews with key executives or managers
- ➤ Reviews of existing documentation and interviews with line staff
- ➤ Facilitating workshops (for various purposes)
- ➤ As is analysis of how things currently happen and as-is processes
- ➤ Design and conceptualisation workshops
- ➤ Collation of cost information and high-level project-planning
- ➤ Business-Case document preparation and presentations

It is suggested that that two additional activities be performed as well. These steps are described in step 2a and 2b.

- ➤ *Step 2a:* Firstly, the introduction of an as-is analysis on existing BI benefits in areas to be impacted by the implementation. This will provide a baseline for future BI benefit measurement. The as-is analysis should include measurement of existing timelines to complete certain task, existing customer satisfaction levels, the existing efficiency in the areas and stakeholder perceptions of decision making. In the case of dis-counted cash-flow analysis (NPV or IRR), a cash flow analysis is critical. The as-is analysis will establish a baseline to determine the cost of not proceeding with the project. This could also be used to determine the opportunity cost of the project; by how much

(R'000 / R'm o ... ecreased off this baseline because of the project?

It is suggested that surveys, questionnaires and focus groups be used as possible tools for data collection. Various business performance and process performance tools are already employed in Absa. These systems could act as sources of the above required information.

> *Step 2b:* Secondly, the inclusion of BI benefits identified by this research report in financial component of the business case. (Tables 10 and 11). The list of identified benefits of BI applications could be selected for different projects depending on the nature and characteristics of the BI project.

Mogollon and Raisinghani (2003) proposed a method for measuring the ROI for Ecommerce applications. This could be adapted for measuring the ROI for BI implementations in Absa. The "other benefits" portion of the formula could now be substituted with benefit quantification from the as is analysis.

ROI =     (Current process cost – New process cost +  "Other benefits")  per year

              Initial investment +  (Operation and  maintenance per year)

Mogollon and Raisinghani (2003,p.66)

If the project is a new BI implementation, the process cost portion of the calculation should equal to the quantifiable benefits of the new project. Intangible benefits will impact on the additional cash flows that will result because of the project. This also includes cash flows that would not have resulted if the project did not go ahead.

*Step 3: Implement v̶a̶_____ ̶while the project is being implemented.*

Williams and Williams (2003), state that most BI benefit capture stops once the project is implemented or initial BI asset creation completed. The research results suggested the same is occurring in Absa. It is suggested that while the BI project is being implemented, efforts should be made to monitor any notable increases / decreases in any of the work processes and efficiencies identified in the business case justification. Various BI benefit tracking initiatives should be implemented to track the benefits on a consistent regular basis. Once again, this could be done with the use of surveys, questionnaires or feedback from various business performance systems as possible tools for data collection.

This was explained in figure 12 in section 2.5. Projects cost accumulate at the start of the project and then decrease as the project nears completion. It is suggest that the benefits be tracked very early in the project lifecycle and continue even after the project is completed.

This step in the process ensures that benefits are tracked after the implementation of the BI initiative as well.

*Step 4: Collate all the BI related project information and learning's in a central BI competency centre or BI project office.*

If the benefits described above are to be monitored and tracked, a central repository would manage the collation of all project information. Furthermore it is suggested that the BI project office address areas such as business sponsorship, participation and governance of BI projects. The BI project office could operate an overall BI program for Absa as opposed to a series of tactical projects. The BI project office would be

responsible for the foll

- Assisting with Absa's BI vision, scope, business justifications, funding, timeframes, roles and responsibilities, and developing numerous BI methodologies

- Project Management and project initiation, planning, execution, control and closure

- Gathering BI benefit feedback, tracking benefits across Absa  and updating existing documentation with regard to BI benefit measurement

- Creating data models, mapping specifications, report layouts, meta data specification and other components that fulfil the detailed BI requirements

- Suggest a group- wide BI architecture and continuously improve on existing BI implementations. Introduce BI standards and guidelines to assist Absa staff

- Promotion of BI and BI efforts in Absa, training, application roll-out and governance issues

The process can be used for both ad hoc or systematic projects. The ad hoc process can be used for individual stand-alone BI projects, while the systematic process will collect continuously information concerning BI projects and the impacts of BI solutions on the overall business environment. BI project office staff could identify trends and discover new business opportunities.

Having proposed the process above, it still has to be tested and assessed.
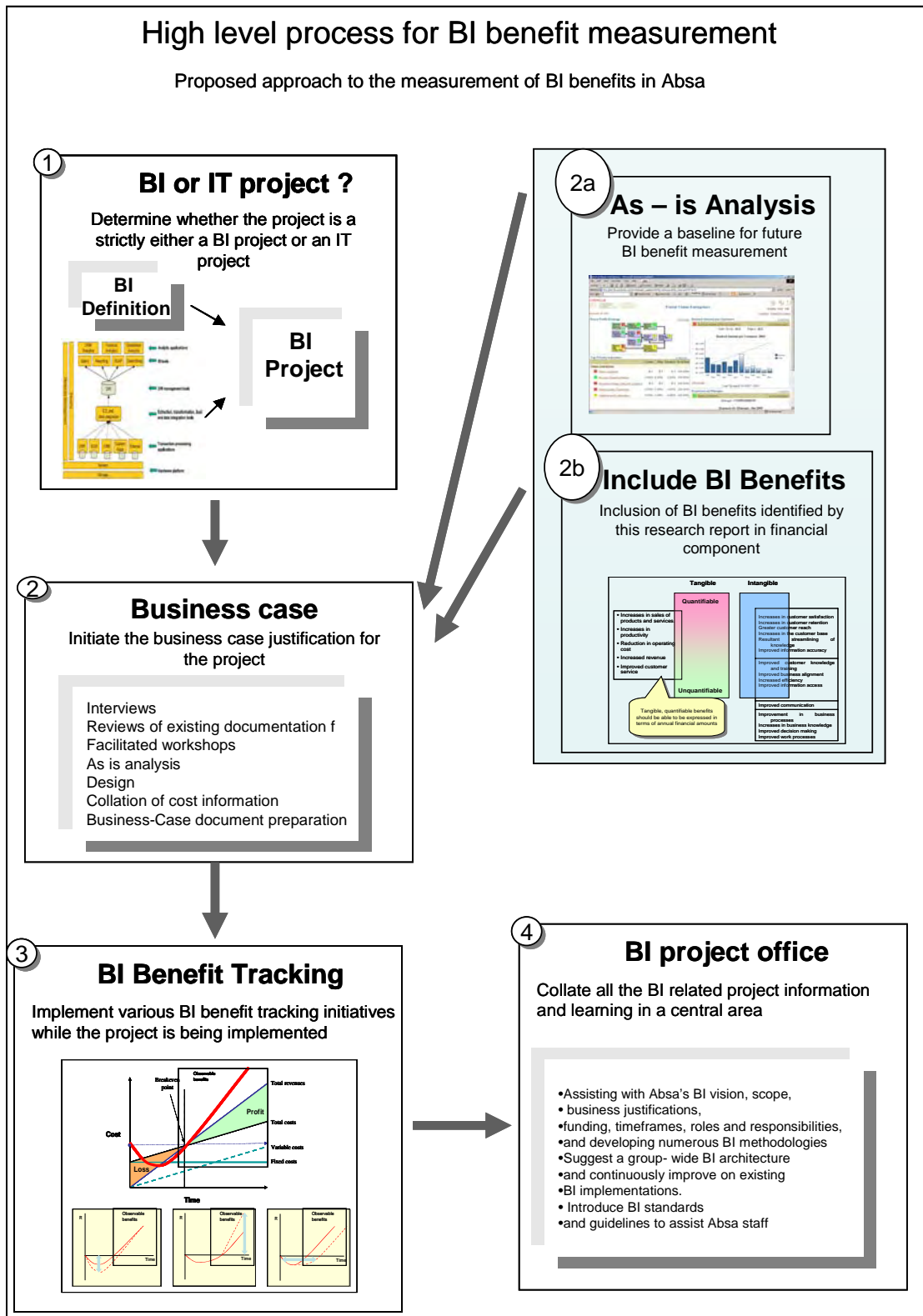
As explained in section 1.2, the value of many implemented BI applications is poorly understood across different industries, as there is limited knowledge as to how these applications actually support different decisions and processes. Hence with a growing market for BI, the need for academic research increases.

The following can be considered for future research:

1. Research on the identification of intangible benefits associated with BI investments in other South African banking institutions or financial institutions, which could verify whether Absa results are congruent with industry related factors. The effect of different types of BI architectures and BI implementation strategies employed by different banks can also be considered.

2. Research on the benefits of BI solutions in other industries, such as the South African retail sector, could be used to compliment the findings presented in this report. It is recommended that future BI research encompass a broader sample of South African companies in other industries.

3. This research was targeted at managerial and professional staff. Research targeted at different work groups, project teams and different levels in the organisation could identify more areas in the field of BI that can be explored to gain a better understanding of BI.

4. Having identified the intangible benefits if BI, it is recommended that the feasibility of attaching monetary values to these benefits be investigated. Benefits such as increased customer satisfaction and greater customer reach, present problems in trying to attach a monetary value to such benefits. Models or guidelines, providing direction on how to include such benefits in a BI cost vs. benefit calculation needs to be researched.

7.4    **Conclusion**

The main aim of this study was to gain an understanding as to how a South African banking institution calculates the benefits of implementing BI applications. Six research questions were answered by the study. Results showed that Absa uses numerous approaches to calculate the benefits of its BI implementations. It was also confirmed that ROI is being used as an approval tool for projects by a small portion of Absa staff. It was suggested that ROI be used in a greater role than it is currently being used. The research also identified various tangible and intangible benefits of BI solutions in Absa. These findings together with insights gleaned from the literature review were then be used to suggest a process for the measurement and identification of BI benefits in Absa. Issues such as governance, training and project management are vital in ensuring that the benefits of implementing BI solutions in South African banking institutions are captured and identified. Having identified the benefits of BI implementations in a single South African banking institution, recommendations for future research was made.

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## 9.1    **Appendix One**

IT evaluation methodologies addressing intangibles (Gibson *et al*, 2004)

| Evaluation Techniques | Author | Research Type | Focus | Measures |
|---|---|---|---|---|
| Combination Net Present Value (NPV) and Discussion with Personnel | Anandarajan & Wen (1999) | Single case study | Computer Integrated Manufacturing (CIM) | Intangibles quantified using discussion with personnel. |
| Information Economics | Parker & Benson (1988) | Conceptual | General IT | Tangible and some intangible |
| Multiobjective, Muli-criteria (MOMC) | Kenny & Raiffa (1976) | Conceptual | General | Tangible and Intangible. Intangible measured by rank and weight of individual preferences. |
| Negotiation and Imputation Information Economics | Remenyi (2000) | Conceptual | General IT | Intangibles quantified using subjective measures. |
| Process Model with 6 critical factors | Counihan, Finnegan & Sammon (2002) | Multiple Case Study (4 firms) | Data Warehousing (DW) | Intangible, identified using critical factors. |
| Quantification Technique | Hares & Royle (1994) | Single case study | General IT | Intangibles quantified into cash, using subjective measures. |
| Return on Management (ROM) | Strassman (1990) | Conceptual | General IT | Tangible, the value of labour is added as intangible. |
| Total Cost Analysis | Tayyari & Kroll (1990) | Conceptual | Computer Integrated Manufacturing (CIM) | Intangibles quantified using surrogate indicators. |
| Value Analysis | Keen (1981) | Conceptual | Decision Support System (DSS) | Tangible and intangible. Intangibles made visible through the use of prototyping. |

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## GORDON INSTITUTE OF BUSINESS
### RESEARCH QUESTIONNAIRE

GORDON INSTITUTE
OF BUSINESS SCIENCE
University of Pretoria

Thank you for taking the time to respond to this research questionnaire. The questionnaire will not take you longer than 10 minutes to complete. Please be assured that your responses will be strictly confidential and is only being used for research purposes.

The aim of this study is to gain an understanding and insights as to how Absa should calculate the benefits of implementing business intelligence applications.

### SECTION 1: PERSONAL PROFILE

1. Position in the organisation ▼    2. Gender ▼

3. Years in organisation ▼

4. Please indicate which business unit in Absa you represent ▼

### SECTION 2: BUSINESS INTELLIGENCE (BI) APPLICATIONS

5. Your division makes use of or is in the process of implementing any of the following Business Intelligence Applications

Please select the applicable tick boxes below:

- ☐ (BSC) Balanced Scorecards – Monthly updates via the scorecard portal
- ☐ (BSC) Balanced Scorecards – Performance measurement type graphs & reports
- ☐ (BSC) Balanced Scorecards – Strategy formulation and war room formulation
- ☐ (MIS) Management information systems – Adhoc reports via the information help desk
- ☐ (MIS) Management information systems – Monthly management reports & dashboards
- ☐ (MIS) Management information systems – Customer leads and customer information
- ☐ (MIS) Management information systems – SAS extracts or warehouse extracts
- ☐ (AI) Analytics – Profiling & strategic analysis
- ☐ (AI) Analytics – Predictive modeling
- ☐ (AI) Analytics – Statistical modeling
- ☐ (AI) Analytics – Spatial analysis
- ☐ (DW) Data Warehouse – Data extracts for various reporting requirements
- ☐ (DW) Data Warehouse – Data Marts for individual business units

6. Does your division measure the business value of implementing Business Intelligence Applications? ▼

7. Do you use any of the following financial metrics to measure the benefits of your BI investments? ▼

8. When measuring the business value of your BI investments, do you use any of the following tools for guidance: ▼

9. How important is it to measure the benefits of implementing these BI Applications? ▼

### SECTION 3: INTANGIBLE BENEFITS OF BI

Based on the following statement, please select the most appropriate response according to the available rankings

**As a consequence of implementing or using Business Intelligence applications in your department or division :**

10. There has been increased customer satisfaction ▼

11. There has been increased cu...
12. There is greater customer reach
13. There is an increased customer base
14. There is reduced customer contact / support requirements
15. There is reduced fulfilment and customer response errors
16. There is increased employee retention
17. There is an improvement in employee morale
18. There is improved customer or employee knowledge and training
19. There has been an improvement in business processes
20. There is a decreased time to market
21. There has been an observable increase in the business knowledge
22. There has been an acceleration in decision making
23. There is improved work processes
24. There is more effective relationships between departments / divisions and staff
25. There is better business alignment
26. There is improved communications
27. There is increased efficiency
28. There is additional cost savings in terms of time being spent to produce reports
29. There is additional cost savings in terms of resource usage
30. There is improved information access
31. There is a resultant streamlining of knowledge
32. There is an improvement in the information accuracy

## SECTION 4: BENEFIT CALCULATION

33. Has there been any efforts made within your business area / division to capture these intangible business gains / losses listed above?

34. How important are these intangible benefits to your department / division?

35. Intangible benefits should be included in the measurement of the benefits of implementing BI Applications in Absa.

36. It would be easier for me to calculate the benefits of implementing BI applications if I were supplied with a guideline or tool by Absa

37. If ROI is defined as the project returns divided by the project cost - Then ROI is the most appropriate financial metric to use when calculating the benefits / value of BI implementations?

38. If intelligence or some kind of processed information is the "return" of BI implementations then Return On Investment (ROI) calculations do not take into consideration possible time lags in the production of this intelligence

39. What do you propose as a solution to calculating the benefits or value of BI implementations in Absa ?

Comment:

Thank you for participating in this survey.

Email : jeeteshv@absa.co.za

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UNIVERSITY OF PRETORIA
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GORDON INSTITUTE
OF BUSINESS SCIENCE

University of Pretoria

September 2006

Dear Respondent

Thank you for taking the time to respond. This questionnaire forms the basis of a research project for purposes of qualifying for the MBA post graduate degree at the Gordon Institute of Business Science. The information gathered will be used for this purpose only and treated as private and confidential.

Your assistance in this regard will be highly appreciated.

"Measuring the value/benefits of these BI investments remains a significant challenge for organizations as traditional evaluation techniques have difficulty in identifying the soft, intangible benefits often provided by effective use of BI".

The aim of this study is to gain an understanding and insights, as to how Absa should calculate the benefits of implementing business intelligence applications.

The questionnaire consists of 38 questions and is made up of four sections

Section 1 – Personal Profile;

Section 2 – Business Intelligence Applications

Section 3 – Intangible benefits of BI

Section 4 – Benefit calculation

Please note that no names of respondents are required, the anonymity of respondents shall be respected. I would be happy to provide you with a copy of the resulting research findings, please specify this in your return email.

Yours sincerely

Jeetesh Vanmare (082 491 6847)

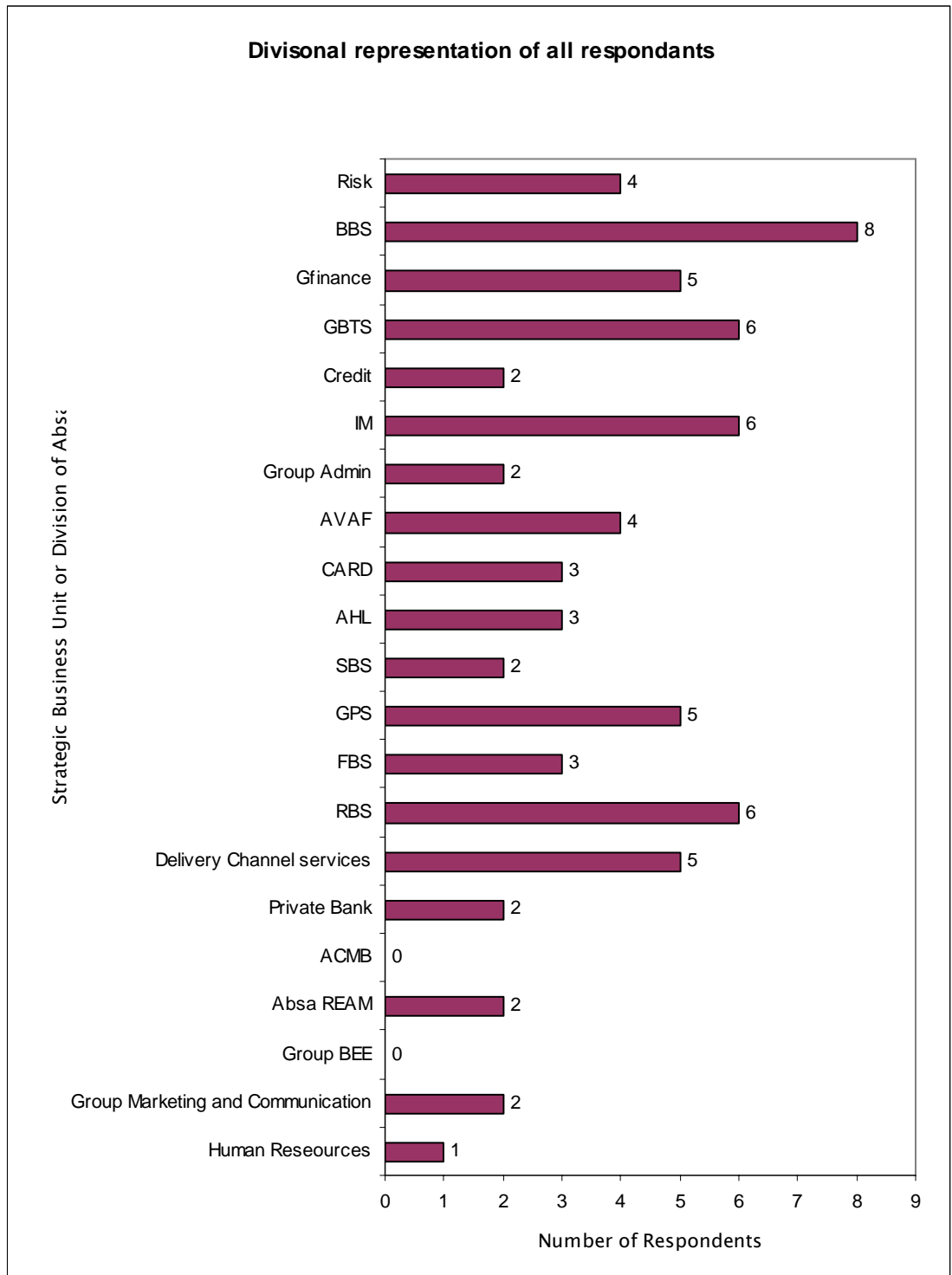| No. | Questions |
| --- | --- |
|  | **Your department is directly responsible for or has heavily invested in BI tools and systems referred to as BI Implementations.** |
| 1 | Can you advise what amount of money was spent on such initiatives? |
| 2 | Can you elaborate further on the Absa business case and project management requirements? |
| 3 | How do you calculate the cost vs. benefits for implementing these projects? |
| 4 | Do you make use of any financial metrics such as ROI, NPV or Payback period in your calculations? |
| 5 | How do you evaluate the return for the investment you have made? |
| 6 | What is the definition of "Return" in the return on investment portion of your calculation? |
| 7 | Does you support functions or advisors suggest a certain way or a standardised approach to doing such calculations? |
| 8 | Do you take into consideration any benefits such as decreases or increases in business knowledge / work processes or even reduction in paper when compiling business cases? |
| 9 | How do you currently measure the value of "leads" generated from the supply of information from your area. |
| 10 | Is there any approach which you use to classify these cost BI Implementations separately from IT investments |
| 11 | Do you see IT investments as being separate from BI Investments. Yes or No and please elaborate on your answer. |
| 12 | Has any effort been made within your area / division to capture these intangible business gains/ losses? |
| 13 | How important are these above mentioned benefits to your area? |
| 14 | Do you believe that intangible benefits as described above be included in the calculation of BI implementations for Absa? and Why? |
| 15 | What do you propose as a solution to calculating the benefits or value of BI implementations? |

Summary of responses to open ended question in Questionnaire (Question 39)

| Feedback received from respondents |
|---|
| A combination of ROI, NPV as well as the result of bottom line impact to SBU's revenue. Using a standard approach across the group... |
| There does need to be a focus on time saved, accuracy of information, retention of focus on core competencies, and the ability to leverage off the information in a way that may not have been possible without the information (i.e. what were we able to do that has added value, but which we would not even have considered doing had this information not been available). |
| Just on the practicality of calculating the returns. It is no use measuring benefits if you don't track it. With all the BI or information developments in Absa, you'll need a whole department of accountants just doing return calculations and benefits tracking. In my opinion, this will be a waste of time and money. |
| BI continues to be fairly fragmented with each business unit continuing to have their own teams rather than relying on a centralised support function for the majority of their needs - this leads to unnecessary/increased costs and varying interpretations of the same data. |
| Link to clear objectives - i.e. retention, acquisition, cross-sell, etc.  Measure against these before and after implementation of BI initiative.  Most likely need to build some sort of scorecard per BI imitative to track and monitor success. |
| Time should spend in rather determining the contribution to any increase in sales and/or contribution to the reduction in expenditure. |
| What do you include as a cost, especially in an environment where you make use of hundreds of different resources? Example: Mainframes that are depreciated in full a long time ago, dozens of servers, labour hours of the consultant, stationary, telecommunication, sick leave, and cost associated to ABSA due to my study leave, and a whole lot more. |
| I am a big fan of the EVA indicator. Coca-Cola has implemented it very successfully in their world wide operations and they incentivise their managers/staff accordingly. My suggestion to ABSA would be to provide guidelines on how to measure, but to leave enough room for the specialist to adopt the method to suit the specific, highly specialised area in which he operates. Baby steps at first, and as the years pass one can track the accuracy of the determination of the initial investment and adopt the model of the day accordingly. |
| The performance of the tool needs to be measured on both a quantitative and qualitative approach. Quantitative should be both current ROI and projected ROI, whilst qualitative should be on opinion survey, given a fair period of time after implementation and use. The tool needs to be accurately aligned with strategic plans and here to professional and specialist opinion would be the measurement. |

Must measure tangib... ...lso need to have a good understanding of long-term costs of ownership, training, skills retention etc.

Vendor reputation plays a part because you will be dealing with a business partner rather than just a supplier. BI Solutions must be scalable and must be easy to adjust to meet the needs of the dynamic business environment.

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Have clearly defined guidelines as what to measure and what not to.

Agree that there will be grey areas around the measurements

Agree that there will be returns on investments that cant be calculated

Try and understand the increased benefit the implementations have had on your job role

---

Benefits (financial and non-financial) achieved due to a project that was initiated as a direct result of Business Intelligent outcome.

---

A two pronged methodology i.e. Financial (ROI, Nap's etc.) & Non-Financial i.e. Relevance of the BI i.e. how successful was the organisation in utilizing the BI produced?, the Validity of the BI, the Application of BI Predictive Modelling i.e. Attrition, Retention, Up-Sell, Cross-Sell; Customer Life Cycle Management, Product Life Cycle Management etc.

---

We need to be able to track the value from the customer, Business Intelligence also needs to identify the gaps and make more use of there modelling and put it into practice it is very difficult to do intangible vale predictions if the people are present

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A properly defined process that is applied throughout Absa but customised to suit the business unit needs. Currently the business intelligence approach is inconsistent to none within the various business units / areas. Systems support within Absa is limited to non-existent and manual approaches are commonly used - poses a great risk to the Absa organisation.

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To assess the financial impact that the increased intelligence has had on the business. This could be ascertained by the input from divisional managers and their perception of the savings and/or increased business as a result of the implementation.

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Our most important benefit is the Product Sales, this is where we make money thus link the Sales support with the Analytical Leads we provide and that will provide the value of BI implementation.

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BI to be utilised effectively must add value to business, contribute to effective decision-making and to client service as well as eventually manifest in an increased bottom line - even though indirectly. The only way to rate the softer indirect contributions is based on some kind of scorecard. Maybe financial benefits can also be an input into the process.

9.6.1 Divisional representation of all respondents



**Divisonal representation of all respondants**

9.6.2    The breakdown to sub categories of various BI applications being used

for different purposes in Absa (n=71)



- ☐ Individuals use multiple BI applications for decision making, includind Analytics, 37%
- ☐ High BSC usage assisted by some MIS and Data Warehouse extracts, very little Analytics, 21%
- ☐ High MIS requirements and some strategic use of BSC and Data Warehouse extracts, some Analytics, 42%
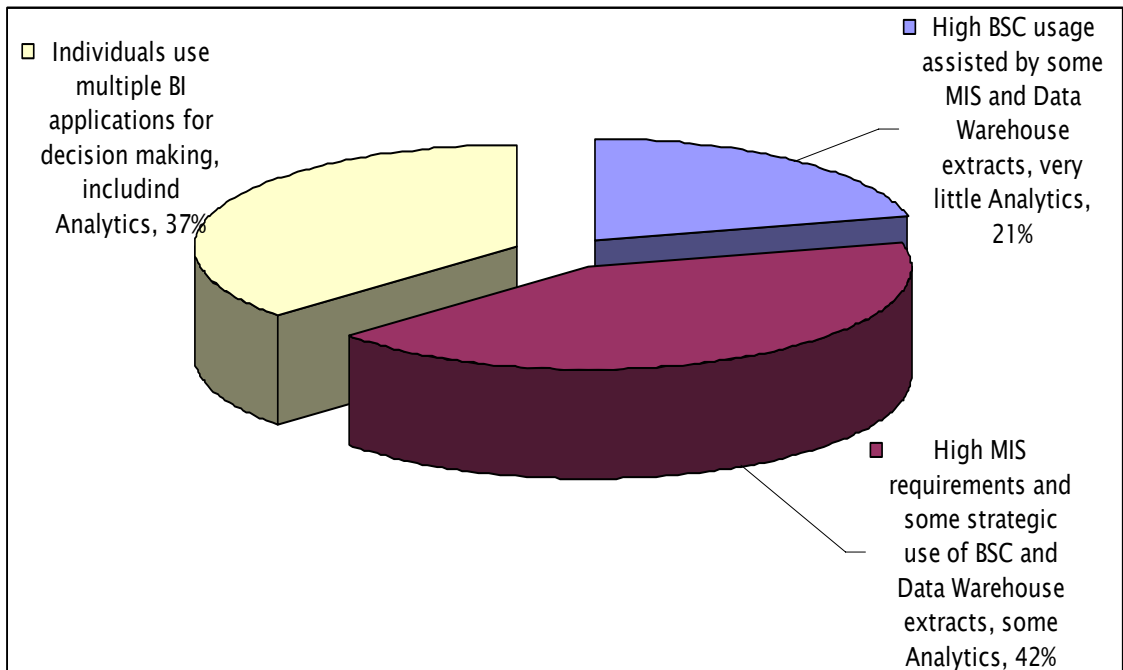
| Question Number | Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|---|
| 10. There has been increased customer satisfaction | 4 | 4 | 3.62 | 0.78 | 0.61 | 5 | 2 | 71 |
| 11. There has been increased customer retention | 4 | 4 | 3.41 | 0.77 | 0.59 | 5 | 1 | 71 |
| 12. There is greater customer reach | 4 | 4 | 3.70 | 0.76 | 0.58 | 5 | 2 | 71 |
| 13. There is an increased customer base | 3 | 3 | 3.41 | 0.77 | 0.59 | 5 | 2 | 71 |
| 14. There is reduced customer contact / support requirements | 3 | 3 | 2.85 | 0.82 | 0.68 | 5 | 1 | 71 |
| 15. There is reduced fulfillment and customer response errors | 3 | 3 | 3.13 | 0.72 | 0.51 | 5 | 2 | 71 |
| 16. There is increased employee retention | 3 | 3 | 2.87 | 0.77 | 0.60 | 5 | 1 | 71 |
| 17. There is an improvement in employee morale | 3 | 3 | 3.25 | 0.82 | 0.68 | 5 | 2 | 71 |
| 18. There is improved customer or employee knowledge and training | 4 | 4 | 3.69 | 0.80 | 0.65 | 5 | 1 | 71 |
| 19. There has been an improvement in business processes | 4 | 4 | 3.62 | 0.96 | 0.92 | 5 | 1 | 71 |
| 20. There is a decreased time to market | 3 | 4 | 3.28 | 0.88 | 0.78 | 5 | 1 | 71 |
| 21. There has been an observable increase in the business knowledge | 4 | 4 | 3.79 | 0.75 | 0.57 | 5 | 2 | 71 |
| 22. There has been an acceleration in decision making | 4 | 4 | 3.46 | 0.88 | 0.77 | 5 | 1 | 71 |
| 23. There is improved work processes | 4 | 4 | 3.39 | 0.73 | 0.53 | 5 | 2 | 71 |
| 24. There is more effective relationships between departments / divisions  and staff | 4 | 4 | 3.48 | 0.91 | 0.82 | 5 | 1 | 71 |
| 25. There is better business alignment | 4 | 4 | 3.55 | 0.87 | 0.77 | 5 | 1 | 71 |
| 26. There is improved communications | 4 | 4 | 3.56 | 0.89 | 0.79 | 5 | 1 | 71 |
| 27. There is increased efficiency | 4 | 4 | 3.55 | 0.86 | 0.74 | 5 | 1 | 71 |
| 28. There is additional cost savings in terms of time  being spent to produce reports | 4 | 4 | 3.39 | 0.98 | 0.96 | 5 | 1 | 71 |
| 29. There is additional cost savings in terms of resource usage | 3 | 4 | 3.28 | 1.00 | 1.01 | 5 | 1 | 71 |
| 30. There is improved information access | 4 | 4 | 3.77 | 0.88 | 0.78 | 5 | 1 | 71 |
| 31. There is a resultant streamlining of knowledge | 4 | 4 | 3.66 | 0.81 | 0.66 | 5 | 1 | 71 |
| 32. There is an improvement in the information accuracy | 4 | 4 | 3.58 | 0.98 | 0.96 | 5 | 1 | 71 |

**Question 10:** "There has been increased customer satisfaction"



10. There has been increased customer satisfaction
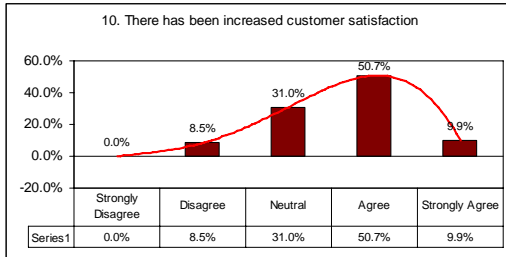
|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Series1 | 0.0% | 8.5% | 31.0% | 50.7% | 9.9% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.6 | 0.78 | 0.61 | 5 | 2 | 71 |

**Question 13:** "There is an increased customer



13. There is an increased customer base
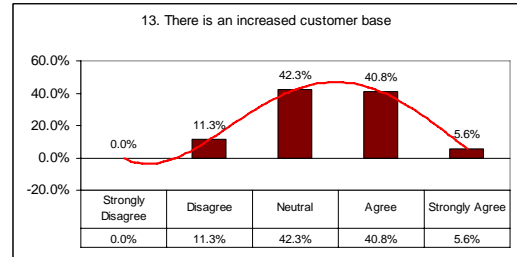
|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
|  | 0.0% | 11.3% | 42.3% | 40.8% | 5.6% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 3.40 | 0.76 | 0.58 | 5 | 2 | 71 |

**Question 11:** "There has been increased customer retention"



11. There has been increased customer retention
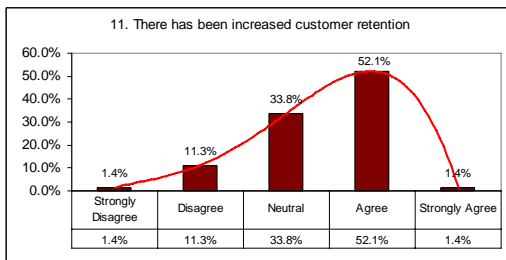
|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
|  | 1.4% | 11.3% | 33.8% | 52.1% | 1.4% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.40 | 0.76 | 0.58 | 5 | 1 | 71 |

**Question 14:** "There is reduced customer contact / support requirements"



14. There is reduced customer contact / support requirements
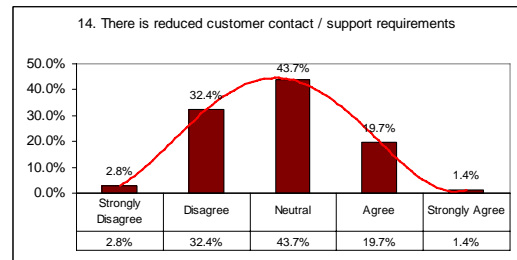
|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
|  | 2.8% | 32.4% | 43.7% | 19.7% | 1.4% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 2.84 | 0.82 | 0.67 | 5 | 1 | 71 |

**Question 12:** "There is greater customer reach"



12. There is greater customer reach
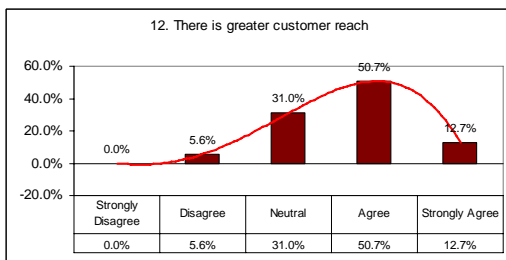
|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
|  | 0.0% | 5.6% | 31.0% | 50.7% | 12.7% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.70 | 0.76 | 0.58 | 5 | 2 | 71 |

**Question 15:** "There is reduced fulfilment and customer response errors"



15. There is reduced fulfillment and customer response errors
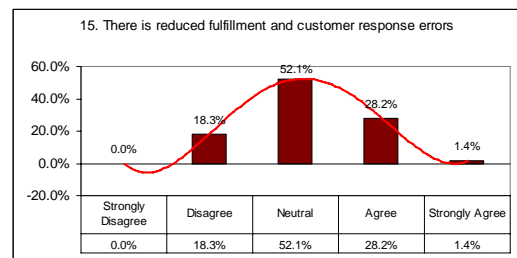
|  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
|  | 0.0% | 18.3% | 52.1% | 28.2% | 1.4% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 3.12 | 0.71 | 0.51 | 5 | 2 | 71 |

Question 16: "There is increased employee retention"



16. There is increased employee retention
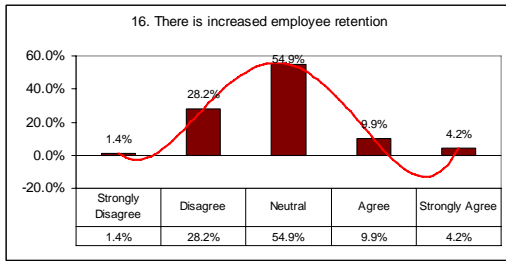
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 28.2% | 54.9% | 9.9% | 4.2% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 2.87 | 0.77 | 0.59 | 5 | 1 | 71 |

Question 17: "There is an improvement in employee morale"



17. There is an improvement in employee morale
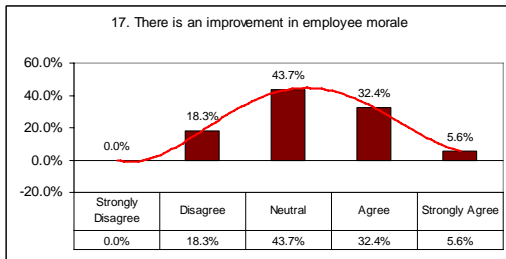
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 0.0% | 18.3% | 43.7% | 32.4% | 5.6% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 3 | 3.25 | 0.82 | 0.67 | 5 | 2 | 71 |

Question 18: "There is improved customer or employee knowledge and training"



18. There is improved customer or employee knowledge and training
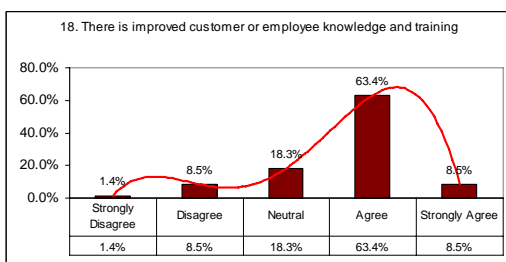
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 8.5% | 18.3% | 63.4% | 8.5% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.69 | 0.80 | 0.64 | 5 | 1 | 71 |

Question 19: "There has been an improvement in business processes"



19. There has been an improvement in business processes

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 15.5% | 16.9% | 52.1% | 14.1% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.61 | 0.96 | 0.92 | 5 | 1 | 71 |

Question 20: "There is a decreased time to market"



20. There is a decreased time to market

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 18.3% | 36.6% | 38.3% | 5.6% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 4 | 3.28 | 0.88 | 0.77 | 5 | 1 | 71 |

Question 21: "There has been an observable increase in the business knowledge"



21. There has been an observable increase in the business knowledge
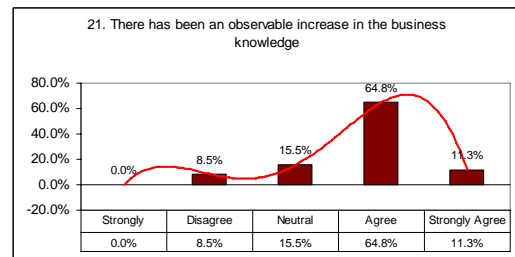
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 0.0% | 8.5% | 15.5% | 64.8% | 11.3% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.78 | 0.75 | 0.56 | 5 | 2 | 71 |

Question 22: "There has been an acceleration in decision making"

**22. There has been an acceleration in decision making**
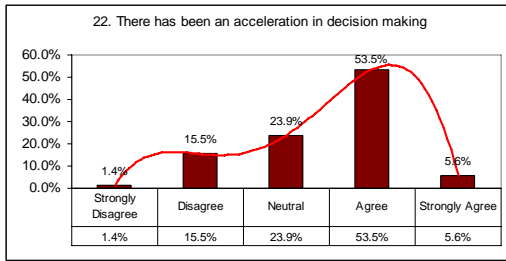
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 15.5% | 23.9% | 53.5% | 5.6% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.46 | 0.87 | 0.76 | 5 | 1 | 71 |

Question 23: "There is improved work processes"

**23. There is improved work processes**
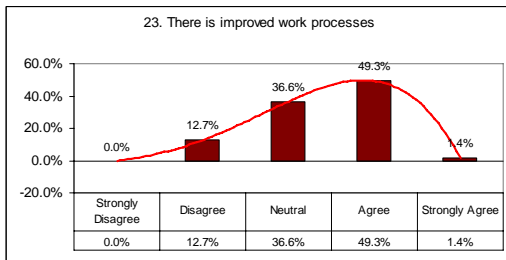
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 0.0% | 12.7% | 36.6% | 49.3% | 1.4% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.39 | 0.72 | 0.52 | 5 | 2 | 71 |

Question 24: "There is more effective relationships between departments / divisions and staff"

**24. There is more effective relationships between departments / divisions and staff**
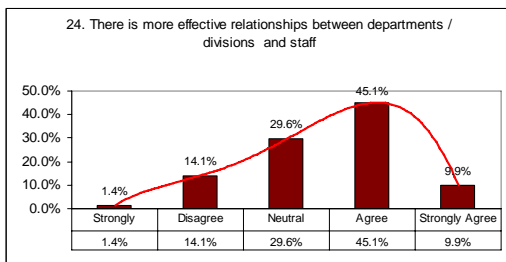
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 14.1% | 29.6% | 45.1% | 9.9% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.47 | 0.90 | 0.82 | 5 | 1 | 71 |

Question 25: "There is better business alignment"

**25. There is better business alignment**

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 4.2% | 9.9% | 15.5% | 67.6% | 2.8% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.54 | 0.87 | 0.76 | 5 | 1 | 71 |

Question 26: "There is improved communication"

**26. There is improved communications**

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 12.7% | 23.9% | 52.1% | 9.9% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.56 | 0.89 | 0.79 | 5 | 1 | 71 |

Question 27: "There is increased efficiency"

**27. There is increased efficiency**
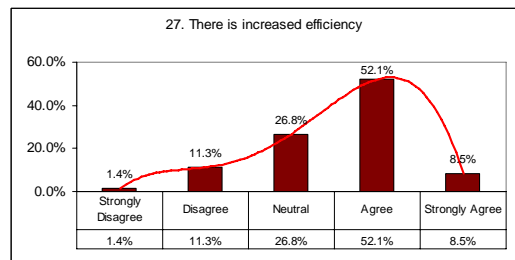
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 11.3% | 26.8% | 52.1% | 8.5% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.54 | 0.85 | 0.73 | 5 | 1 | 71 |

Question 28 : "There is additional cost savings in terms of time  being spent to produce reports"



28. There is additional cost savings in terms of time  being spent to produce reports
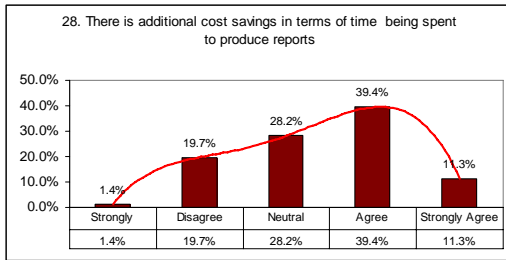
| | Strongly | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 19.7% | 28.2% | 39.4% | 11.3% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.39 | 0.97 | 0.95 | 5 | 1 | 71 |

Question 29: "There is additional cost savings in terms of resource usage"



29. There is additional cost savings in terms of resource usage
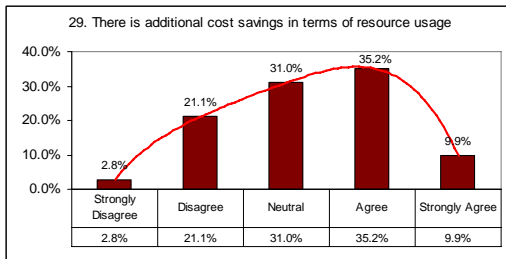
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 2.8% | 21.1% | 31.0% | 35.2% | 9.9% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 3 | 4 | 3.28 | 1.00 | 1.00 | 5 | 1 | 71 |

Question 30: "There is improved information access"



30. There is improved information access
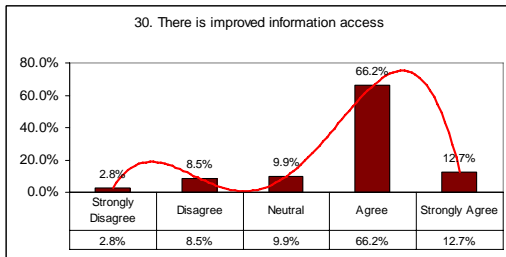
| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 2.8% | 8.5% | 9.9% | 66.2% | 12.7% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.77 | 0.88 | 0.77 | 5 | 1 | 71 |

Question 31: "There is a resultant streamlining of knowledge"



31. There is a resultant streamlining of knowledge

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 1.4% | 8.5% | 21.1% | 60.6% | 8.5% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.66 | 0.81 | 0.65 | 5 | 1 | 71 |

Question 32: "There is an improvement in the information accuracy"



32. There is an improvement in the information accuracy

| | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| | 2.8% | 15.5% | 14.1% | 56.7% | 11.3% |

| Median | Mode | Mean | STD Dev | Variance | Max | Min | N |
|---|---|---|---|---|---|---|---|
| 4 | 4 | 3.57 | 0.98 | 0.96 | 5 | 1 | 71 |

9.6.5    Questio ... be included in the BI

calculations

Include Intangible benefits in BI calculations

| | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---|---|---|---|---|---|
| Series1 | 0 | 0 | 7 | 44 | 20 |