

UNIVERSITY OF KWAZULU-NATAL

**Taming the Information Beast: Ensuring the Success of Crickmay and
Associates Business Intelligence Systems**

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I, Robin Pooley, declare that

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- ii. This dissertation has not been submitted for any degree or examination at any other university.
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Abstract

Crickmay and Associates (Crickmay) is a company that implements Business Intelligence (BI) solutions within Supply Chains, across numerous industries. In their daily operations they look to manage, enhance and improve their clients businesses. Crickmay's slogan is, "Supply Chain Evolution".

Crickmay's value proposition lies in their ability to leverage the data produced by their clients systems in order to find insights. Through continuous evaluation of operations, coupled with an unwavering determination to uncover potential improvements, they aim to continually enhance the value chain aspects of their clients businesses.

As Crickmay's client base grows and they expand further into differing industries, the complexities of implementing BI systems increases in parallel. In addition, the growing African economy and an increasing number of vendors that offer alternative solutions make for a competitive BI industry.

Companies are compelled to find ways to differentiate themselves. Some employ cost cutting strategies, others try to reduce the time between design and deployment.

In an attempt to uncover what the Critical Success Factors (CSF) of a Crickmay BI solution are, employees were interviewed so as to understand what has previously been delivered to clients as well as to uncover what makes a BI system successful.

The results were then analysed using thematic analysis. The findings of the research indicated that an equal focus of management effort needs to be placed on managing three main components of a BI system. People, Process and Technology. An Integrated BI competency at all levels of the organisation must be developed. Business Processes must be defined and understood. Technology must be aligned to support the ever changing needs of the users.

These CSF's ensure that the reliability, accuracy and longevity of Crickmay's systems not only provide a good return on investment for their clients, but differentiate Crickmay as a BI supplier that provides world class solutions.

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Chapter 1: Overview of the Study

1.1 Introduction

According to Herring (1999) defining an organisations intelligence needs in a way that results in the production of intelligence that management feels compelled to act on, is an elusive goal. Herring (1999) states that the Critical Success Factors (CSF) in any intelligence operation is meeting the user's real needs in such a way that the organisation is able to take decisive steps with the resulting intelligence to achieve their strategic objectives.

This study aims to find the CSF for Crickmay and Associates Business Intelligence (BI) Systems. The researcher is an employee at Crickmay, and is part of the team responsible for the development, implementation and support of the systems. Crickmay is poised to gain new clients in differing industries, therefore it is vital to understand how to effectively implement a BI system, find what makes a solutions successful and what could potentially derail a system.

This chapter provides an overview of the topic chosen and the motivation for the study. The focus area of the study is highlighted in order to provide an understanding of the direction of the study. The problem statement identifies the problem solved by this study and the research questions posed present the areas of research that were addressed. The research approach will then be discussed followed by the limitations of the study.

1.2 Motivation for the Study

This study was designed to provide a platform for Crickmay to be able to identify the critical deliverable components of its BI Systems. In identifying what contributes to making solutions successful, it will help Crickmay to focus resources in the most effective and efficient manner so as to deliver on what matters most to clients, information from data. In addition Crickmay will be able to develop a knowledge base that will ensure that intellectual property (IP) is shared amongst current and future members of the organisation.

1.2.1 A Brief Overview of Crickmay and Associates

Crickmay was established in 1985 by its founder David Crickmay. The business currently operates in the following industries: Sugar, Forestry, Sawmilling and Mining. Crickmay offers both consulting and BI services to their client base (Crickmay, 2015).

Within each industry Crickmay provides varying service offerings. In the simplest definition, the company positions itself into existing supply chains to provide value to customers by helping them increase utilisation, reduce unavailability and improve the efficiency of their resources by employing the most pragmatic information technology solutions available to manage complicated client operations (Crickmay, 2015).

This service is made possible by firstly integrating into clients systems, then extracting high volumes of data. The data is then processed into information, evaluated, analysed and presented. Information is then used to make meaningful recommendations to clients to drive down costs and increase productivity on a continual basis.

The resulting information is consumed by using most modern Information Communication Technology (ICT) platforms that are available to today's business professional. Internet, Mobile and Cellular channels are all employed to provide a comprehensive and integrated solution.

1.3 Focus of the Study

The main focus of this study was to identify the CSF for Crickmay's BI Systems. The study results will make recommendations to both internal and external stakeholders that will enable Crickmay to improve on the delivery of its systems to clients.

1.4 Problem Statement

BI systems are designed to enable time-critical, strategic decision making. Companies rely on the systems to provide accurate information for analysis and reporting at many points in the business cycle (Deloitte Consulting LLP, 2010).

BI systems can become a mismatched collection of packaged and custom software. Navigating the above mentioned systems in conjunction with the business landscape can present surprises at every turn. Add to this the pressure to contain IT costs, and BI systems are limited in their potential to provide meaningful insight for strategic decision making.

Thus the question arose, what are the CSF that will ensure the success of Crickmay and Associates BI systems?

1.5 Objectives of the Study

The study will provide an in-depth analysis of Crickmay and Associates BI solutions, with the objective being the determination of what specific factors must be considered to ensure the success of future BI systems.

There are four main objectives, namely to;

- Determine what the main contributors are to improving the BI value proposition.
- Identify the CSF for a Crickmay BI System implementation.
- Identify the main problems that Crickmay is experiencing with their systems.
- Develop a BI strategy that is aligned to Crickmay's future business objectives.

1.6 Research Questions

This study focused on answering the following research questions:

1. What are the core contributors to improving BI for Crickmay?
2. What makes a BI System successful?
3. What makes a BI System unsuccessful?

4. What BI strategy will align to the business' future objectives?

1.7 Research Methodology

The research approach used was qualitative. Qualitative research provides an understanding of perceptions from people in a particular situation (Flick, von Kardorff and Steinke, 2004).

In-depth interviews were held with fifteen employees at Crickmay. Respondents were interviewed and asked about the factors that influence the current systems both positively and negatively. The data was then collected and a thematic analysis conducted, to identify themes that were relevant to improving value delivery capabilities of Crickmay's solutions.

The results were presented in the most suitable manner for presenting qualitative data, which is in a narrative text format. The results were discussed in relation to the literature presented with the aim of concluding the study by presenting recommendations.

1.8 Limitations of the Study

The study only included employees of Crickmay. Given that not all employees have backgrounds in BI or IT their responses drew from their experiences within Crickmay only and are thus not necessarily be representative of any industry wide trends. Time is a further limitation as the final date for submission of this research precluded a wider study.

1.9 Significance of the Research

This study is a significant endeavour in improving the effectiveness, efficiency and quality of BI solutions that Crickmay and Associates implement in their customers value chains. The study will in turn be beneficial to external practitioners who design, deploy and support BI implementations. By understanding the factors that lead to BI success and avoiding the inhibitors of value, BI professionals are able to take proactive and preventative steps simultaneously. The research presents strategies

that have been validated by industry experts, that when used in developing a BI platform, a higher rate of system adoption can be achieved.

Moreover, this research provides recommendations on how to evaluate the performance of BI solutions in accordance with strategic organisational objectives.

In addition, this study is helpful to non-BI individuals as it details the importance of their contribution to the BI life-cycle by discussing how BI is not a technical undertaking whose locus of control resides in the IT department.

The research will also serve as a future reference for researchers on the subject of BI assessment and management. Lastly, this research will educate customers in understanding the value that they should be looking to extract from their capital investment. BI should ultimately produce and intelligent business.

1.10 Structure of the Study

The study is presented in the following key chapters as follows:

Chapter One – Introduction

Chapter one introduced this study by providing background information, the focus and the motivation of the study, followed by the problem statement, and research questions that are to be answered. A brief overview of the research methodology was provided. The chapter concluded with the limitations of this study.

Chapter Two – Literature Review

This chapter focuses on identifying CSF's for BI implementations that have been identified in previous studies. It will also look to literature to provide a baseline framework to answer the studies objectives.

Chapter Three – Research Methodology

The research methodology that was used to research the problem statement and the objectives of this research are discussed in this chapter.

Chapter Four – Results

The data from the interviews that were conducted with the employees of Crickmay are presented in this chapter.

Chapter Five – Recommendations and Conclusions

This chapter highlights the pertinent responses of the interviews, draws conclusions and provides recommendations to ensure the ongoing success of Crickmay's BI solutions. In addition, suggestions for further research are made.

1.11 Summary

This chapter has set out the objectives to be researched, regarding identifying the CSF of Crickmay's BI Systems. In the following chapter, as mentioned in the structure of the study, existing literature that is appropriate to this research is discussed.

Chapter 2: Literature Review

2.1 Introduction

A literature review is conducted in this chapter. The research material reviewed has been obtained from books and journal articles that are current.

Firstly, the Traditional Intelligence Cycle is discussed and then BI will be defined, then factors that contribute to the BI value proposition are uncovered. In conjunction with an analysis of the factors that stifle BI systems, a review of CSF in existing literature is listed. Lastly the process of developing of a BI strategy is discussed.

2.2 The Traditional Intelligence Cycle

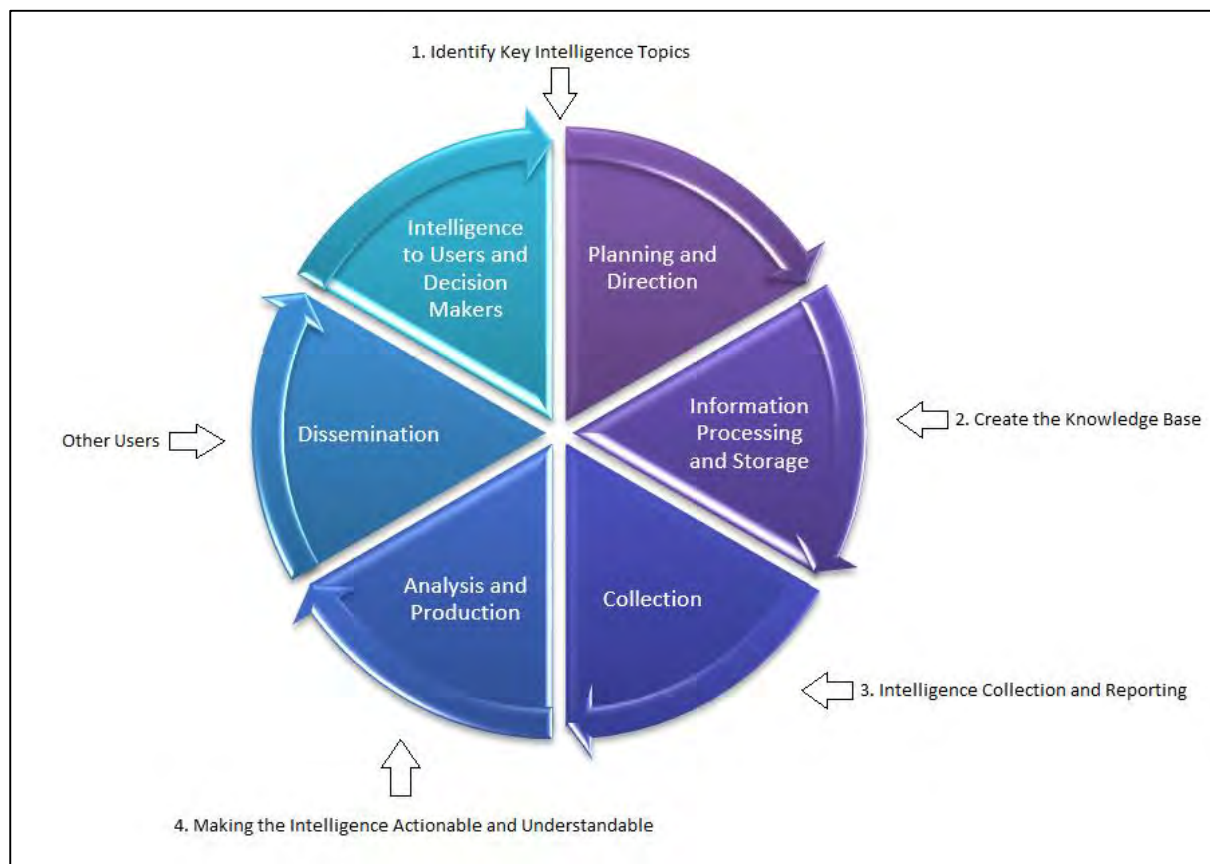
According to Herring (1999) the Intelligence Cycle is the process of developing raw information, more commonly known as data, into finished intelligence for policymakers to use in decision making.

The cycle starts with the planning and understanding of the direction needed to achieve a set objective. The next step is the definition of the processes and rules that will govern how information will be obtained and stored. The collection of reliable information from valid sources is next, after that the analysing of the data to form intelligence is completed. Finally, if the intelligence is to have value, it must be disseminated in a form that's clear and understandable, (Herring, 1999).

This cycle is a repeating process consisting of a number of steps. Planning, Processing, Collection, Analysis, Dissemination and Decisions. (Johnston and Johnston, 2007).

Figure 2.1 shows that a BI system must be systematic and needs-driven as with the Traditional Intelligence Cycle.

Figure 2.1: The Traditional Intelligence Cycle



Adapted from Herring (1999), pg. 6

With the advancements in Information Technology, new disciplines are able to add more value in providing information at the right time to the right people to have a much greater influence in the decision-making process.

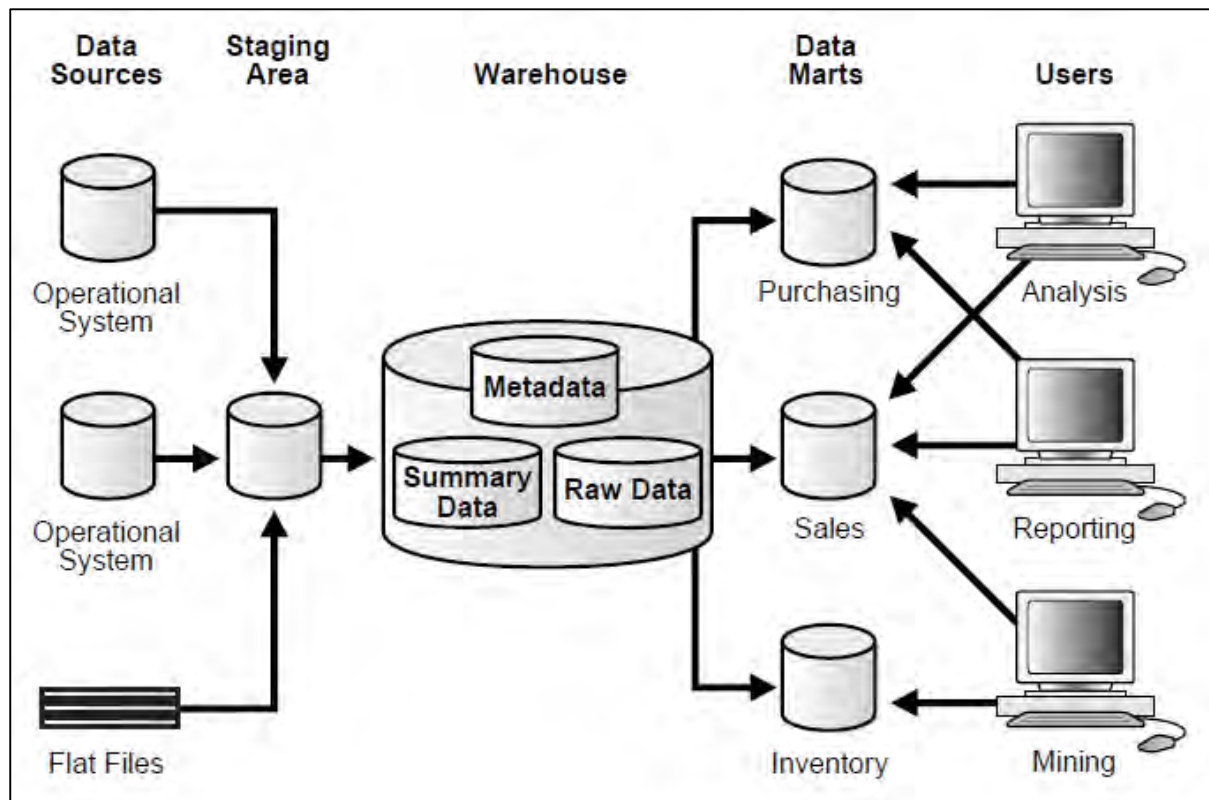
2.3 BI – The Discipline Defined

BI has been described as the process of transforming raw data into information that is actionable and then into knowledge (Haag, Baltzan and Phillips, 2008).

The BI discipline encompasses the processes of integration into source systems, the extraction of data from source systems, commonly referred to as Extract Transform Load (ETL) processes, the storing of extracted data into data warehouses and data marts, the presentation of newly acquired information through channels like reporting, dashboards, scorecards, the interrogation of data using tools and

procedures such as OLAP, querying, data visualization and data mining. In addition, the management of knowledge acquired for future reference and the development of decision support systems (Moss and Atre, 2003).

Figure 2.2 The typical components of a BI environment.



Adapted from Oracle Database Concepts (2011), Ch 16, pg. 5

Figure 2.2 above shows the typical movement of data from source to the end user. It describes the process as flowing from Data Sources, to Staging Areas, to a Data Warehouse to Data Marts (Relevant subsets of data) that users are able to connect to. The figure is a simplification of what is typically a more complex architecture.

Watson (2009, pg. 487) defines BI as, “a broad category of applications, technologies, and processes for gathering, storing, accessing, and analysing data to help business users make better decisions.”

BI is a business-driven process that has the ability to add value to organisations traditional intelligence cycles. BI encompasses all specific intelligence activities such as strategic intelligence, competitive intelligence, customer intelligence, product intelligence and operational intelligence (Dawson and Van Belle, 2013).

The key deliverable of BI solutions is not report delivery and information presentation. Rather, at the core of BI is the delivery of context-rich knowledge to the organisations people that enhances their understanding of what collectively makes up the business. People with high levels of experience in analysis and a dedicated attitude toward both IT and the business, complete the system (Smit and Oosthuizen, 2010).

Gartner's (2013) definition for BI is "an umbrella term that includes the applications, infrastructure and tools, and best practices that enable access to, and analysis of, information to improve and optimize decisions and performance."

The above BI definitions are supported by Taylor and Raden (2007, pg. 110), who connect the core components of BI to the following, "a single version of the truth.", "getting the right information to the right person at the right time" and "better data for improved decision making."

All the descriptions mentioned can be used to underpin the main reason for being of a BI solution, which is the transformation of data to information. The information generated allows for the analysis of information from different perspectives, by organisational policy-makers, to support their decision-making processes, which in turn will enable the business to realise their strategic objectives.

2.3.1 BI – The Sum of its Parts

BI is an information system that can be categorised into three interrelated elements (Laursen and Thorlund, 2010):

1. Technological element that collects, stores, and delivers information.
2. Human competencies element that defines the abilities of human beings to retrieve data and deliver it as information, to generate knowledge, and to make decisions based on the new knowledge.

3. Specific Business Processes is the third element that is supported. Making use of the information or the new knowledge for optimising operations to improve business value.

The above three elements are supported by Yeoh, Koronios and Gao (2008). They state that CSFs can be classified into three dimensions. They are the organisational dimension, a process dimension and a technical dimension.

The elements or dimensions identified provide a complete foundation on which a BI solution is built. BI describes the enterprise wide discipline, comprising of People, Processes and Technologies that together make it possible for the better usage of data, improved analysis of information, and better decision making and performance management (Gartner, 2008).

2.4 The Slippery Slope for BI

With the value that BI promises to deliver, reality has proved that these benefits do not automatically materialise with the mere implementation of a BI system (Smit and Oosthuizen, 2010).

Hawking and Sellitto (2010) found that businesses do not realise that higher quality of decision making is the main driver behind BI.

Organisations invest heavily in BI and mostly do not enjoy all the benefits. The initial scoping, design and implementation require a capital outlay, to add to this is the ongoing operational expense of the system. If these costs are not justified by the advantages gained, the costs incurred should be questioned (Smit and Oosthuizen, 2010).

A factor in the low success rate of BI systems is in part due to traditional BI systems having a high level of complexity. Historically, BI solutions are the domain of trained users with very specific skill sets that enable them to syphon, interrogate and extract insights from complex data, (Panorama Software, 2013).

The above mentioned users are usually limited in their capacity to deliver information. The delay inevitably leads to business executives and managers having to wait to receive insights into business performance, (Panorama Software, 2013).

BI systems that initially promised to deliver improved decision making, can thus become the very problem, in that they require ever more input from managers than they deliver in intelligence, (Deloitte Consulting LLP, 2010).

BI implies that BI systems should do more than simply collate and display information. Intelligence suggests a more complete and comprehensive understanding of patterns and relationships in datasets as well as trends and insights (Smit and Oosthuizen, 2010).

The extraction and processing of knowledge regarding strategy execution, and the key performance indicators on which a strategy is formed should be central to the solution. Many BI systems fail in this regard, and purely become performance and measurement reporting systems (Smit and Oosthuizen, 2010).

2.4.1 The Reasons BI Implementations fail.

Research conducted by Gartner (2013) calculates that 70-80% of BI projects fail. BI implementations deal with numerous issues, often the cause of the issue is related to people and processes and not technology, (Boyer, et al., 2010).

Olszak and Ziemba (2012) in their study titled, CSF for Implementing BI Systems in Small and Medium Enterprises on the Example of Upper Silesia, Poland, compiled a list of barriers that are encountered during the BI implementation process. They are listed as:

- The lack of a well-defined business problem
- The lack of management support
- The lack of knowledge about BI systems and their capabilities
- Not determining the expectation of BI user.
- Exceeded BI implementation budget.
- Ineffective BI project management.

- The lack of appropriate data for BI system.
- Complicated BI project.
- The lack of user training and support.
- The resistance of the "human factor". (Resistance to change)
- Insufficient responsiveness on changing users' requirements.
- The lack of relation between business vision and BI system.
- The lack of BI system flexibility.
- Uncoordinated BI project activities.
- Misunderstanding of knowledge provided by BI.
- Different viewpoints on BI system implementation

Common pitfalls might not be relevant for differing businesses (Hwang et al., 2004; Scholz et al., 2010). Bergeron (2000), suggests that BI system design and implementation theory focuses mainly on large organisations, therefore the reasons for failure would differ based on other factors. Identifying influencing factors for BI system implementations in companies of differing sizes and in different industries is a necessary undertaking.

In Table 2.1 below Mantfeld (2006) lists eight reasons that BI Implementations fail:

Lack of upfront Planning	The lack of a business case for the need of BI. Not considering as many requirements as possible and the misalignment of BI with business problems.
Data Quality Issues	A lack of quality in data leads to too many bad decisions. This can cause immediate distrust and abandonment.
Not Anticipating Change	The requirements at implementation will change within a year. BI systems evolve and new requirements will surface
Differences in Perceived need.	A "Single Version of the Truth" must be prioritised throughout the business.

One-Stop Shopping	The belief that the best solution for BI would be to implement their existing ERP Analytics product.
Dashboards as a generic cure.	Attractive graphical dashboards that lack the same amount of planning and consideration that any other project would receive.
Outsourcing	The belief that the knowledge of the organisation's policies, practices, history, user needs and customer demographics can safely reside outside of the business.
Performance Considerations	Ignoring the scalability of BI systems. Not anticipating data volumes, user volumes and concurrency.

Table 2.1 Reasons BI Implementations Fail

Adapted from Mantfeld (2006)

Mantfeld (2006) explains that the failure of BI deployment is a possibility when, “Inconsistent implementations, lack of executive sponsorship, lack of cooperation and intra-departmental conflicts cause slow adoption and abandonment of BI projects. The success of a BI Project is directly related to consideration of business, user and training requirements.” He continues, “...the value of a BI deployment is not that obvious that all users would be lining up to learn to use the system.”

2.5 Drawing Value from BI

The value that BI delivers will differ from business to business as the intelligence that lies within each organisation and information that sourced from outside it is unique to that business (Moss and Atre, 2003).

The tangible benefits to accessing information that decisions can be made off may not be clear until the effect of the decision is realised – this might occur only after a long period of time has passed (Bannister and Remenyi, 2000).

A positive impact on an organisation's competitiveness can be achieved by affecting business process improvements, productivity, and cost containment, (Vesset, 2012).

Williams and Williams (2007) state that the value that BI delivers to business is dependent on the existence of management processes to ensure that operational processes utilise the information delivered.

Vesset (2012) notes that IDC studies show that once BI and analytical systems are implemented and are used to measure incremental improvements, they have a direct correlation to the competitiveness of organisations within their respective industries.

Thomas (2001, pg. 48) suggests that BI goals are to “avoid surprises, identify threats and opportunities, understand where your company is vulnerable, decrease reaction time, out-think the competition and protect intellectual capital”.

The Intangible benefits that are associated with BI solutions include regulatory compliance, increased business knowledge, enhanced operational processes, efficiency, and more productive relationships, (Gibson, et al., 2004).

The value of better BI and analytics is often expressed in such intangible terms as the ability to make better decisions, where "better" is usually undefined. In practice, however, there is growing quantifiable evidence of the value of BI and analytics, (Thomas, 2001).

Return on Investment (ROI) in BI is obtained through faster access to higher quality information and an improvement in processes that increase revenue and decrease costs, provided there is an understanding of the associated costs and investment, (Ranjan, 2008).

Vesset (2012) references IDC studies that identify the average ROI of BI implementations to be slightly over 100%. The efficiencies realised by businesses deploying BI solutions are split as follows:

- 4% from technology cost savings.
- 42% from productivity gains.
- 54% from business process improvements.

From another perspective, 96% of the benefits are in the productivity and business process enhancement categories.

The value of BI cannot simply in the gathering and disseminating of data. The focus needs to be on intelligence (Venter and Tustin, 2006).

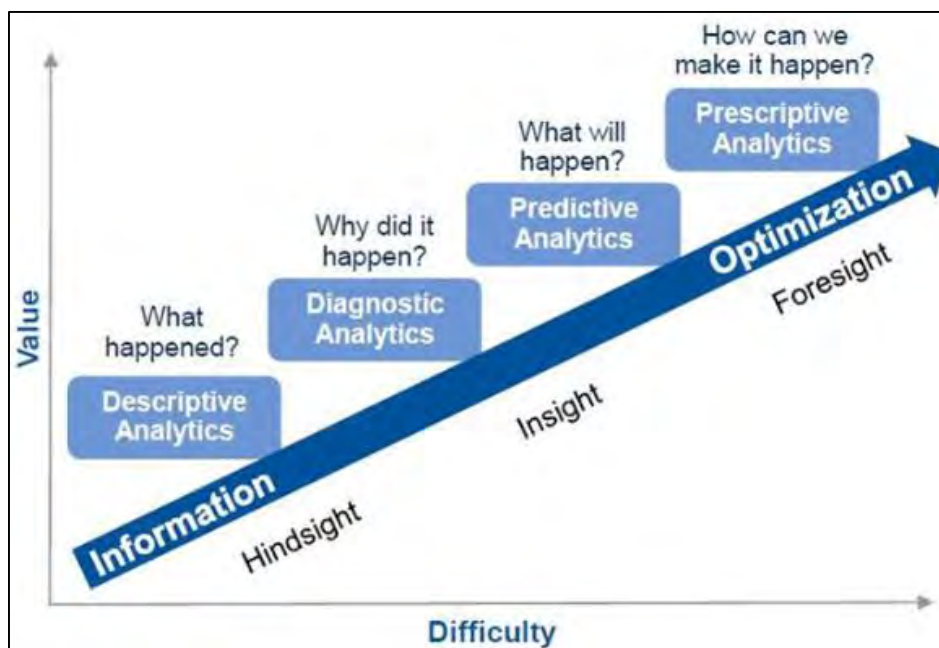
Proactively using BI can transform data from internal and external sources into information that can be leveraged to be used as a competitive advantage. There is also a role for the reactive use of the information delivered from BI. Evaluating the information extracted from the monitoring of operational processes can be used to support a decision to realign those processes to be more supportive of business strategy (Ranjan, 2008).

Gartner (2013) suggests that business can gain value from increasing their levels of analytic maturity, by moving from information and hindsight to optimization and foresight.

Gartner (2013) encourages organisations to evolve to more prescriptive analytics, the argument can be made that the business case determines the type of solution that needs to be implemented.

Figure 2.3 describes the value that can be obtained in conjunction with the difficulty to implement when determining the type analytical requirements of a BI system.

Figure 2.3 Gartner's Analytics - Maturity Model



Adapted from Elliott (2013)

Davenport and Harris (2007) as well as Davis, Miller and Russell (2006) state that value will only be realised from BI once a level of system maturity is achieved. They point out that an evolutionary process occurs, where achievement of higher levels is dependent firstly on reaching the preceding maturity level.

2.5.1 BI – The Critical Success Factors

Dawson and Van Belle (2013, pg. 1) state in their study on the CSF of BI in the South African financial services sector, “BI has become an important part of the solution to providing businesses with the vital decision-making information they need to ensure sustainability and to build shareholder value. CSF provide insight into those factors that organisations need to address to improve new BI projects’ chances of success.”

According to Isik, Jones and Sidorova (2013, pg. 13), “BI success is related to the positive value an organisation obtains from its BI investments”.

BI solutions take years to mature, expanding in breadth and depth over time. The value of a BI solution grows exponentially with the number of users and applications it supports (Eckerson, 2003).

It’s important that organisations understand the key indicators of success so they can surmount the challenges associated with every BI project. Eckerson (2003) shows that successful BI solutions have the following characteristics:

1. Business sponsors are highly committed and actively involved in the project.
2. Business users and the BI technical team work together closely.
3. The BI system is viewed as an enterprise resource and given adequate funding and guidance to ensure long-term growth and viability.
4. Firms provide users both static and interactive online views of data.
5. The BI team has prior experience with BI and is assisted by vendor and independent consultants in a partnership arrangement.

6. The company's organisational culture reinforces the BI solution.

Whilst these factors do not guarantee success they do signal the potential for success. BI ultimately succeeds when the business, not the technical team, drives the BI systems development and are accountable for its success (Eckerson, 2003).

Vodapalli (2009) lists seven success factors for the implementation of a BI project. In alphabetical order, they are:

1. Business-driven methodology and project management
2. Clear vision and planning
3. Committed management support and sponsorship
4. Data management and quality
5. Mapping solutions to user requirements
6. Performance considerations of the BI system
7. Robust and expandable framework

To manage the success of BI implementations, the focus on the seven points made above is recommended, to prolong the solutions lifespan (Vodapalli, 2009).

2.6 Developing a winning BI Strategy

To execute strategy successfully in the modern business landscape, executives and managers need deeper levels of understanding of the value creation process in their businesses and departments (Smit and Oosthuizen, 2010).

Business strategy execution is dependent on high quality and informative decision-support information. BI systems endeavour to fill the need for information to support strategy execution (Smit and Oosthuizen, 2010).

IBM (2010) states that every company needs a clear set of defined objectives to achieve the benefits from its BI. Typical desired outcomes are:

- Unrestricted access to one trusted source of information to make grounded decisions based on reliable facts not be dependent on instinct.
- Simplified reporting and analysis tools that assist users in gaining better business insights to reveal issues and uncover trends quickly.
- Provide the platform to react with agility to evolving business conditions through the use of effective, corresponding actions

Defining the BI outcomes is an important process. But goals alone do not add much value without appropriate action. A well formulated strategy provides the blueprint for success (IBM, 2010).

BI strategy must be adaptive and agile. It should be rigorously evaluated and enhanced to continually meet business objectives (Pant, 2009).

BI systems should not be viewed as technical applications in isolation, the system includes people and the two parts should be seen as co-dependent when discussing a BI strategy. This implies professional expertise as well as the social processes involved in generating, and probing for, needed outputs (Smit and Oosthuizen, 2010).

Pant (2009), provides numerous factors to consider for the success of a BI strategy. In Table 2.2 below these are presented. In addition the potential pitfalls to avoid when designing a BI strategy are also listed.

BI Strategy Development Considerations
Success Factors
The creation of a business case with the expected benefits outlined
Obtain buy in from stakeholders, especially the senior executives
An overarching, enterprise-wide perspective is incredibly important.
Establish criteria for success
Information is an intangible asset and must be managed closely.
Adopt best practices and standards

Set up change management procedures
An alignment between business goals and the BI strategy must be built.
Do a current state, future state, and gap analysis
Take calculated, easily attainable steps all the time.
Establish governance body
Implement iteratively
Work with frameworks and adopt proven methodologies
Assess the readiness of the business and identify gaps and issues
Document and analyse the constraints and assumptions
Consider all BI components
Potential Pitfalls
A narrow vision will create problems down the line. Strategy cannot be restricted due to limitations created at the outset.
BI implementations take time. Do not look to roll out an “all-at-once” solution. Deliver modules at a time.
BI is not a technology function. Include all relevant parties in the design and building of the solution.
Do not “make it up as you go.” The strategy document is the roadmap to follow as a BI environment is created.
The strategy must not be technically focused, it should incorporate more than data warehouses and BI tools.
Ensure the design of the data warehouse supports an enterprise-wide informational asset.
Avoid an inflexible approach. The strategy must be a living artefact. It must be tuned and adjusted to the needs of the business.

Table 2.2 BI Strategy Development Considerations

Adapted from Pant (2009, pg. 3)

Table 2.2 above provides a number of considerations when looking to initially develop a BI strategy. Broad definitions are provided that can be used in the initial development phase of the strategy and also as a guide during strategy execution. The following section provides literature that allows for the identification of maturity of existing BI solutions.

2.6.1 The BI Maturity Model

Davenport and Harris (2007), state that the journey from data to information is a multiple step process. At each step there is a deliverable that can be presented to answer an associated business question.

There are two categories that business questions and associated deliverables fall into. Firstly, Access and Reporting, secondly, Analytics (Davenport and Harris, 2007).

The lower level, Access and Reporting, deliverables include standard and ad hoc reports, query and drill-down reporting capabilities and alerts, these are used to answer questions such as “What happened?”, “How many, how often, where?”, “Where exactly is the problem?” and “What actions are needed?” (Davenport and Harris, 2007).

The higher end deliverables in the Analytics category provide, statistical analysis, forecasting, predictive modelling and optimisation to answer questions like, “Why is this happening?”, “What if these trends continue?”. “What will happen next?” and “What is the best that can happen?” (Davenport and Harris, 2007).

As with Davenport and Harris, Davis, et al. (2006) developed a framework that allows for the benchmarking of a businesses information management maturity levels. They identify five levels: Operational, Consolidation, Integration, Optimisation and Innovation.

1. Operational:

- a. The business is primarily focused on the information only to support day to day activities, there are numerous versions of the truth. Unstructured decisions are made and information usage and

interpretation is decided by the individual. Results do not get verified before they are disseminated.

2. Consolidation:

- a. There are established departments and functions and information is kept at each level and is used to achieve specific objectives. Inconsistent measures exist across departments and are inconsistent across the organisation with several versions of the truth existing. KPIs have been identified but are tracked through manual processes.

3. Integration:

- a. A single version of the truth exists and information requirements are linked to business objectives. Information environment is established and accessible by all employees. Organisational information is available and used in decision making on multiple levels. Data quality management is in place.

4. Optimisation:

- a. The business is focused on improving the efficiency and effectiveness of how it operates. Information is critical in measuring, aligning and improving processes and drives information based decision making. New demands are quickly responded to when the market place demands it. The value chain the business offers has little ambiguity and is supported by dependable accurate information.

5. Innovation:

- a. Innovation and adaptability is evident across the business and the organisation uses its competencies and knowledge to grow into new markets and develop new products. Growth is supported with the new efficiencies achieved at the Optimisation stage. New proposals and ideas are encouraged. Cross-industry information is used to predict and manage potential risk associated with new undertakings.

Gartner (2008) also developed a BI Maturity Model to determine the sophistication of BI solutions. They present five levels of BI maturity.

Level 1: Unaware

- Total Lack of Awareness, Spreadsheet and Information Anarchy, One-off Report Requests.

Level 2: Tactical

- No Business Sponsor, IT executive in charge, Limited Users - mainly managers and executives. Data Inconsistency and stove-piped systems

Level 3: Focused

- Funding from business units on a project-by-project basis. Specific set of users is realizing value. Successful focus on a specific business need. BI Competency Centre in place.

Level 4: Strategic

- Establish a balanced portfolio of standards. Business objectives drive BI and performance management systems. Deploy an Enterprise metrics framework. Governance policies are defined and enforced

Level 5: Pervasive

- Use of BI is extended to suppliers and customers. Analytics are inserted into and around the business processes. Information is trusted across the company

When BI solutions are assessed against these maturity models it is possible to determine where the starting point is to develop an appropriate strategy to achieve the goals of the business that align the people, processes and technologies to deliver a successful implementation.

2.6.2 Framework for Implementing a BI System

Smit and Oosthuizen (2010), mention that strategic management involves two phases. The first phase is formulation, which consists of three steps:

- The development of a strategic vision.
- The setting out of the strategic objectives

- Mapping out the execution of the strategy so that the vision and objectives are attainable.

The second phase is the strategy execution phase. They continue to say that most business are capable of formulating the strategy, but lack the ability to execute it. It is the ability to actually carry out a strategy that is important and not the formulation of one. The weak link lies in the evaluation and execution of the strategy (Smit and Oosthuizen, 2010).

In Table 2.3 below, Smit and Oosthuizen (2010) present the framework they developed to underpin BI strategy formulation.

Smit and Oosthuizen Framework for Implementing a BI System	
Four Foundation Pillars	<ol style="list-style-type: none"> 1. The BI development must be supported by the organisation's executive leaders. 2. The BI system must be designed so as to align to strategic requirements. 3. The organisational culture must be conducive to BI and analytical thinking. 4. There must be a strong partnership between IT and business functions.
Data	<ol style="list-style-type: none"> 1. Data must be relevant to the activities of, and decisions made by, business leaders. 2. Data must be sourced from both internal and external sources to ensure effective performance tracking and benchmarking. 3. Data must be carefully selected to meet actual requirements. Care must be taken not to overload the system with volumes of irrelevant data in order to be on the safe side. 4. The data quality must be high.
Technical Architecture	<ol style="list-style-type: none"> 1. Data-staging must ensure that data is effectively extracted from operational sources and effectively integrated into the data warehouse.

	<ol style="list-style-type: none"> 2. Data must be restructured and presented in a way that makes it easy to interpret and analyse. 3. Advanced, but relevant, analytical functionality must be included in the BI system to ensure that the strategic business information requirements can be effectively met. 4. The system must include a planning platform that facilitates implementation planning, communication, performance monitoring and evaluation. 5. A range of data access tools must be incorporated to cater for differing needs in various layers of the organisation.
People	<ol style="list-style-type: none"> 1. Executives from IT and business areas must be involved continuously in the BI system strategy and design. 2. Professional analysts must be involved, whether in business areas or in IT, to unleash the full value of advanced analytical processes and resultant decision-support information. 3. The BI team should be guided by a BI architect who can facilitate discussions between IT and business. The team must also include business analysts with relevant business understanding and IT developers that understand the unique complexities of BI.

Table 2.3 Smit and Oosthuizen Framework for Implementing a BI System

Adapted from Smit and Oosthuizen (2010, pg. 14)

Vesset (2012), proposes that beyond the initial development of a BI strategy businesses should also focus on:

- Training. How to use BI and analytics tools, how the use of analytics improves decision making, the meaning of data and how to improve existing process.
- BI System Design Quality. Position the implementation to react to changing business conditions and user requirements.
- Data Governance. Place a high level of importance on the governance of data and data quality.

- Non-executive Management Involvement. Empower the next layer of management to implement BI technologies and processes throughout the business.
- Performance Management Methodology. Align the organisation with defined metrics and KPIs that influence user behaviour.

Hostmann, Rayner and Herschel (2009) developed the Gartner Business Intelligence, Analytics and Performance Management (PM) Framework. The framework defined the people, processes and technologies that need to be integrated and aligned to take a more strategic approach to BI, Performance Management and analytics initiatives.

Gartner's BI, Analytics and Performance Management Framework	
Start with Business Strategy and Enterprise Metrics	To evolve BI solutions from only fulfilling only immediate reporting or dashboard requests, businesses need to lay out the components for a solution in terms of people, processes and technologies with the goal of aligning them to the strategic objectives. The alignment of these components coupled with the linking of them to the operational activities will lay the platform for a strategically aligned solution.
Give equal consideration to People, Processes and Technology	<p>People should be grouped into three groups of users.</p> <ul style="list-style-type: none"> • Analysts. Those that define and explore business models and business processes. • Users. The consumers of information. • IT staff. The members who design, build and maintain the systems.
	A broader view of Processes is required to transition from tactical to strategic BI. A strategic view must include business processes and decision processes, and also the processes that create information.
	The lack of BI adoption is in part due to businesses

	focusing only on the Technology of BI. That said, users more readily adopt BI if it fits naturally into their information and computing environment.
Pay Attention to two related areas	Program Management ensures that more value is delivered by the platform than simply the emailing of information. Actively supporting the information and decisions made off the those decisions is a jey-characteristic of leading initiatives
	Metadata and Services Repositories contribute to the sharing of common information across business units and presenting a common “face” to the information. Linking disparate data sources.
Use the Framework to scope BI, Analytics and Performance Management Efforts	Performance Management is defined by Gartner (2008) as the management processes, methodologies, metrics, applications, tools and infrastructure that enable users to define, monitor and optimize results to achieve objectives. PM drives the definition of the framework and spans the top layer of the three pillars. Users, Processes and technologies.
	BI focuses on the extraction and loading of data that is relevant. It is responsible for presenting information in useable formats. No value is realised if the business does not use the information. BI must focus on understanding the user’s roles and how information will assist them and ensure that the relevant data is processed and presented in a timely manner.
	Analytics is the “process of doing” analysis. Knowing how information needs to be used allows for the management of the output during the process of development to ensure that what is ultimately delivered can be utilised in the efforts to achieve the businesses

	strategic goals.
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Table 2.4 Gartner's BI, Analytics and PM Framework

Adapted from Gartner (2010, pgs. 6-15)

Smit and Oosthuizen (2010, pg. 15) say, "Only when the technical platform is complemented by the right people and social environment can the BI system fulfil its important role in present-day strategy execution."

2.7 Summary

This chapter explained the concept of BI and identified the various factors that contribute to its ability to add value. Whilst differences in theories are to be expected, the reality is that there are more common themes. The motivation for the study is to uncover the influencers that contribute to the success of a BI system at Crickmay. In this literature review, it is evident that there are decisive actions that can be taken that is within the control of managers, which will positively impact the success of a BI implementation.

The next chapter evaluates the research methodology that was used for this study.

Chapter 3: Research Methodology

3.1 Introduction

This chapter will present the research design and methodology. The chapter will include the aim and objectives of the study, the location of the study, the studies participants the research approach employed, sampling, and the manner in which data was collected. It also discusses how the research instrument was designed and a summary of how the data was analysed.

The understanding that qualitative research aims to contribute to understanding realities better by describing phenomenon from the perspective of the people who participate in a particular setting was the basis for the research methodology employed (Flick, et al., 2004).

3.2 Research Approach: Qualitative and Quantitative Methods

Research can be defined as an organised, systematic, data-based, critical, objective, scientific inquiry or investigation into a specific problem, undertaken with the purpose of finding answers. Research provides the necessary information that guides managers to make informed decisions to successfully deal with problems (Sekaran and Bougie, 2011).

The two possible methods that exist when conducting research are quantitative and qualitative. The method chosen must be appropriate for the research undertaken (Mouton, 2009).

Mouton (2009) says that understanding the differences between the methods prior to selecting the preferred method is critical. The differences that exist between the two research methods have been listed in Table 3.1 below.

Qualitative data	Quantitative data
Based on meanings expressed through words	Based on meanings derived from numbers
Collection results in non-standardised data requiring classification into categories	Collection results in numerical standardised data
Analysis conducted through the use of conceptualisation	Analysis conducted through the use of diagrams and statistics

Table 3.1 Differences between Qualitative and Quantitative Research

(Saunders, et al., 2012, pg. 438)

As presented in Table 3.1 above, quantitative research tests specific variables, using numbers and statistics. Data is collected by using structured instruments. Quantitative research tests specific hypothesis with the aims of being objective. Results are presented using statistical analysis to present correlations, mean data and other statistically important findings (Sekaran and Bougie, 2011).

This study used qualitative research to determine the CSF for BI systems at Crickmay and Associates. The intention of qualitative research is to extract important details from within a social setting, this is achieved by providing detailed descriptions. Qualitative research has the ability to convey understanding through the respondent's eyes (Du-Plooy-Cilliers, et al., 2014).

The method was chosen because qualitative research enables the extraction of information from within the organisation by detailing the perspectives of the participants, in doing so contributes to a deeper understanding of the realities (Flick, et al., 2004).

Qualitative research delivers an open and involved approach. The results of qualitative research are highly detailed and descriptive. The underlying nature of qualitative research provides the platform to highlight and explore unknown areas of the subject matter being studied. Unlike quantitative research, qualitative research

not limited by preconceived notions about the subject being studied (Flick, et al., 2004).

This study focuses on the staff of Crickmay and Associates and their knowledge of the industries they work within and the systems that are implemented for their clients. The research is qualitative and makes use of interviews. The approach is exploratory and descriptive.

3.3 Interviews

There are three different types of interviews that can be conducted, they are:

- Semi-structured
- Structured
- Unstructured interviews.

This research made use of qualitative interviews. Mouton (2000, pg. 196) described their use in that they “emphasize the relativism of culture, the active participation of the interviewer, and the importance of giving the interviewee voice”.

The interview questions were semi-structured in design. The employees were asked the same questions (in differing orders at times), which were recorded and transposed for later analysis. This process was carried out in order to provide valid and reliable datasets. Bless and Higson-Smith (2000), state the the advantages of qualitative interviews as:

- They allow free interaction between the interviewer and the interviewee.
- They allow opportunities for clarification so that relevant data is captured.
- They maximise description and discovery.
- They offer researchers access to people’s ideas, thoughts and memories in their own words, rather than in the words of the researcher

3.4 Exploratory and Descriptive Research

According to Sekaran and Bougie (2011), explorative studies are undertaken to better comprehend the nature of the problem since very few, if any, studies might have to be undertaken to get a handle on the situation and understand the phenomenon. In this study, the opinions of employees regarding the CSF of the BI systems at Crickmay were explored using semi-structured interviews.

Although research has been conducted on CSF's in BI, Crickmay have yet to formalise and order the CSF's of their BI Solutions.

Sekaran and Bougie (2011), state that descriptive research is undertaken in order to ascertain and be able to describe the characteristics of the variables of interest in a situation. For the purpose of this study, descriptive research was used to obtain a picture of employee's opinions of the critical areas of importance of the BI systems with a view to improving the value that can be derived from the solutions.

3.5 Population and Sample

Given the research objective to determine the CSF for Crickmay's BI systems, the single case-study approach necessitated that the organisation be used for the research study. The target research population consisted of all employees. There are 16 permanent, active employees within Crickmay including the researcher. The unit of analysis was employee perception regarding the BI systems and the element was the employee.

3.6 Data Collection

The data collection method of semi-structured face-to-face interviews was used to collect the primary data. Interviews were conducted at Crickmay's offices in Hilton, KwaZulu-Natal. This process is discussed below.

3.6.1. Types of Data

Data can be obtained from primary and secondary sources (McNeill and Chapman, 2005).

Primary data, the only data type used in this study, is the information collected by the researcher himself/herself, on the variables being investigated in the study (Sekaran and Bougie, 2011). Primary data can be obtained from individuals, focus groups and samples of respondents specifically chosen by the researcher, in the form of interviews, questionnaires or observation (McNeill and Chapman, 2005).

In the current study primary data was collected by the researcher by conducting in-depth interviews.

3.6.2. The Data Instrument

Primary data that was used in this study was collected through the use of face-to face semi-structured interviews.

Interviews are a form of conversation, where information can be obtained through the use of open-ended questions (Du-Plooy-Cilliers, et al., 2014). Open or semi-structured interviews provide the opportunity for discussion of meaning and motives, therefore they can be used for empirical application within a sociological and psychological setting (Flick, et al., 2004). Therefore, a semi- structured face-to-face interview was deemed appropriate for the purposes of this study

3.6.3. Internal Validity

Sekaran and Bougie (2011) state that internal validity refers to the degree of our confidence in the causal effects and other relationships within the data that allow the researcher to draw accurate conclusions.

The study needs to indicate measures taken to eliminate other possible explanations for the interview results. The interview questions were independently presented to both internal and external professionals to gauge their understanding of the questions so that amendments could be made to ensure that the participants were able to understand questions. This suggests that the internal validity can be assumed to apply to the respondents in the study.

3.7 Instrument Development and Administration

Primary information was obtained for this study through the use of a semi-structured interview schedule (Appendix 2).

The interview questions were tested for validity and to ensure that no ambiguity existed. Two people were asked all questions, the first was a BI professional that does not work at Crickmay, the second was a non-BI professional.

The interviews were administered face-to-face where possible. Two interviews were conducted telephonically as the respondents were located in Johannesburg. This proved to be the most cost effective, relevant method to obtain information for the study. Ethical clearance was obtained prior to commencement of interviews (Appendix 3).

The interview schedule which was constructed for the research was designed with 19 questions that fell into three categories. According to Yeoh, et al. (2008) CSFs can be categorised into numerous sections, the three relevant ones used in this research were People, Process and Technical.

- Category One: Technical Perspective
 - How do you define BI?
 - Can you describe our BI systems to me?
 - What are the main objectives of our BI solutions?
 - How would you define a successful BI system for us?
 - How would you define an unsuccessful BI system?
 - Are the currently deployed solutions easy to use?
 - How reliable and consistent is the BI solution?
 - Reporting can be grouped into alerting, flat reports, OLAP reports.
Which of these types of reporting are more relevant for Crickmay?
 - If you could wave a wand, what would the ideal system look like/do/be?

- Category Two: Process Perspective
 - How are requirements gathered?
 - How do we ensure Data accuracy?
 - What are the best methods for collecting data? Are some methods of data collection better than others?
 - What is the best way to harvest/surface insights?
- Category Three: People Perspective
 - To what extent do our BI systems contribute to our company's performance? Elaborate
 - What issue will you clarify to truly move your business forward?
 - What is the best way to make recommendations/give feedback to business/clients?
 - Are assumptions made for clients based on internally prevalent skill sets?
 - What skill sets do our people lack from a BI perspective?
- The final questions responses would fall into all three categories
 - Are there any other factors you feel to be important?

All interviews were recorded so as to mitigate the disruption that note taking by the researcher would have on the discussion. The permission of the respondent was obtained prior to the recordings taking place.

Respondents were provided with a confidentiality agreement and asked to complete formal consent form prior to the interview (Appendix 1). The consent form is an agreement by the respondent to take part in the interview and gave the interviewee the opportunity to withdraw at any time, should they choose to do so. It also provided permission for the interviews to be recorded.

The funnelling technique is described as the method whereby interviewers focus on newly introduced concepts that originate from the respondents during the semi-structured interview. The purpose of this is to explore concepts further and explain the new points of interest in greater detail (Sekaran and Bougie, 2011).

As recommended by du-Plooy, et al. (2014) when developing the semi-structured interview guide the following should be taken into account:

- Language devoid of jargon and complexity was avoided to ensure no misunderstandings.
- Questions that were able to solicit broad ranges of responses were asked and, based on the answers, focus was placed where new or relevant concepts that were identified.
- Rapport was established with interviewees prior to the predefined questions being asked. This resulted in an open discussion rather than a formal question and response interview.
- Open-ended questions were asked to eliminate researcher bias. Answers that were a true reflection of the respondent's reality was the main goal.
- The studies focus was communicated to interviewees from the outset, so that they were able to identify the context in which the questions that were being asked were from.

Du-Plooy, et al. (2014) state that the key to good interviewing, is effective listening. Every attempt was made to identify underlying subtext, (Du-Plooy-Cilliers, et al., 2014), and where relevant this was further explored. Unclear responses were probed further so that further clarity could be obtained from respondents (Sekaran and Bougie, 2011).

A drawback of interviews is the possibility that respondents withhold their true thoughts out of fear of being perceived as being ignorant or being persecuted because of their perspectives, and as a result are guarded in their responses. Although every effort was made to assure interviewees of confidentiality as well as

the notion that no answer was wrong, some respondents were still cautious. That impacted slightly on the quality of the data collected.

An advantage to the method of interviewing is that the researcher has the potential to direct the discussion when both verbal and non-verbal cues present themselves during the interview. Another advantage is that respondents have an opportunity to elaborate on their responses which would provide more information. This phenomenon would enhance the quality of the study.

Interviews were held from the 5th of August 2015 to the 22nd of September 2015. They were conducted during working hours with the two telephonic interviews being conducted directly after five o'clock in the afternoon. Interviews were held in the main board room of Crickmay. Interviews were between twenty and forty minutes in length. All respondents gave of their time willingly and the study was graciously given permission to be conducted by the companies' directors.

3.8 Data Analysis

Thematic analysis was used to analyse the data for this study. The objective of thematic analysis is to provide a method to identify, analyse and uncover patterns or themes within data (Braun and Clarke, 2006).

A theme captures important aspects of the data on hand, in relation to the research question. It is a representation of either a pattern or meaning, within a data set (Braun and Clarke, 2006).

The thematic analysis conducted for this study followed the six phases below, as suggested by Braun and Clarke (2006):

Phase 1: Familiarising yourself with your data

In phase one, a thorough familiarisation with the data is required. Sekaran and Bougie (2011), state the benefit of the researcher familiarising themselves with the data, improves the ability to recognise patterns and connections, and helps with the organisation of the data.

In this study, once the recorded interviews were transcribed, the researcher then listed to each interview again in conjunction with the transcript. In this phase pertinent concepts and ideas that were made in relation to the study were noted.

Phase 2: Generating Initial Codes

Phase two involved coding. A code is used to identify units of text by using a single label, the label is then later be grouped into themes. Sekaran and Bougie (2011) refer to this phase as data reduction. A number of codes were created in order to identify themes for the next phase.

Phase 3: Search for Themes

Phase 3 requires the revaluation of the data to identify themes. Analysing codes determines if they can be combined to form a theme. Visual representations are useful at this stage (Braun and Clarke, 2006). Themes for this study were mapped out and listed using visual representations.

Phase 4: Reviewing themes

In the fourth phase themes are refined. Themes that are irrelevant are excluded, similar themes are combined and other themes are divided into separate themes. Braun and Clarke (2006), describe the two level process of refining themes. At the first level, the researcher needs to review and consider whether all collated data extracts for a particular theme flow and provide a coherent pattern. At this stage there might be possible rework of themes. At the second level, consideration needs to be given as to whether individual themes are valid in relation to the entire data set.

Phase 5: Define and name the themes

The fifth phase involved defining each theme and completing an analysis of each theme. Braun and Clarke (2006), recommend that consideration is given for each themes fit in relation to the research question.

Complex themes are subdivided into sub-themes. Sub-themes that are identified are discussed. Direct quotations from respondents are presented in Chapter 4, in order to lend support to the themes and sub-themes identified in this study.

Phase 6: Producing the report

The final phase was the summarisation and collation of the findings into an academic report.

3.9 Ethical Considerations

After the respondents agreed to participate, informed consent was first sought from them. This was achieved by presenting the participants informed consent notices of participation that stated that interviews were being recorded and asking them to sign in order to obtain their consent.

3.10 Summary

The chapter provides a broad view of the methodologies and approaches necessary to design a research methodology. The practical measures applied in order to obtain answers to the key research questions was also presented.

An overview of the appropriate methodologies was discussed, listing the common characteristics of various methodologies, and eventually filtering these to select the most adept methodology available to the researcher. The characteristics of the data collection method, in this case interviews, was also discussed, looking specifically at the advantages of this approach, and constructing elements which provided additional validity to this approach.

In this chapter the data analysis method for the research problem under study were outlined. The interview responses was analysed using the thematic content analysis method. Hence, the credibility of the research design was established and the findings of the study generated for presentation in the next chapter.

The next chapter (Chapter 4) presents a summary of the findings of the interview information gathered and presents an analysis of this data in an attempt to answer the key research questions.

Chapter 4: Results

4.1 Introduction

In this chapter the responses of the participants to the semi-structured questions asked in the interviews are presented. The discussion of the individual responses takes excerpts from the interview data. In conclusion a summary of the findings is presented.

4.2 Summary of Interview Metrics

Fifteen people were interviewed and 7 hours and 15 minutes of interview data was recorded. The mean interview duration was 29 minutes, the maximum was 39 and the minimum was 21 minutes.

	Age	Years' Service	Department	Gender
Respondent 1	27	1 Year 5 Months	Operations	Male
Respondent 2	31	3 Years 8 Months	Finance	Female
Respondent 3	43	2 Years 11 Months	Finance	Male
Respondent 4	59	15 Years 11 Months	Administration	Female
Respondent 5	49	2 Years 11 Months	Finance	Male
Respondent 6	38	15 Years 0 Months	Management	Male
Respondent 7	27	1 Year 2 Months	Finance	Male
Respondent 8	40	10 Years 10 Months	Administration	Female
Respondent 9	30	4 Years 3 Months	Operations	Male
Respondent 10	29	6 Years 0 Months	Operations	Male
Respondent 11	34	8 Years 5 Months	Business Intelligence	Female
Respondent 12	53	3 Years 0 Months	Management	Male
Respondent 13	46	20 Years 0 Months	Management	Female
Respondent 14	24	10 Months	Operations	Male
Respondent 15	31	5 Years 3 Months	Operations	Male

Table 4.1 Respondent Demographic Information

The volume of data collected is measured by the word count of each interview. The total number of words captured was 6,858 words. The mean was 457 words. The maximum was 1,162 words and the minimum was 276 words.

Figure 4.1 below depicts the interview data by duration and number of words per respondent.

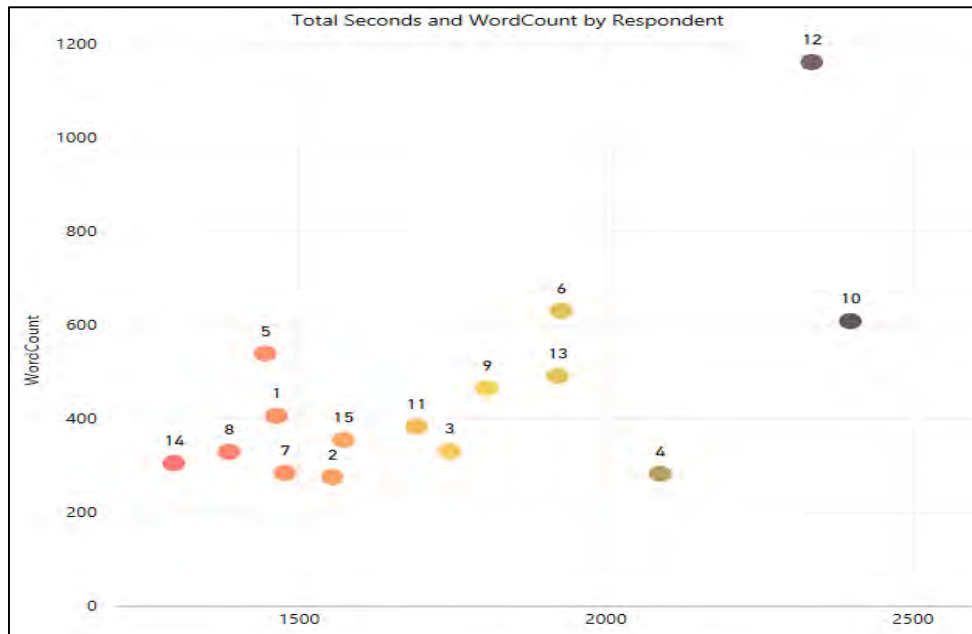


Figure 4.1 Interview Duration and Word Volume

Figure 4.2 below depicts the total number of words for each response per question asked.

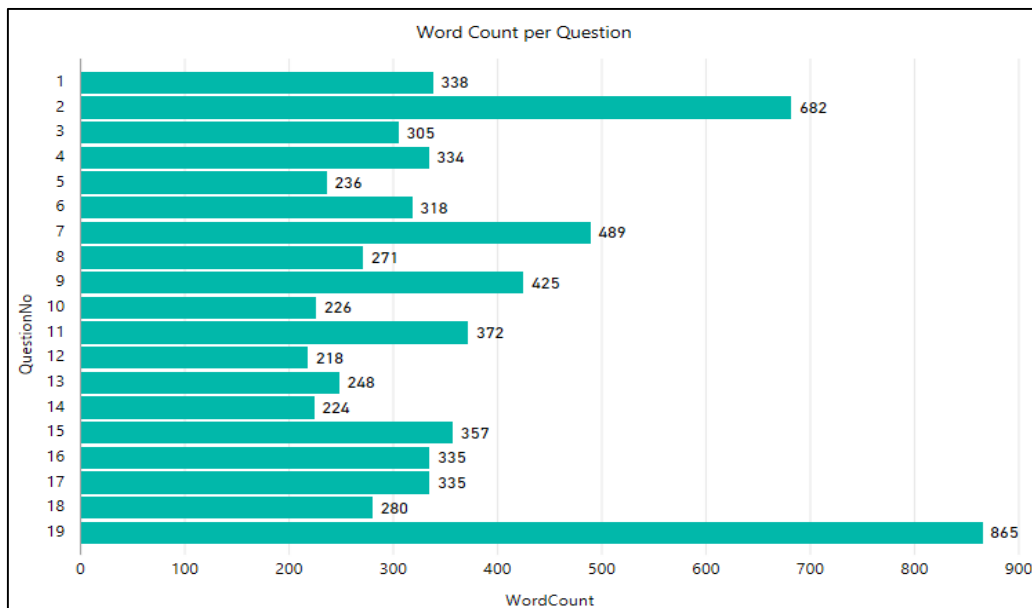


Figure 4.2 Word Count per question posed

The two figures presented above have been provided for informational purposes. The details are however significant to the analysis of the data they do provide a context to the study in that it demonstrates the commitment shown by the respondents to answer each question fully.

4.3 Analysis of the Research Data

The section below discusses the themes and sub themes that emerged after analysing the responses received during the interviews. The themes and sub themes have been summarised as:

Theme	Sub-Theme
4.3.1 Value Delivery	
4.3.2 Successful System Characteristics	4.3.2.1 Simplicity
	4.3.2.2 Stability
	4.3.2.3 Reliability
	4.3.2.4 Applicability
	4.3.2.5 Modifiability
	4.3.2.6 Usability
4.3.3 Failure Indicators	4.3.3.1 Mistrust
	4.3.3.2 Complicated
	4.3.3.3 Lack of value
	4.3.3.4 Volatility
	4.3.3.5 Detachment
4.3.4 Current System Shortcomings	4.3.4.1 Data Quality Validation
4.3.5 System Enhancements	4.3.5.1 Requirement and Data Collection
	4.3.5.2 Reports and Reporting
4.3.6 Customer Dimension	
4.3.7 Employee Dimension	4.3.7.1 Technical Competencies
4.3.8 Strategic Considerations	4.3.8.1 Process Development
	4.3.8.2 Knowledge Management

Table 4.2 Themes and Sub Themes Identified

4.3.1 Value Delivery

The importance of Crickmay's BI systems to the company's performance was stated over and over as being an integral part and contributor to what services and value are offered. In line with objective one, determining what the main contributors are to improving the BI value proposition, the following responses provide numerous insights.

"Hugely. The whole company relies on our systems." and *"Very important, it is what we do"* as well as *"Without our systems we wouldn't exist. It is what we do"*. And lastly *"Substantially, integral to what we do."*

A number of interviewees felt compelled to add a percentage to their response, *"100%. Everything is a system."* and *"Crucial, critical 100% of what we do"* and *"Wouldn't be able to do what we do. 100% dependant on the data that is there"* and finally, *"70% communications that we have with clients is based on what we find in the data. 30% is based on business networks/relationships"*

Other responses made the argument that it was the combination of the people and the BI systems that contributed to value add, *"People and system need to be a single entity"* and *"Performance is due to the combination of the systems and people."*

The objectives of Crickmay's BI solutions were articulated in many ways. Improving a client's operations through time saving, business performance enhancing and improving operational line-of-sight was a common theme.

- *Provide a picture to each client. Current situation and how to improve.*
- *Save time, improve accuracy and reduce checking.*
- *To help you to be more productive, help you to achieve your KPI's*
- *Business improvement*
- *Process management.*
- *Create awareness around issues that clients did not know about.*
- *To improve profitability, performance and productivity.*
- *Sustainability of the clients.*
- *Automating processes and raising the visibility of operations within a client's company.*

Other responses looked at systems from a more generalised view point and said, *“Give out accurate and reliable information”, “Deliver BI in a way that they can consume it.”* And *“Efficiency in processing of information.”*

The comment that summarised most responses was, *“Some companies operate in siloes but our systems are able to span across those divides. Provide a centralised information repository to promote transparency across the clients business. Break the walls down, create a culture of collaboration and information sharing”.*

In summary, and in line with the objective of determining what the main contributors are to improving the BI value proposition for Crickmay, Vesset (2012) stated that affecting business process improvements, productivity and cost containment, a positive impact on an organisations competitiveness can be achieved. The responses of the interviewees agree with this statement.

4.3.2 Successful System Characteristics

Objective two of this research looked to find CSF for a BI system. The responses to questions that uncovered the characteristics of success in a BI solution were collated. The list of characteristics of a successful system are grouped into the following sub-themes:

Simplicity

- *Something Simple.*
- *Simple that the lowest level employee can answer questions.*
- *Simple enough that anyone with training can get information.*
- *Systems must be user friendly*

Stability

- *Accurate, user friendly.*
- *Easy to use, reliable, stable, accurate.*
- *Must deliver consistent outputs.*

Reliability

- *Reliable info and saved time and gave accurate reports.*
- *Reliable without any doubt.*

Applicability

- *A system that is relevant to different levels of a system.*
- *When people start to rely on the information that the system produces.*
- *Meeting and exceeding the requirements of a client.*
- *Reducing administrative time.*

Modifiability

- *See reports by different dimensions.*
- *Expand easily, build onto it as your needs change.*
- *Business needs change and so must your reporting needs change along with it.*

Usability

- *A working system that works for everyone.*
- *One that is used by the client as a first port of call.*
- *One that gets used.*
- *Usage and ongoing usage.*
- *Cater to all users.*
- *Gives user what they want.*
- *A client not having to search for information, what you need when you need it.*
- *Client must get value and they must be happy to part with their money.*

The literature provided numerous, broadly defined, success factors that encompassed all three elements that make up the BI framework, People, Process and Technology. The interviews in this research too focused on the pre and post-implementation success factors. The sub-themes of, Simplicity, Stability, Reliability, Applicability, Modifiability and Usability were uncovered.

4.3.3 Failure Indicators

The list of success inhibitors would be used to evaluate if current and future system implementations were starting to experience a negative decline. The identified inhibitors related to answering research question three, what makes a BI system unsuccessful?

Mistrust

- *Questioning the information*
- *Inconsistent*
- *Can't rely on the data*
- *Not reliable and required checking*
- *Inaccurate data*
- *One that doesn't work. Reports that give errors.*

Complicated

- *Time consuming*
- *Over complicated*
- *Steps to get the data are too complicated then people lose interest*
- *Cascading parameters were cumbersome*
- *A Boring report with too much data does not work*

Lack of value

- *Costs money.*
- *The symptom of it being unsuccessful is that it is not used.*
- *Not producing intelligence but rather producing data. Dumping.*
- *A system that is not positioned correctly, but tells a great story, is an unsuccessful one.*
- *Presenting something that is not needed, not listening to what is required and is costing clients' money.*

Volatility

- *Bombs on you all the time.*
- *Not up, not working, not available.*

Detachment

- *Not integrated into operations.*
- *When you don't have the bigger picture.*
- *Not getting you what you want. Lots of promises but actual implementation something else.*

The responses that uncovered what makes a BI system unsuccessful, showed the impact that an individual's perception of a system can have on their adoption of the system. Mistrust, Complicated, Lack of Value, Volatility and Detachment are avoidable. Early identification of these failure inhibitors is possible and can be intercepted at their first surfacing. Intervention and mitigation processes should be developed to combat these issues.

4.3.4 Current System Shortcomings

Research objective three looked to identify the main problems that Crickmay is experiencing with their systems.

Interviewees described the systems as *“Complicated, chunks of systems”* that *“did not talk to each other”*. One interviewee explained that the systems are not fully delivering on their promise of BI in that they said, *“We don’t give as much information as is possible to both ourselves and our clients.”*

Another point of view explained that there was a level of frustration toward the systems as they were, *“Ridged and fixed systems that cannot be manipulated.”*

The fact that the systems are dependent on sources of external data that are outside the control of the systems do negatively impact the systems. *“Bandwidth and Internet in African countries is not always great, thus the user experience is not great.”* They went on to explain, *“Although we can’t always control all inputs, the quality of our systems depends on our ability to do so.”*

The sentiment above holds true when understanding what was meant by, *“...it goes down too often. Infrastructure is not reliable.”*

The responses mostly took on an agreeable tone when referring to the ease of use of the existing solutions. However nearly every response had a “But” clause.

Not all interviewees said that they use the current platform. They sighted different reasons for their lack use. *“It is easy to use. Using is not the issue, accessing it is.”*

This was again stated as, *“It is easy to use, but infrastructure does strangle the ability to use it”*. Even respondents that were not heavily invested in the use of the systems mentioned the geolocation limitations, *“I don’t know. Use is dependent on geography. It gets the job done. Does it get the job done easily?”*

One respondent mentioned that the use of the system was closely related to how it was being supported from a technical perspective when bugs were found. They said the intermittent unreliability of the systems reflected poorly on the company and the people involved in the system. They went on to say, *“The tool does offer more solutions than problems, but there is always something strange happening.”*

The more indifferent definitions of the current BI systems described them as *“Our BI systems largely remain in the space of snapshots, ‘how are we doing’ type of reports.”* A response that explained that only the E-Mailing of Reports module is used to add value. They said, *“Clients do not log into our systems. They mostly get reports emailed to them.”*

Some argued that the current platforms are limiting their ability to consume the information that is contained within the databases, they said, *“Current systems don’t allow for the extraction of raw data, they are limiting”*. One Interviewee mentioned that Crickmay would benefit from an increase in innovation. They explained, *“Our systems need to change. We cannot report like we did 5 years ago. We need to evolve.”*

A point that was made that needed to be mentioned was, *“We don’t use the tool to manage our business internally.”*

Comments that suggested other shortcomings:

- *If you don’t use it yourself, then how can you expect your clients to use it?*
- *Reports require loads of human intervention. Should be automated.*
- *Online takes 10 minutes to get one report.*
- *Systems are very generic and need to be geared toward each user profile.*
- *To be unconstrained by technical/programmatical limitations.*

4.3.4.1 Data Quality Validation

Respondents were at pains to stress that Data Accuracy was an area that needed attention. Responses ranged from *“We don’t do enough to ensure data accuracy.”* to *“We don’t know if the data is accurate. Just assume that it is right because it exists”*

“Our biggest enemy. Checks and double checks, we tell clients that we do data validation, but we don’t really. Data clean-ups is an area that we must improve on. The product guys need more information to be able to check what is occurring without needing to unpack the code” was said.

In conjunction with physical data values, data accuracy is also determined by the business rules that are applied to data. When discussing these rules respondents said the following, *“Internal users don’t know the business rules that are generating the end data.”* and *“Don’t know. There are rules but I don’t know them.”*

A reliance on industry knowledge and experience was mentioned as a means to ensure data accuracy. It was said that, *“The fact that we have access to the most granular data is a mitigating step and provides a certain level of accuracy. There is a dependency on our intellectual property to ensure the data is correct.”*

One particularly interesting point that was raised was, *“Validation rules are stumbled on through tenure at business. The Business layer needs to be extracted from the database layer.”* The main take away from this response was the need for Crickmay employees to possess an ability to read programming code, a skill that was not practically possible or necessary for employees to possess.

Ultimately the following responses summarised where the company was currently positioned to ensure data accuracy, *“We are not good at it. We don’t know where to start. We do the rudimentary type of formatting checks but fall short of doing data quality checks. We are sorely lacking in this area.”*

In summary, research objective three aims to identify the main problems that Crickmay are experiencing with their systems. Issues fall into categories that are within the control of the business and issues that fall outside the areas that Crickmay have jurisdiction of control in.

Where they fall outside, the speed of response and reduction of service interruption time can be improved. The issues that fall within the control of Crickmay will be discussed in chapter five.

4.3.5 System Enhancements

Respondents mentioned that the system was mostly one that ran at a level that did not frustrate or handicap any client in particular, but they all tended to make mention of some sort of improvement or enhancement that would increase the systems dependability.

When asked about the systems baseline performance answers such as, *“70% in terms of reliability. Efficiency can always be improved”*, *“80%. Script/Business rules*

are sometimes inaccurate.” And “78%-80%. We hold a market position without any competition”, gave the impression that employees were not entirely convinced that the current systems were a finished product.

Responses continued in this manner, *“Reasonably solid. Robust”, others said “It has holes as any application would have.” And lastly, “Fairly reliable. There are off the shelf benefits. Legacy mistakes are still making it difficult to improve the reporting.”*

It was explained that one of the inconsistencies in the system as, *“Working in large industries we seem to be forced to use a single paintbrush to explain very different things. To be more accurate we need to deal with things on a case by case basis.”*

Other responses mentioned they would like an improvement in the platforms ability to give them access to all the underlying information.

- *Improve access to data.*
- *Improve data extraction from clients operations.*
- *Having the flexibility/blank canvas.*
- *True self-service BI. People that are able to design reports that can deliver results. Not trying to pre-empt every question.*

There were a number of succinct points raised that answered what most interviewees wanted to enhance in the system.

- *Accurate, simple to use, friendly user interface.*
- *Give us a view into the industry to identify possible markets.*
- *A system that will mitigate procedural risk.*
- *The best system that is less reliant on hard coding of solutions to get to a result.*
- *Monitor, evaluate, and investigate.*
- *The ability to work remotely.*
- *Mobility across platforms.*
- *A mobile first system. Must be a human first system.*

There were three responses that tried to encompass the “total and perfect” system. The first was, *“Get the data right. The system runs. Never gives errors. Runs with confidence. Minimal downtime. Stable.”* The Second one said, *“Totally intuitive to*

interact with. Represents the clients business very simply. It might be complicated but is represented simply. A system that can present the health of my business on one page is awesome.” The third one said, *“I want to be able to drill down through the metrics. It must be near time. Must have an indication as to how old the data is. It should look sexy, but with a balance between form and substance. Simplicity of presentation is important.”*

Requirement and Data Collection

The evolution of the different methods that had been used for requirements gathering was rather comically explained as, *“In the past it was death by documentation. But now it is relationship building. Spending time with clients gives you an insight into what they need and want.”*

“We start with a user requirement document, identify key requirements, mock-up reports. Asking why we are delivering this and not what are we delivering. It is not up to the client to innovate, it is up to us. Tell me what your report should be telling you. What are you trying to manage?” was a description of the goals for requirements gathering. This process ensures that the client’s needs are continually at the front of mind during the process.

This point was echoed in, *“Through a consultative process. Using a frame of reference. Our existing knowledge is our template.”* and *“If you don’t go see clients then you won’t know/pickup on their needs.”*

A pertinent point that was raised mentioned that requirements are mainly gathered at the initial stages of the system implementation and Crickmay was potentially missing improving on what is currently deployed at client sites, *“We get it working sometimes and don’t look at improvements.”*

Interviewees drew from their experience within their current role and listed the data collection methods that are currently employed. The responses highlighted one very important point, the less human intervention there was in the data collection process the more accurate and dependable the method was considered.

Respondents that did list the methods mostly ranked them by:

1. Web Service
2. Directly off a Database
3. FTP (File Transfer Protocol). Receiving CSV (Comma Separated Values) files.
4. Spreadsheets received via Email.
5. Face-to-Face/Telephonically.

The most pragmatic response mentioned that business needs determine the decision, *“Every method has a positive and negative. The real issue is about choosing the most appropriate one.”*

Reports and Reporting

When looking at the application of different reporting channels from Crickmay's client's perspective they said, *“Clients need flat reports and alerts, mainly because they do not have the ability to investigate further by logging into a system.”*

Choosing the correct reporting channel was also dependant on the manner that the client was able to consume the information, *“Dependant on who the user is. SMS is enough for operators, for higher level managers it is a split between all three types.”* This was again echoed in the statement, *“Depends on the instrument that the client has on their end.”*

Improving on how information is distributed and adding to the types of reports produced was mentioned in many responses. Respondents said, *“There is a demand for forecasting.”* Added to that they wanted, *“Predictive modelling”*.

The majority of respondents tended to initially communicate, *“It depends on the circumstances.”* and took the “Fit for purpose” stance. When pressed for more to their answer and given time to think about the different applications for each reporting channel the interviewees provided some valid points.

The need for detailed, well formatted professionally presented flat reports was the most common theme. *"The days of online reporting are gone. The report distributor is the way forward."* was said.

- *Externally flat reports.*
- *Flat reports are the most relevant.*
- *Flat reports are important.*
- *Static reports are most relevant.*
- *Emailed reports first.*
- *The emailed flat reports.*
- *Summary weekly/monthly more relevant than SMS's.*

Alerting was next in the order of relevance.

- *Alerts on an (business) exception.*
- *SMS's is the quickest way to get information across.*
- *Mobile is the most effective.*
- *On the tactical end it is the alerts.*

OLAP reporting was mentioned as a tool that would better serve the reporting needs of Crickmay's employees, not the clients, to find information. *"Internally moving toward the OLAP level reporting"* and *"Internally OLAP."* The flat reports were described as the "sign-post" reports to give an indication of where focus should be placed. Then the OLAP reports find a place to add value. They said, *"We get to the strategic information through the tactical/operational information. On the strategic side it must be as dynamic as possible."*

The answer that also posed an interesting perspective was the one that mentioned that knowing what and when not to report is important, *"Too much information is thrown at people. Information overload. Must be very clear as to what you send to people. Simple is best. Alerts are a great way to report. Flat reports are fine. A single report sent every month with loads of info. Very few people log onto the web."*

Crickmay should focus on content and not presentation of information. *“The BI industry has plenty of people that spend their time presenting data in a pretty way.”* was said.

4.3.4 Customer Dimension

To remove any doubt as to where Crickmay should position itself in relation to their clients the following was said, *“We are here to run our clients companies/departments of their business. We need to help them shift. We don’t have any clients who outsource their business to us, so from that perspective we are not here to do their job. But if we don’t run a stress test they will never get there. At the moment we have guys on the ground whose main focus is the deliverable; achieving operational efficiency in the client’s value chain. We are involved. Previously we provided information and the client could do what they wanted to do with it. That is what we should not do anymore.”*

It was said, *“There was a time when Crickmay tried to push systems, reports or information at people. The client must tell us what they need/want otherwise you will miss the mark and harm the relationship.”*

A response that articulated the position that Crickmay holds with their clients stated, *“We sit in a privileged position sometimes. We can ask difficult questions that other suppliers cannot. We are independent and have earned the right to ask difficult questions. Trust is earned.”*

Knowing where to position oneself in relation to the delivery of value from BI systems at a client is important. Responses alluded that Crickmay made assumptions for clients. Interview responses stated, *“We present data in a manner that we think is appropriate.”* also mentioned, *“Clients are choosing to take our product because of the advice, ease of doing business with our people.”*

The active management of developing relationships with clients was mentioned, *“We don’t spend enough time with the clients to understand how they interpret their data. Not all people like graphs, not all people need stats. Not all people like tables.”*

Adding to this one respondent said that Crickmay tends to develop reports for internal consumption first, *“Are our needs overriding our client’s needs? Clients don’t*

always speak the same language. What does efficiency mean? Our internal language might not translate to our clients."

An answer that was noted was, *"We are being paid to be able to tell clients what is happening with their business. Clients are paying us to help them. Must have the expert next to the report to explain it."* The importance of the individual that is presenting the data to the client was raised.

The previous point made mention of the Crickmay employees relevance in the delivery of information to the customer, this was elevated in the next comment from the individual to the company level, but still maintained the same theme, *"Yes. People outside your business should tell you what is happening in your business. In the thick of things it is not easy to see different perspectives. We are partners that are adding value in a specific area."*

The response that specifically dealt with the issue of where the client's expertise end and the skill set of the Crickmay employee begin said, *"Wouldn't expect a farmer to pick up on outbound distribution issues, but would expect them to know about farming. Need one person to understand the entire business."* They went on to mention the importance of *"Niche Generalists"*, those people that bridge the gap between technology and business, *"Specialist Generalists. Niche generalists are unique in today's drive to find new markets"*

Interviewees highlighted the importance of customer interaction. The relevance of this point was strongly presented in the following responses.

The answers that made reference to the importance of personal meetings with clients were the following:

- *Call the client and arrange a face-to-face meeting.*
- *Best way to make recommendations is to talk.*
- *Go and see them!*
- *Firm believer of speaking to clients to build a relationship. Be proactive, ask how things are operating.*

- *Face-to-Face is the best way. Must have something to reference when discussing with a client.*
- *We have traditionally been bad at being agile to respond to changing needs. We need to interact with our clients.*

Respondents spoke of the importance of preparing the client for the discussions that are going to take place, setting the context of the meeting first. They said that, *“Clients are not always on top of their business.”* This response highlighted the fact that Crickmay was ultimately partnering with the client to improve the efficiency and effectiveness of their business. Thus, the value that can be added is to present the client with scenarios and action plans that they might not have considered either through a shortage of time or a lack of skills.

When giving feedback to clients it was mentioned that having the correct audience at the client is important, *“There are a finite number of ways to show certain types of data. You can tell the world what is happening but if you don’t have the authority you are actually not able to action anything.”*

The best way to give feedback to clients was described as, *“Give the right information at the right time. Making sure the client is adequately prepped to receive information that they can interpret that leaves them with the positive perception of the value we offer. Give them information to act on now.”*

4.3.5 Employee Dimension

When describing the current BI systems most respondents made mention of the human element of the existing solutions. Something that was stressed quite verbosely was the importance of the Crickmay employee in delivering value.

They explained, *“What we do very well and uniquely, given our knowledge in and of particular industry sectors and elements of those value chains in those sectors, make it meaningful and insightful.”* And *“Using the knowledge we hold internally in addition with the client’s data.”* To remove any doubt as to the importance of the input from Crickmay staff one response was, *“System value is in the relationships that are being built with clients.”*

In looking at the value offered by employees, the point was made that there is room for improvement, *“There are some aspects of our BI that we don’t get to the right places. Strategic information does not always get to the board/executive teams of our clients. We are operational people. We need to elevate that to be able to add more strategic value. We need to harmonise between the strategic and operational.”*

Knowing where employees fit in the current systems value proposition was succinctly explained in the following manner, *“We are not miners and cannot tell miners how to mine, but we can tell them what to do with their data”*

Whilst one respondent again mentioned that the businesses people were the reason that Crickmay performed well, *“More the people that make our business perform well”*

“The Report generator knows what to look at, report receiver does not always know where to look.” This statement stressed the point that the person that is presenting the data is as important to the communication as the actual data is.

One answer spanned the responses mentioned above, *“Systems is what we sell, but the people behind it drive the success of the system”*

Technical Competencies

A pressing issues that employees would have addressed was increasing the internal BI skill set of employees. The lack of internal technical skill sets was a theme that appeared in numerous answers of interviewees.

- *Big gap between technical and operational people*
- *The company has too few technical BI people.*
- *Not enough IT people*
- *Technical knowledge is lacking. With more understanding of how our systems are built allows for better service.*

In the same theme the following was said, *“Client facing people don’t always know what needs to be done to achieve a result. Internal skill set doesn’t know the*

business enough to know when they are going down the wrong road. There is a gap that needs to be filled."

A perspective that was raised was one that made mention of "Purple People." This term was described by the respondent as, *"Purple people are those that straddle the divide between technical and business issues."*

A summary that was given stated, *"We lack understanding of what true BI is. We lack knowledge of what is possible. We lack a keen understanding of what we serve up to our clients when. We have to build up our skill set in the more specific/technical areas of delivering value to clients."*

4.3.6 Strategic Considerations

Objective four looked to develop a BI strategy that is aligned to Crickmay's future business objectives.

To move the business forward respondents mentioned that the use of multiple distribution channels should be made more widely attainable, *"Mobility. We always focus on historical data but we need to move to a more real time, actionable data platform. We want to prevent disasters from occurring rather than knowing why they happened."* The ability to answer the question, *"What is happening in the business now?"* is considered a definite area of future focus to enhance the Crickmay value proposition.

Employees wanted to, *"Improve the collection of data and make the business more mobile"*. They stated, *"Our business is about optimising value chains. As we move into a new space we need to be aware of the needs. If we are able to tap into the needs of one industry using the industry knowledge we hold from another it will accelerate our growth into that sector."* Market Intelligence was another term used that would help to move the business forward.

- *We will have to improve systems if we grow.*
- *We need to move into strategic BI. We need to get into the boardroom.*
- *We have a goal to do X and not sure if everybody is aware of what we are trying to achieve.*

Others looked at processing from the clients side as a potential improvement point, *“Information processing/distilling and disseminating is where the opportunity lies for us.”*

“We don’t have to be cutting edge, we don’t have to be market leaders, all that we have to do is influence the clients business result in a positive way at the end of the day.”

Knowledge Management

The other theme that surfaced was the lack of knowledge sharing, in that people said, *“We don’t really know what skills each of our colleagues have.”* And *“We can work closer together and skill each other up.”*

Interviewees wanted to learn more about their business. They were interested in each other’s work and wanted to know who was responsible for which area of the company. They also wanted to be made aware of what direction the business was heading in.

- *Unsure what other departments/business units do*
- *Service/Admin staff needs to be able to get a better understanding of the “on-the-ground” operations*
- *We help our clients to build communication channels in their business but don’t do so in ours.*
- *Knowledge Management is something that needs to happen.*
- *Would like an improvement in knowledge sharing.*
- *Knowledge management is a problem because I am not aware of what the culture is.*

- *Knowing who is responsible for every part of the business. If there is an error then an email is sent to numerous people in the hope that one of them are the responsible ones for the specified error.*
- *Communication within the office is not great. Information session to show people what has been done, what is being done and how to do it.*
- *Would like to know what people are doing on an ongoing basis. Know what the goals are.*

Process Development

Every business has a finite number of levers that can be pulled for the effective running of that business. It is knowing what is going on with those levers. I want to know that the information that pertains to each lever is built off reliable, thick, accurate data.

In defining the process of harvesting insights one respondent mentioned that the users experience is an important attribute to be able to see what others have not. They then said that those without the experience would still be able to surface insights, provided they has a willingness to understand the data first. They said, *“Some will glaze over and others will be excited about it”*

Certain respondents found that the current internal processes in the business lacked a polished solution. *“A reduction in human intervention.”* was said. *“Integrate automatically to sources of data instead of having to call for the figures.”* was an issue

BI system need to be built around business rules. Most people have no idea about the business rules that are implemented. We need to know how our data is made into information.

Interviewees raised three points. Firstly, Data Availability, secondly time to be able to work with the data, and lastly Collaboration.

One respondent said, *“Sit and look at the raw data. Play with the data and see what you find. Listen to your client and find out what they are trying to understand.”*

They went on to say, *“To surface new insights you need to compare disparate data sets”*. This statement is especially relevant to data availability. Simply looking at a set of data that resides in the confines of the database is no longer a barrier to insights. Users want to be able to see how one set of information might be influenced by an unrelated set of information through common base lines.

They also wanted a reduction in the number of steps required to process data so that they would be able to, *“Give the directors what they want in a single step.”*

Having the data as well as the time to do an interrogation of the information was summarised as, *“I need to have complete access to all the data when I want it. Must be in the right frame of mind with the correct focus to be able to do the analysis.”* Another interviewee echoed this by saying, *“Scrutinise the data to see what potential exists. And then discuss.”*

The ability to collaborate with clients and other employees was a theme that came up in most responses. After finding anomalies in information it might not always be apparent as to the factors that are influencing the outcome, thus, *“Asking questions of the outliers gives a direction to look.”*

“Our strength is in gathering data and making sense of it. What the information is saying is more important than how the information is presented.”

“It comes down to what is our core reason for being for our clients? We are focused on operational efficiency. We must keep that in mind with what we build.”

4.4 Conclusion

Chapter four focused on and discussed the results of the interviews. The interviews have been presented using a qualitative, thematic analysis, research methodology. Chapter five makes recommendations and concludes the research.

Chapter 5: Recommendations and Conclusions

5.1 Introduction

This final chapter highlights the results of the Interviews as well as the relevant findings found in current literature. It makes conclusions and provides recommendations for future management considerations to ensure the continued success of Crickmay's BI Systems. In addition suggestions for further research are made.

5.2 Research Findings

This studies main objective was to uncover the factors that influenced Crickmay and Associates BI systems so as to ensure their continued success. This required determining the contributing factors that make a BI system successful, it also necessitated determining what factors played a part in stifling the delivery of value.

The study also aimed to align current and future BI implementations with the objectives of Crickmay's current strategy, which is making a positive and measured impact to the value chain of Crickmay's clients.

Assessments of the Research Objectives of the study:

5.3 Research Objective One: Determine what the main contributors are to improving the BI value proposition

5.3.1 Findings from the Literature

A positive impact on an organisation's competitiveness can be achieved by affecting business process improvements, productivity, and cost containment (Vesset, 2012).

Williams and Williams (2007) state that the value that BI delivers to business is dependent on the existence of management processes to ensure that operational processes utilise the information delivered.

Vesset (2012) mentions that 96% of the benefits are in the productivity and business process enhancement categories.

Gartner (2013) suggests that business can gain value from increasing their levels of analytic maturity, by moving from information and hindsight to optimization and foresight.

5.3.2 Findings from the Research

The objectives of Crickmay's BI solutions were articulated in many ways. Improving a client's operations through time saving, business performance enhancing and improving operational line-of-sight was a common theme.

- Provide a picture to each client. Current situation and how to improve.
- Save time, improve accuracy and reduce checking.
- To help you to be more productive, help you to achieve your KPI's
- Business improvement
- Process management.
- Create awareness around issues that clients did not know about.
- To improve profitability, performance and productivity.
- Sustainability of the clients.
- Automating processes and raising the visibility of operations within a client's company.

The comment that summarised most responses was, "Some companies operate in siloes but our systems are able to span across those divides. Provide a centralised information repository to promote transparency across the clients business. Break the walls down, create a culture of collaboration and information sharing"

5.3.3 Recommendations

As found in the literature and the responses collected, value is derived from BI systems when the people, processes and technologies make equally weighted and complimentary contributions to the design, development and delivery of intelligence.

None of the components of a BI system are able to improve the value chain in isolation.

With this knowledge, the management of the three components that contribute to value add should be managed accordingly:

- Crickmay should identify the three groups of **People** (Analysts, Users and IT staff) that will be involved in the BI solution. Understanding the required outputs they will need from the systems, must be initially understood in detail, and continually evaluated.
- **Processes** and business rules that reside within Crickmay, that govern the journey from data to information must be defined and documented and if none are apparent they must be developed.
- When looking at **Technology**, Crickmay should look to diversify the information delivery channels and platforms that are used. Both internal and external information clients need to be given broader access to the underlying data so that a culture of analysis and collaboration can be developed.

5.4 Research Objective Two: Identify the CSF for a Crickmay BI System implementation.

5.4.1 Findings from the Literature

Vodapalli (2009) lists seven success factors for the implementation of a BI project. In alphabetical order, they are:

- Business-driven methodology and project management.
- Clear vision and planning.
- Committed management support and sponsorship.
- Data management and quality.
- Mapping solutions to user requirements.

- Performance considerations of the BI system.
- Robust and expandable framework.

5.4.2 Findings from the Research

“Systems is what we sell, but the people behind it drive the success of the system” succinctly explains the critical role that the Crickmay people play in the success of the systems.

“We are being paid to be able to tell clients what is happening with their business. Clients are paying us to help them. Must have the expert next to the report to explain it.” The importance of the individual that is presenting the data to the client was raised as a success factor again.

In addition to the importance of the individual, the research uncovered six categories that describe a successful system. Simplicity, Stability, Reliability, Applicability, Modifiability and Usability. Although the themes would not ensure the success of BI solutions they are definitely perception influencers. The following questions should be continually asked of the systems:

- Is the BI system simple?
- Is the BI system stable?
- Is the BI system reliable?
- Is the BI system applicable?
- Is the BI system modifiable?
- Is the BI system usable?

Users that answer with a positive response to these questions would have had a positive experience and would also have already adopted the system. System Adoption and usage when coupled with an agile response to evolving business needs will assure the continual success of the system.

5.4.3 Recommendations

The literature provided appropriate and manageable areas of focus for success. The research raised a new critical success factor: **The Erudite Professional**.

Crickmay should look to reduce the time that it takes to develop and train their erudite professionals. The ongoing success of Crickmays BI systems will be determined by their ability to increase the sharing of knowledge and the upskilling of the client facing employees of the organisation with a full range of BI competencies.

5.5 Research Objective Three: Identify the main problems that Crickmay is experiencing with their systems

5.5.1 Findings from the Literature

A factor in the low success rate of BI systems is in part due to traditional BI systems having a high level of complexity. Historically, BI solutions are the domain of trained users with very specific skill sets that enable them to syphon, interrogate and extract insights from complex data (Panorama Software, 2013).

Mantfeld (2006) explains that the failure of BI deployment is a possibility when, “Inconsistent implementations, lack of executive sponsorship, lack of cooperation and intra-departmental conflicts cause slow adoption and abandonment of BI projects. The success of a BI Project is directly related to consideration of business, user and training requirements.”

Research conducted by Gartner (2013) calculates that 70-80% of BI projects fail. BI implementations deal with numerous issues, often the cause of the issue is related to people and processes and not technology, (Boyer, et al., 2010).

The extraction and processing of knowledge regarding strategy execution, and the key performance indicators on which a strategy is formed should be central to the solution. Many BI systems fail in this regard, and purely become performance and measurement reporting systems (Smit and Oosthuizen, 2010).

5.5.2 Findings from the Research

Interviewees described the systems as “Complicated, chunks of systems” that “did not talk to each other”. One interviewee explained that the systems are not fully delivering on their promise of BI in that they said, “We don’t give as much information as is possible to both ourselves and our clients.”

Not all interviewees said that they use the current platform. They sighted different reasons for their lack use. “It is easy to use. Using is not the issue, accessing it is.”

This was again stated as, “It is easy to use, but infrastructure does strangle the ability to use it”. Even respondents that were not heavily invested in the use of the systems mentioned the geolocation limitations, “I don’t know. Use is dependent on geography. It gets the job done. Does it get the job done easily?”

Respondents were at pains to stress that Data Accuracy was an area that needed attention. Responses ranged from “We don’t do enough to ensure data accuracy.” to “We don’t know if the data is accurate. Just assume that it is right because it exists“

In conjunction with physical data values, data accuracy is also determined by the business rules that are applied to data. When discussing these rules respondents said the following, “Internal users don’t know the business rules that are generating the end data.” and “There are rules but I don’t know them.” One particularly interesting point that was raised was, “Validation rules are stumbled on through tenure at business.”

A summary that was given stated, “We lack understanding of what true BI is. We lack knowledge of what is possible. We lack a keen understanding of what we serve up to our clients when. We have to build up our skill set in the more specific/technical areas of delivering value to clients.”

5.5.3 Recommendations

Crickmay’s has successfully implemented performance and measurement reporting systems in the past. The current demands of their systems however are asking more from the existing infrastructure than it is able to deliver. The outsourcing of the IT and systems departments has limited management in their ability to naturally evolve the systems through research and development, due to the responsibility for

enhancements and progress lying outside the control of Crickmay. Crickmay need to begin with a **Continuous Software Improvement Program** to ensure that the solutions in production do not fall victim to problems as a result of stagnation.

Infrastructural limitations are outside the control of Crickmay, they should look to develop a **Service Interruption Response Process**. The critical system modules should be continually monitored to mitigate the risk of hardware failures.

Data Quality Validation steps have to be surfaced out of the current “black box” system processes. Data users need to be sure that the data they are using is dependable.

Technical Competencies are not at a developed level within the business. Crickmay need to develop an **Integrated BI Competency**. Upskilling employees to be “Purple People” will greatly reduce the need to constantly delegate work to both internal resources and to expensive external resources.

5.6 Research Objective Four: Develop a BI strategy that is aligned to Crickmay’s future business objectives

5.6.1 Findings from the Literature

To execute strategy successfully in the modern business landscape, executives and managers need deeper levels of understanding of the value creation process in their businesses and departments. (Smit and Oosthuizen, 2010)

Business strategy execution is dependent on high quality and informative decision-support information. BI systems endeavour to fill the need for information to support strategy execution (Smit and Oosthuizen, 2010)

IBM (2010) states that every company needs a clear set of defined objectives to achieve the benefits from its BI. Typical desired outcomes are:

- Unrestricted access to one trusted source of information to make grounded decisions based on reliable facts not be dependent on instinct.

- Simplified reporting and analysis tools that assist users in gaining better business insights to reveal issues and uncover trends quickly.
- Provide the platform to react with agility to evolving business conditions through the use of effective, corresponding actions

Defining the BI outcomes is an important process. But goals alone do not add much value without appropriate action. A well formulated strategy provides the blueprint for success, (IBM, 2010).

BI strategy must be adaptive and agile. It should be rigorously evaluated and enhanced to continually meet business objectives, (Pant, 2009)

BI systems should not be viewed as technical applications in isolation, the system includes people and the two parts should be seen as co-dependent when discussing a BI strategy. This implies professional expertise as well as the social processes involved in generating, and probing for, needed outputs.

Vesset (2012) proposes that beyond the initial development of a BI strategy businesses should also focus on:

- Training. How to use BI and analytics tools, how the use of analytics improves decision making, the meaning of data and how to improve existing process.
- BI System Design Quality. Position the implementation to react to changing business conditions and user requirements.
- Data Governance. Place a high level of importance on the governance of data and data quality.
- Non-executive Management Involvement. Empower the next layer of management to implement BI technologies and processes throughout the business.
- Performance Management Methodology. Align the organisation with defined metrics and KPIs that influence user behaviour.

Smit and Oosthuizen (2010, pg. 15) say, "Only when the technical platform is complemented by the right people and social environment can the BI system fulfil its important role in present-day strategy execution."

5.6.2 Findings from the Research

Employees wanted to, “Improve the collection of data and make the business more mobile”. They stated, “Our business is about optimising value chains. As we move into a new space we need to be aware of the needs. If we are able to tap into the needs of one industry using the industry knowledge we hold from another it will accelerate our growth into that sector.” Market Intelligence was another term used that would help to move the business forward.

- We will have to improve systems if we grow.
- We need to move into strategic BI. We need to get into the boardroom.
- We have a goal to do X and not sure if everybody is aware of what we are trying to achieve.
- Others looked at processing from the clients side as a potential improvement point, “Information processing/distilling and disseminating is where the opportunity lies for us.”

We don’t have to be cutting edge, we don’t have to be market leaders, all that we have to do is influence the clients business result in a positive way at the end of the day.

5.6.3 Recommendations

The BI strategy development for Crickmay has to be aligned to the objective of making a marked and measurable difference by influencing client’s business results in a positive way.

This can be achieved by taking a holistic view of the business. Looking internally at how Crickmay’s internal processes influence the outcomes required to service the external (client’s) processes.

The amalgamation of all recommendations for this study will provide the necessary framework, that is:

- The alignment of People, Processes and Technologies to deliver what is needed, quickly, accurately and dependably.

- Developing **the erudite professionals** in the business through an **Integrated BI Competency** program to become complete BI professionals.
- **Continuous Software Improvement Program** to ensure solutions are current, relevant and applicable.
- **Service Interruption Response Process** to reduce down-time and increase service levels.
- **Data Quality Validation** to make sure that when decisions are made they are done so on dependable, dense data.

5.7 Limitations of the Study

The research only focused on responses gathered from interviews with Crickmay employees. This limited the study in the breadth and depth of possible factors that could affect the outcomes of BI systems.

Another limitation was the time frame allocated to conducting face-to-face interviews. A senior director, who would have provided over a decade of experience was not interviewed as they were travelling internationally.

5.8 Suggestions for Future Research

This research study focused solely on Crickmay and Associates BI systems. Other businesses of varying sizes, within a broader range of industries should be considered in future studies. This will help in improving the quality of BI implementations and also increasing the extraction of inherently unused value that resides within organisations.

5.9 Conclusion

The researcher has presented a complete study, detailing the BI framework, positive and negative influencers and strategic recommendations for Crickmay to use to manage the design, development, implementation and operational lifespans of its solutions. BI will naturally evolve and systems will need to be continually assessed to ensure their ongoing success, however this study gives the business direction to its improvement efforts. Lastly, this study delivers on its objectives to tame the information beast, and as such it is considered complete.

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Appendix 1: Informed Consent

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

MBA Research Project

Researcher: Robin Pooley

Tel: 076 338 5899

Email: robin@crickmay.co.za

Supervisor: Mr. Alec Bozas

Tel: 082 33 444 77

Email: mwbozas@mweb.co.za

Research Office: Ms. P Ximba

Tel: 031-2603587

I, Robin Pooley, an MBA student, at the Graduate School of Business and Leadership, of the University of KwaZulu-Natal invite you to participate in this research entitled 'Taming the Information Beast: Ensuring the Success of Crickmay and Associates Business Intelligence Systems.'

Your participation in this research is voluntary and you may refuse to participate or withdraw from the project at any time with no negative consequence. There will be no monetary gain from participating in this interview group. Confidentiality and anonymity of records identifying you as a participant will be maintained by the Graduate School of Business and Leadership, UKZN. If you have any questions or concerns about participating in this study, you may contact me or my supervisor at the numbers listed above. Your participation will be appreciated.

Sincerely

Investigator's Signature_____

Date_____

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

MBA Research Project
Researcher: Robin Pooley Tel: 076 338 5899
Email: robin@crickmay.co.za
Supervisor: Mr. Alec Bozas Tel: 082 33 444 77
Email: mwbozas@mweb.co.za
Research Office: Ms. P Ximba 031-2603587

CONSENT

I..... (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I hereby consent / do not consent to have this interview recorded.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT

DATE

Appendix 2: Interview Schedule

Taming the Information Beast: Ensuring the Success of Crickmay and Associates Business Intelligence Systems.

The purpose of this interview is to solicit information from Crickmay and Associates employees regarding factors that influence the success of their Business Intelligence Systems. The information you provide will go a long way in helping me identify the Critical Success Factors influencing BI success. The interview should only take about 30 minutes.

1. How do you define BI?
2. Can you describe our BI systems to me?
3. What are the main objectives of our BI solutions?
4. How would you define a successful BI system for us?
5. How would you define an unsuccessful BI system?
6. To what extent do our BI systems contribute to our company's performance?
Elaborate
7. Determine the real business question: What issue will you clarify to truly move your business forward?
8. How are requirements gathered?
9. How do we ensure Data accuracy?
10. What are the best methods for collecting data? Are some methods of data collection better than others?
11. What is the best way to harvest/surface insights?
12. What is the best way to make recommendations/give feedback to business/clients?
13. Is LIP, the currently deployed solution, easy to use?
14. How reliable and consistent is the BI solution?
15. Are assumptions made for clients based on internally prevalent skill sets?
16. Reporting can be grouped into alerting, flat reports, OLAP reports. Which of these types of reporting are more relevant for Crickmay?
17. If you could wave a wand, what would the ideal system look like/do/be?
18. What skill sets do our people lack from a BI perspective?
19. Are there any other factors you feel to be important?

Appendix 3: Turnitin Summary

Full Dissertation

ORIGINALITY REPORT

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SIMILARITY INDEX

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Appendix 4: Ethical Clearance

23 July 2015

Mr Robin Pooley (211523917)
Graduate School of Business & Leadership
Westville Campus

Dear Mr Pooley,

Protocol reference number: HSS/0861/015M

Project title: Taming the Information Beast: Ensuring the Success of Crickmay and Associates Business Intelligent Systems

Full Approval – Expedited Application

In response to your application received on 01 July 2015, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol have been granted **FULL APPROVAL**.

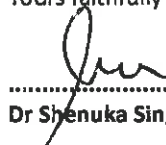
Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully



Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Brett van Niekerk and Mr Alec Bozas
Cc Academic Leader Research: Dr Muhammad Hoque
Cc School Administrator: Ms Zarina Bullyraj

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Founding Campuses:  Edgewood  Howard College  Medical School  Pietermaritzburg  Westville