CHAPTER 4 PART 1: CASE STUDY BACKGROUND AND CONTEXT

Case study background and context for Fortune Bank and its BI vendors as research participants

1. Introduction

The case study makes sense of the evidence (Brand, 2011:27) by reflecting on and analysing the research results gathered at Fortune Bank. Research results consist of interpretive data gathered from interviews at Fortune Bank, questionnaires to Fortune Bank's potential BI vendors and observations of Fortune Bank's BI activities, interactions and operations in the practice of BI.

2. Case study structure, input and notation

The case study chapter is divided into three parts. This part provides background and context on the case study environment, specifically Fortune Bank and its typical BI vendors and their roles as BI customers and BI providers. Part 2 provides case study results and analysis of BI's challenges and Part 3 provides this for BI's worldview. Part 3 also examines BI's challenges to determine the relationship between these and BI's dominant worldview and ascertain if they result from underlying G-D Logic in BI's worldview.

Data was gathered using interviews with BI customers and BI providers at Fortune Bank, observation of Fortune Bank's BI activities and questionnaires to Fortune Bank's potential BI vendors. Research data from the 2008-2010 period and the 2012 follow-up discussions have been integrated. Where data is specific to 2012, this is highlighted and discussed at the point where relevant.

Throughout the case study, interviewees are referred to as IA to IN where "I" stands for "Interviewee". Vendors are referred to in the same way, as V1 to V8. Direct quotes from participants are in italics.

3. BI customers and BI providers in the case study context

Figure 15 reflects two scenarios. In the first scenario, Fortune Bank employees are the customers of the BI vendors as the providers. In this case, V1 to V8 represent the typical vendor that engages with one or more Fortune Bank employee as a customer (represented through IA to IN). Examples are: a member of the BI department involved in purchasing and implementing a BI solution for one of their users in the bank, or an end-user who purchases a BI application directly from a BI vendor, or a BI sponsor who attends a conference and receives a marketing demonstration from the BI vendor. In this scenario, the researcher observed from the point of view of a Fortune Bank employee, i.e. a customer.

In the second scenario, employees (e.g. IB, IM, etc.) from Fortune Bank departments with BI re-

quirements are the customers of one or more of the three Fortune Bank BI departments, where they interact with employees (e.g. IA, IE, etc.) from these departments. In this case, the Fortune Bank BI department – as the BI provider – typically develops an application or report, sources data or provides some form of BI solution for a user or sponsor as their BI customer based in a different Fortune Bank department. In this scenario, the researcher observed from the point of view of the FBCBI department, where she worked. As most of her observations took place from within FBCBI, she focused the research on FBCBI activities and interviewed the bulk of the BI provider research participants from FBCBI. She used BI provider views from the Retail BICC and the EDW department to compare findings and established that FBCBI experienced similar challenges and had a similar viewpoint as others in Fortune Bank, enabling her to conclude that FBCBI represents a typical BI department within Fortune Bank (further indications of this are emphasised in the other two parts of this chapter).

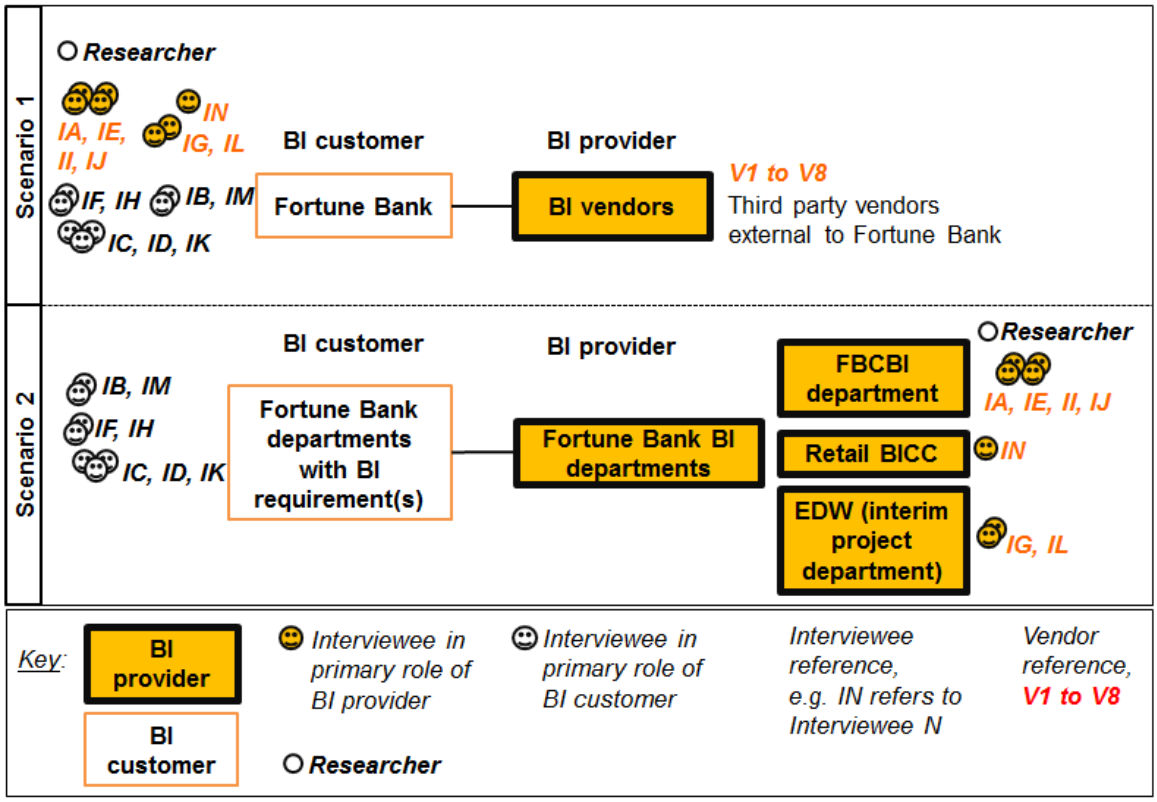

Figure 15: BI customer and BI provider roles in Fortune Bank case study

Figure 15 reflects that each interviewee was involved in both scenarios. The researcher clarified which role the interviewee played most often and has flagged this as the primary role of the interviewee, but did not stop interviewees when they provided perspectives from the point of view of their secondary role. She refers to the BI customer and the BI provider throughout the case study. She provides context when referring to interviewees in these roles so that it is clear whether the viewpoint is reflective of their role in scenario 1 or 2 – i.e. whether they express an opinion from the point of view of their role as a provider or a customer of a BI vendor or a customer of a BI department.

4. Fortune Bank overview

The researcher interviewed employees from a few departments within Fortune Bank's Corporate division, as potential customers of the BI vendors and customers of Fortune Bank's BI departments. She also interviewed BI provider interviewees from three BI departments. Background and context are provided for Fortune Bank as a whole, including detail on the history and background of each BI department. Greater detail is provided on FBCBI, as FBCBI is the focus of the case study.

Statistics and background information are relevant to the observation period, ending in March 2010. This was not revised in 2012 when the follow-up discussions took place, as follow-up discussions were used only to confirm research data initially collected are still valid.

4.1 Location and size

Fortune Bank's head offices are located in Johannesburg, South Africa. It has offices and branches across South Africa – in all of the nine provinces – and in several countries in Southern Africa, where it also operates. The big four banks in South Africa have between 24,000 and 37,000 employees across all their operations (Metcalfe, 2009), this includes Fortune Bank (exact figures are not disclosed to maintain their anonymity).

4.2 Structure and nature of business

Fortune Bank is split into three divisions: Capital, Retail and Corporate, as reflected below in Figure 16. Within these divisions, Fortune Bank offers the full spectrum of banking products and services for the individual (including High Net Worth (HNW) individual) and organisation (from small to large). For example, it offers insurance, investment, advisory, funding, foreign exchange, trading and sales, risk management and credit cards. Each division operates in all nine South African provinces and conducts aspects of their business in the other countries in Africa where Fortune Bank operates. In addition, Fortune Bank has correspondent banks and branches internationally, has a number of shareholders and is listed on the South African stock exchange. It is controlled by a bank holding company that is a national financial services provider within South Africa.

4.3 BI and BI projects at Fortune Bank

Figure 16 also reflects the location of interviewees (BI customers and providers) within the Fortune Bank organisational structure and the three Fortune Bank areas that perform BI. One is Retail, where the Retail BICC serves all the Retail business units. The Retail BICC consisted of 18 staff members. Another is the FBCBI department, that operates from within Business Banking but serves all the Corporate business units. FBCBI comprised of 22 employees. A third is the EDW

Project, run as a department from within Corporate, to provide bank-wide data and BI. The EDW department had approximately 17 employees and was set up as an interim department due to the magnitude and anticipated duration of the project.

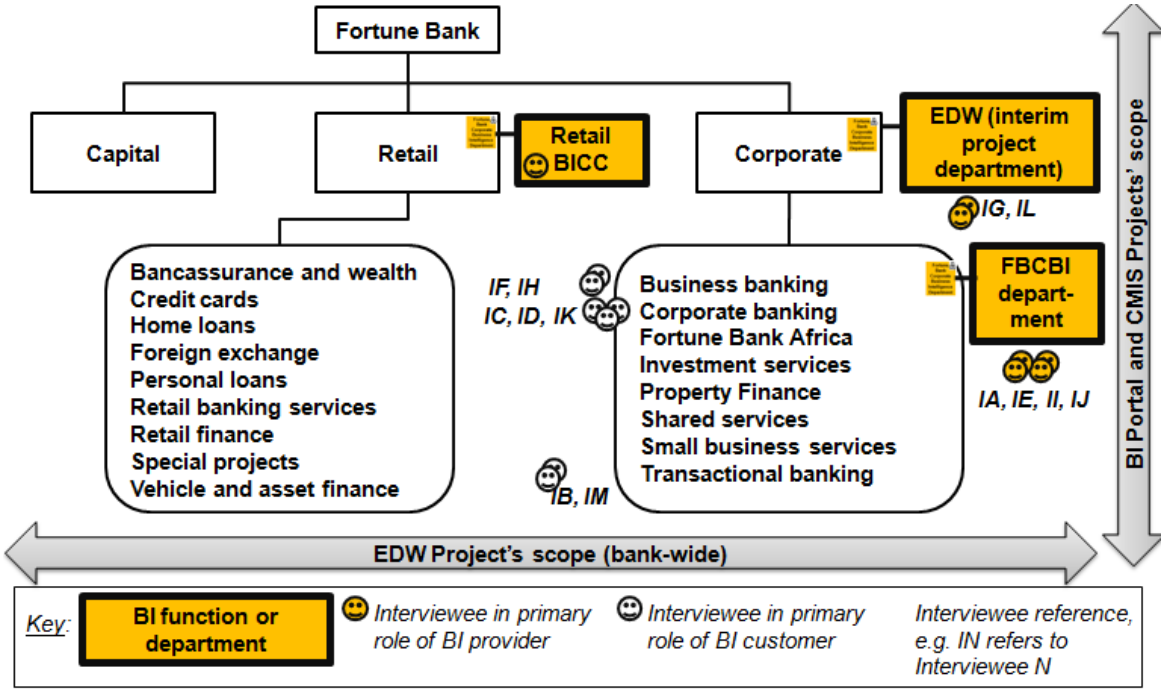

Figure 16: Fortune Bank organisational structure, showing BI departments, location of interviewees and project scope

As highlighted in Chapter 2, this thesis draws from the BI Portal, CMIS and EDW Projects. The BI Portal and CMIS projects were both staffed and managed from within FBCBI and not from departments specifically set up for these as special projects, as is the case with the EDW project. The researcher performed work on the BI Portal and CMIS projects and attended EDW project meetings and was aware of its purpose, challenges and activities. The CMIS and the EDW projects both aimed to consolidate data into centralised databases, with unified business rules and BI processes to achieve a "single version of the truth", providing BI for various types of users. For example, super-users accessing their BI through front-end query applications, users provided with reports and users for whom specific BI applications were built using the centralised CMIS/EDW database. The CMIS project spanned all business units within Fortune Bank's Corporate division and the EDW project was bank-wide. Some of the reports and front-ends provided for the CMIS project were available through FBCBI's BI Portal, which is detailed in FBCBI's history and background (Section 4.5.1).

At the end of March 2010 when the researcher concluded the period of observation, the EDW project had only delivered the home loan data (about a tenth of what it aimed to do) in a centralised database, but no BI. It was over budget and schedule. The CMIS project had delivered approximately eight data marts for the Transactional Banking business unit but, as users failed to use

these, they were no longer updated with monthly data and this was cancelled. The CMIS project had also nearly delivered Income Statements and Balance Sheets for Corporate Banking (available on the BI Portal in a format where users could "slice and dice" the information on these). However, these deliverables remained in a prolonged User Acceptance Testing (UAT) phase that had exceeded both the UAT and project deadline. By 2012, the EDW project was still ongoing but had not delivered significantly more than in 2010. The CMIS project had completed Corporate Banking's financial statements and had started this for another business unit.

Capital business units are not reflected as Capital is out of scope of the case study. Although Capital performs reporting and analysis within each of its business divisions, it does not have a BI department. The Retail BICC and FBCBI both perform all the activities involved in the provision of business information/intelligence for their divisions as a whole and originated separately.

4.4 Behaviour and culture

4.4.1 Overall culture at Fortune Bank

Fortune Bank's organisational culture is measured annually using the Barrett Survey, a cultural transformation survey of employees' attitudes and beliefs towards key cultural diagnostics (Value Centre, 2010). To the knowledge of the researcher, the organisational culture was only measured as perceived from *within* Fortune Bank – i.e. it excluded Fortune Bank's customers or third parties (e.g. BI vendors, other vendors). In 2010, the following descriptions emerged using this survey: dynamic; agile; ambitious; forward-thinking; accountable; people-focused; takes the lead.

Although these are valid outputs of the survey, they only reflect positive traits. Based on her experienced working at Fortune Bank, the researcher believes that addition of the following traits reflects more of a realistic view of Fortune Bank's culture: hierarchical and concerned with status and position; lack of integration between departments (often resulting in empire-building and siloed-thinking); performance driven; paper-based (though there is a vision to change this and a good measure of environmental awareness); multi-cultural and diversity in employee age; lack of trust between employees (visible in the need for various signoffs and email confirmations after meetings); values team work and collaboration; much time spent in meetings; time invested in team-building; a focus on charitable events and assisting the bank's environment; a fair amount of bureaucracy; change is implemented slowly due to size of organisation.

The global economic crisis had an impact on Fortune Bank's culture and economic position. According to economic reports that Fortune Bank released internally in 2009 and 2010, the retail business was severely impacted economically. Many of Fortune Bank's clients – organisations and individuals – were negatively impacted by the economic crisis which, in turn, had negative repercussions for Fortune Bank. For example, some organisations could not service their debts

and some performed fewer transactions than usual. Within Fortune Bank, many employees working on a contract basis experienced that either their contracts were not renewed or were forced to become permanent staff members; an option perceived by Fortune Bank to be less costly for them as an organisation. Fortune Bank employees, especially those in banker and sales client-facing positions or pricing and cost-cutting positions, increased their demand for intelligence as they tried various means to acquire business and maintain existing clients.

4.4.2 FBCBI, Retail BICC and EDW Interim Project Department culture

The culture within FBCBI and the Retail BICC resembled that of Fortune Bank as a whole, except for the following additional observations that can be made on their culture in particular: long working hours (due to e.g., lack of available skilled BI resources, typically long learning curves for new resources, heavy administrative load); innovative; excited by technology and technology-driven; less conformance to strict methodology and compliance (where this did not violate Fortune Bank, legislative or regulatory compliance); separation of analyst and developer teams; strong team work within developer teams; focus on project deliverables and "go live" milestones; and heavy loads of internal departmental reporting and administration (e.g. lengthy individual, team, project, portfolio and department weekly status and progress reporting). Based on the challenges raised in the literature study, it appears that these are rather generic characteristics of departments and even of BI departments, supporting the viewpoint that the findings of the case study performed at Fortune Bank extend beyond the banking industry and South Africa.

The EDW department, including its culture, was described by IG to be the same as FBCBI's Corporate Banking project, which aimed to provide MIS to all the functional business streams within Corporate Banking. IG stated that "EDW is like Corporate Banking MIS multiplied by twenty", emphasising both the complexity and size of the EDW project.

4.5 History and background

4.5.1 Fortune Bank Corporate Business Intelligence (FBCBI)

FBCBI, initially "Business Banking MIS", was established by Business banking at the end of 2004 in response to the need for Management Information (MI). It was started in a small office with a large server, a few Business Banking staff members and the same number of external consultants, hired on an interim basis. As they generated and released BI deliverables, the volume of MIS data and information they managed increased. Each deliverable led to additional requests for more from Business Banking: the demand for MIS and BI spread to other business units within Corporate. At the same time, many of Fortune Bank's executives attended BI conferences where they saw vendor demonstrations that whet their appetites for BI and grew their expectations. As a result, Fortune Bank invested heavily in MIS and BI.

In 2005 and 2006, Business Banking MIS focused on ad hoc development of BI software applications and reports for stakeholders in the Corporate division. Unfortunately, the ad hoc nature of this resulted in isolated development and a "messy" environment where integration was difficult and duplication was common-place. A single view of a customer or product was impossible and users became frustrated with having to access multiple tools, reports and applications to view different aspects of the same customer or product's information. In response to this, in 2007, Business Banking MIS embarked on an initiative to consolidate and clean-up. During this period, external consultants were replaced with permanent staff members, a vision and strategy were set and Business Banking MIS was renamed and rebranded "FBCBI". FBCBI aimed to provide a single, consolidated view of the Bank's corporate clients and products and provide BI and not just MIS. It saw MIS as provision of reporting and financial information, while it saw BI as the provision of most types of information and intelligence (e.g. client, industry, market, financial, etc.). FBCBI migrated stand-alone applications into a single consolidated framework and architecture, made available through a web-based BI Portal.

The BI portal, developed as a project and released to the business in February 2008, provides a central location for various types of information (e.g. Financial Intelligence, Product Intelligence, Customer Intelligence, etc.). It integrates vital BI applications, document systems, databases, information feeds, reports and raw data for delivery to its community of users. The FBCBI head and one of his senior managers performed "road shows" to the various BI users around the country where it was experienced that enthusiasm was high, though users expressed some reservations, e.g. about accuracy, timeliness and performance of the BI portal over the network. The BI Portal represents a significant success for FBCBI. However, despite this success, FBCBI continued to face many of its old challenges as well as some new challenges. Operations took up more time than anticipated from already-pressurised resources (who were in short-supply), staff worked substantial overtime, deadlines were not usually met and there was not always time to adhere to standards and best practices. Some BI initiatives were implemented but never used. Others were not even implemented. BI became synonymous with "a sea of reports" and interdepartmental squabbling started about what exactly BI is.

As a remedy, quality and improvement became the focus. FBCBI discovered that: technology was not at fault, it was leading edge; BI project processes were not at fault, they were PRINCE 2; people were not at fault, they were dedicated and competent. At a loss, FBCBI turned to an RFP process to find a vendor to help them to move up a few maturity levels to become a BICC. Unfortunately, RFP responses highlighted vendors' highly technical perception of BI, which did not correlate with FBCBI's managerial and organisational long-term vision. Ironically, in 2011 FBCBI changed its name, branding and vision, calling itself BI Technology Solutions (BITS), which it is still known as today (2012).

4.5.2 Fortune Bank Retail BICC

The Retail BICC grew as a shared offering to Retail divisions and to other support units. Initially it only provided reporting and Management Information (MI) in the form of applications, reports and data extracts – and was not referred to as a BICC. Retail business stakeholders would approach the department, providing sponsorship for an idea and together they would determine whether the idea was feasible – once off or as a pillar of excellence. Customised solutions were built for the business in this way as business concepts would be reverse engineered into what was needed for implementation.

As this department grew and matured, more analytics and analysis were performed and much operational work and standard reports were automated. As a result, the number of staff members involved in operational and routine work was reduced. This enabled the department to focus on empowering the business through advanced analytics and client analytics. It started providing the business with high level indicators instead of many different reports. This enabled the business to sum up the health of their business in a few variables, a considerably shorter time and less effort. The business was able to quickly identify any issues and then drill into the detail from there.

In 2005 the leaders in Retail's BICC realised that their area was performing at and providing the services of what the industry (both locally and internationally) termed a BICC – and consequently renamed the Retail BI unit a BICC.

4.5.3 Enterprise Data Warehouse Interim Project Department

The EDW Project – including the interim department set up for this – emerged from Fortune Bank's desire to centralise its data and make this available to all areas of the bank in a consistent manner. It involved a bank-wide initiative to migrate bank-wide data from the outdated Information Centre (IC) into a new EDW. It was envisioned that BI could then be conducted more easily at a division level as a result of this initiative. The EDW started with the requirement for BI, but then "scaled down" (in the words of IG) to MIS. The rationale for this was that, because EDW was years past its scheduled due date and was not close to completion, Fortune Bank realised that EDW should just get the foundation in place and each area should then be responsible for its own BI. The EDW Project, which was initially expected to finish in 2007 had its deadline extended to 2008 and, in 2012, was still incomplete.

4.6 Method of operation

Fortune Bank's BI departments perform strategic, operational and project work. This is now detailed from the point of view of FBCBI, as the focus of the case study. Additional discussion is provided below for examples where Fortune Bank's other BI departments' methods differ from these.

Strategic work typically entails planning, direction and alignment of departmental or business unit objectives with the vision of Fortune Bank as a whole. Operational work typically entails month-end data extracts, data transformation, cleansing and loading into databases from internal and external sources. Internal sources may include Fortune Bank's central data warehouse, product systems, etc. External sources may include data purchased from CIPC, Moody's, chain stores, etc. This data is used to populate FBCBI's databases and data marts and is reflected on reports and applications, housed centrally on the BI Portal for the entire BI user population. The BI user population consists of users who are Fortune Bank staff (internal to Fortune Bank). It spans the whole of South Africa, stretches into Southern Africa and consists of many different levels and types of users. For example: sales staff, financial managers, auditors, etc. The data is also made available to the super users through a front-end such as Microsoft ProClarity and other applications. Super users constitute about 20% of the total user population – typically comprised of financial and technical staff.

Project work typically entails the full systems methodology lifecycle – analysis, design, programming, testing, training, rollout and maintenance – on requirements for reports and applications. FBCBI gets BI requirements from Fortune Bank's Corporate Division. It develops these in order of business priority; aligned with the Corporate Division strategy and according to FBCBI's adapted version of the PRINCE2 (Projects In Controlled Environments 2) project methodology. Requirements are met and made available in the form of reports and applications on a central BI Portal, or made available in the Corporate BI databases to specific user audiences via various tools.

At almost any point during the research period, FBCBI had at least thirty active projects on its project list. This thesis does not attempt to provide detail on each of these but rather examines FBCBI's interactions as a whole. This may involve examples from a few of FBCBI's projects, operational work and ad hoc requests. Projects that are specifically mentioned in this thesis can generally be related to the EDW Project (a Corporate-level project where FBCBI was responsible to give some inputs but were not tasked), the Corporate MIS Programme or the BI Portal. EDW and the BI Portal are detailed in the history above. The Corporate MIS Programme was an initiative, similar to the EDW project, whereby data from all the divisions of Fortune Bank Corporate was to be consolidated into a central data warehouse enabling each division to pull its own BI from this, according to their own specifications. The rationale for this exercise was to have a common repository, a single version of the truth, less duplication, consolidation of resources/maintenance, etc.

The Retail BICC operates in much the same way as FBCBI does, also performing strategic, operational and project work. However, it differs from FBCBI for a few reasons. Namely, it spends less time and resources on operational activities, provides a centralised BI function for Retail and does not have a formal requirements channel set up to collect business requirements (and uses business analysts that IN calls "relationship managers" for this). In addition, it has automated over

3,000 reports that it provides to its business users on a daily basis, whereby the user can specialise and customise the report on their BICC portal. The BICC's BI Portal centrally houses data and information such as: financials, business insight and innovation reports, dashboards, product information and HR MI. The BI Portal, like FBCBI's BI Portal, is a gateway that provides a central location for various types of BI.

5. BI vendors

Fortune Bank's typical BI vendors are represented by RFP respondents. A summary of relevant details on the vendors' profiles is provided in Appendix G, as sourced from their RFP responses compiled in December 2008. While aspects of the vendors' profiles have changed over time (e.g. staff complement, partners, etc.), their December 2008 profiles are used in this thesis as they describe the vendors' profiles that were applicable at the time when they responded to the RFP.

The profiles reveal that none of the vendors were specialised in a particular industry and that they have a BI focus – except for V7 who listed experience in Performance Management (PM), and V3 and V4 who respectively indicated their focus is IT and software.

Two of the eight responding vendors were based solely in South Africa at the time of their response to the RFP. Both of these vendors were newly established, with a range of zero to five years' vendor experience in BI and had a staff complement of less than 50 people. Both these vendors had two IT partners, one in software and the other in software and hardware. The other vendors all had a staff complement of more than 1,000 and extended their operations across South Africa and internationally. One of these vendors had between 11 and 20 years' experience as a BI vendor, the others all had more than 21 years. These vendors listed numerous IT partners (from 20 to over 150). Furthermore, their IT partners were described using more descriptions – e.g. niche player, consulting company, etc. – than just hardware/software partner, as described by the two South African-based vendors.

6. Conclusion

This chapter provides an introduction for the case study by positioning the case study participants in their roles as BI customer and BI provider and by describing the environment in which the case study is set. Fortune Bank and its typical BI vendors are described to give context to the reader for the case study analysis and discussion that follows in subsequent parts to this chapter.

The next part of this chapter discusses key insights on BI's worldview gained through the case study.

CHAPTER 4 PART 2: CASE STUDY INSIGHTS ON BI CHALLENGES

Analysis of case study data on BI's challenges and measures applied to resolve challenges

1. Introduction

This part of the case study builds on the literature study of BI's challenges. It examines practice to see whether BI is as highly promoted and praised as in the literature. It then examines practice to determine whether BI is seen to achieve its purpose, the typical challenges that are experienced and existing measures taken to address challenges. A summary of BI challenges is then presented.

The aim is to ascertain whether literature simulates reality and to see whether additional insights emerge in practice that are not reflected in the literature. As case study respondents have been categorised as BI customers and BI providers, it is possible to compare views from these groups for another level of analysis (where relevant) and potentially further insight to BI's challenges.

2. Research data used to inform this part of the case study

Main sections of the interview questions and RFP questionnaires used to inform the case study are Sections I and J (BI challenges and measures to overcome challenges) in the interview questions and Section D (BI challenges) in the RFP. Further insight came from interview questions on BI values and purpose (Section F), the 2012 follow-up discussions as well as from observations. Observations are integrated with participants' views, except where observations highlight examples that do not come across clearly through the participants' voices. In these cases, they are documented separately.

3. The promise of BI

As raised in the literature, the case study revealed that BI was highly promoted and praised within Fortune Bank: BI customers and BI providers had high expectations for BI to assist in informed decision-making, resulting in business benefits. As a result, Fortune Bank invested heavily in BI. In addition, the case study revealed instances of how BI vendors may contribute towards BI customers' high expectations. These topics are now discussed, integrating and comparing BI customer and BI provider viewpoints and highlighting observations in this regard.

3.1 High expectations for BI

High expectations were apparent in the views of the customers of Fortune Bank's BI departments. When asked directly about BI's importance in terms of its priority on performance score cards and allocation of funds on their business units' budgets, all seven indicated that BI is a top priority and

has received substantial funding. BI customers, IB and IK stated that they were facing additional pressure to deliver promised BI outputs that FBCBI was developing for them, resulting from their directors' high expectations after heavy investment in their areas in BI initiatives and technologies. It appeared that Fortune Bank's top directors created a sense of urgency surrounding implementing BI solutions by allocating high percentages to performance measures linked to successful implementation of BI. Fortune Bank is a performance-driven organisation that links desired outcomes into their performance measures, linked to bonuses and salary increases, as a means to achieve these outcomes.

Opinions expressed by interviewees from Fortune Bank's BI departments (BI providers) confirmed the high expectations that BI customers had expressed. All of these BI providers who were interviewed indicated that there was an intense demand for them to deliver BI to the various areas across the bank. Both IE and IL, in separate interviews, highlighted the occurrence where executives attended IT conferences and would return with high expectations for BI, believing that BI could be implemented simply by means of installing the "flashy" front-ends that they saw demonstrated and that BI implementation was quick and easy. IL was in the process of implementing Qlickview as a "quick win" for a Fortune Bank Corporate department as a result of this. IE's opinions highlighted that he believed he saw this to be "*pacifying business areas*", which he did not intend to do, stating that it created increased maintenance for his department which was already over-burdened with customer queries.

Furthermore, BI providers in FBCBI confirmed their high expectations for BI in terms of the scope of its influence in the organisation when they all stated that everyone should be using BI, "*from the tea lady/gent to the top director*" (IE). This viewpoint was confirmed in their BI customers who also indicated that BI should be used by everyone (except for IC, who stated only managers should use it).

3.2 Purpose of BI

Case study data reflects that most of the participants share the view that informed decision-making is the core purpose of BI. This correlates with the finding in the literature study, where enablement and support of decision-making is consistently raised as BI's purpose. Only four interviewees did not express this opinion, namely: IA (who stated that BI answers management's queries), IF (who stated that BI influences business activities), IG (who stated that BI refers to consistent measurement) and IM (who stated that BI gives the complete picture to drive the bank).

3.3 Heavy investment in BI

Heavy investment in BI was visible in the form of the BI infrastructure set up in Fortune Bank's BI departments. This was evidenced by, amongst other things: massive storage capacity, servers

and sophisticated ETL and presentation applications. In addition, these departments were each resourced with 18 to 22 permanent and contracting employees, brought in as "*BI specialists at high rates*" (as stated by FBCBI's main sponsor, IF). Minutes of a CMIS steering committee meeting reflect that IK's director (a BI customer of the CMIS Project) stated "*It is imperative that BI is enabled throughout Corporate through implementing the CMIS solutions. Bring any funding issues to me as I can sort these out*". This reflects the director's willingness to invest heavily in BI. Project budget figures reflect that he did invest heavily in BI.

3.4 BI vendors' contribution to high expectations and heavy investment

Reflecting on the BI vendors' RFP responses, it can be seen that typical BI vendors promote their BI technology solutions and services as well as the benefits they associate with these. Although this is not surprising, insights can be gained from the way they do this. The way they typically do this creates heightened expectation for BI and, when these solutions and/or services are purchased, results in heavy investment in BI in the form of technology application, implementation and support fees as well as ongoing licencing fees.

In terms of the way BI vendors typically promote their technology that leads to high expectations for BI, it appears that they: promote that implementation of their solutions will undoubtedly result in "*customer value*" (V1, 2) or "*happy users and happy customers*" (V7); imply that BI can be implemented quickly through statements such as "*ROI can be delivered fast through identification of quick win areas*" (V1) and; advocate that their solutions will deliver actionable insight (V2, 6), will enable strategic business decisions (V2, 3, 4, 5) and will ensure expertise filters through all levels of the organisation (V1). The researcher perceives that these benefits are not only rather intangible – as identified in the literature's view that BI vendors typically promote intangible features and benefits (Macinnes, 2004:20) – but also may lead to high expectations that are likely to be inconsistent with reality. For instance, BI technology alone cannot result in these types of benefits, other factors also play a role, e.g. ability of a human using the technology to make decisions, interpret the data, etc.

4. The challenge of BI: perceptions that BI does not consistently serve its purpose

As stated in the literature study, the sustained and intense investment in BI in response to the heavy promotion and marketing thereof should be an indication that the benefits that are promoted are received. However, instead of this, aligned with the literature study, the case study interview results reflect numerous challenges and a dominant perception that BI does not consistently serve its purpose. The latter is now discussed – BI's challenges are then discussed specifically in Section 5.

4.1 BI customers' perceptions

Despite their expectations, high demand and heavy investment, BI customers of Fortune Bank BI departments do not perceive that BI consistently achieves its purpose. All seven BI customers stated that BI does not achieve its purpose when asked this directly as part of the interview. Examples from the data that reflect customers' viewpoints are: IC stated that BI does not consistently achieve its purpose as "*it is not always reliable and cannot be used*"; IF indicated that BI does not influence business activities and that a lot of development would be needed before it serves its purpose and; IK highlighted that all she gets is data and not BI, in correlation with IM who stressed that "*BI is currently very operational and given to us at a data level*". IM questioned whether this really even is BI and identified that there are a shortage of people in Fortune Bank who know how to use data at this level.

The views of interviewees who are primarily BI providers, but are also BI customers of the BI vendors (e.g. IA, IE, etc.) are consistent with viewpoints expressed in the next paragraph.

4.2 BI providers' perceptions

The BI providers in Fortune Bank's BI departments indicated that they believe BI consistently achieves its purpose (IA, IE and IN), expressed uncertainty (II, IJ and IL) or showed an awareness of a need for improvement (IG). One of the BI providers who expressed uncertainty (IJ) revealed, "*we don't know how BI is used once we've provided it, we just meet the BI requirement. Sometimes queries after delivery indicate BI's being used, other times it indicates the requirement wasn't understood*". Another (IL) identified that Fortune Bank staff do not typically state they have used BI when they have made a decision. She suggested to "*take it away and see if anyone asks for it*" as a means to identify whether it's being used for decision-making, which she'd listed as BI's purpose.

Six of the eight BI vendors (BI providers to Fortune Bank) responded to this question in the RFP (V2 and V7 neglected to answer this question). Four of these vendors did not commit to a "yes" or a "no". Instead, they detailed challenges that organisations experience when BI is implemented in a silo in a single department instead of across the organisation (V8) and how use of their BI technology assists organisations to consistently achieve BI benefits (V1, 3, 4). V5 and V6 stated BI does consistently achieve its purpose, providing examples of BI successes they achieved with their customers.

4.3 Insights and observations

Case study participants' responses indicate that, although there is a demand and high expectation for BI along with commitment to BI through investment, there is a strong perception that BI is not

achieving the results it should on a consistent basis. An observation in this regard is that BI is typically listed as a "must-have" initiative at a strategic level, where the expectation is set and from where the investment is made, but is often implemented at lower levels within the organisation in a somewhat different form than expected. The gap between the CMIS executive sponsors and the end-users was clear, for example, during post-implementation discussion sessions with CMIS end-users when FBCBI BI providers encouraged use of the CMIS data marts that they delivered in response to the CMIS sponsor's need for BI. Sponsors envisioned "BI" that would solve their business challenges through provision of information and intelligence. FBCBI then delivered CMIS data marts as the "BI" solution, which the users did not use. Interview data highlights that there is often a gap between the "*strategist that designs a solution in their ivory tower and the end-user who actually has to use the solution*" (IL).

5. The challenge of BI: BI's challenges and measures to address BI's challenges

5.1 Challenges identified through observation at Fortune Bank

Many challenges experienced at Fortune Bank are also reflected in the literature. Conversely, all categories of challenges identified in the literature study were evident at Fortune Bank, confirming that BI at Fortune Bank represents the literature's view of the typical organisation performing BI. A few examples of challenges observed at Fortune Bank are discussed in Table 10. The intention is not to discuss an example for each of the literature study's detailed challenges (e.g. U1-U10, D1-D3, etc.), as the literature study already discusses these. Instead, challenges are discussed at a higher level to enable concentration on new insights, which the researcher is not aware of in the literature. New insights from in Table 10 are discussed with those from other sections, in Section 5.3.2.

Table 10: Examples of BI challenges observed at Fortune Bank that support the literature study

Challenge description – per literature study category
Use: Analysis of BI Portal and CMIS application and report usage statistics confirmed the low use that FBCBI (as BI providers) suspected after users (as BI customers) showed frustration and then apathy. During 2009, FBCBI developers performed a clean-up of the BI Portal after usage statistics revealed that users had not accessed over 60% of the BI reports over a six month period. Furthermore, the data marts delivered as part of the CMIS project were only used by one or two users for a trivial number of queries during the first few months after implementation and not again thereafter. This was despite the fact that these users had personally requested the Microsoft ProClarity licences that were purchased for them and had booked themselves on the training courses on this.
Data: FBCBI's capacity planning and timesheets reflect a high percentage of time as a department (as a BI provider) was spent on operational activities such as data processing, e.g. FBCBI's

Challenge description – per literature study category
monthly ETL process. This was also observed on the CMIS project, where monthly population of the data marts eventually took up the developer's whole month: she moved from being in BI development to being in data operations. In contrast, the Retail BICC manager (IN) highlighted that her department had "*evolved from being MIS to being BI*", as more of her resources performed systems development and automation activities compared with those who performed operational work. FBCBI also aimed to reduce the time spent on operational work to free resources' capacity to do project work.
Integration: Integration work was largely overlooked at FBCBI. This was even observed within FBCBI where Business Analysts, Developers, Database Administrators, etc. struggled to collaborate and worked largely in isolated teams. In addition, in terms of integration of BI across Fortune Bank, although Business Analysts' Context Diagrams and Data Flow Diagrams (DFDs) that formed part of their Functional Specifications assisted them to identify potential integration requirements and interface points, they generally compiled these based on input from business stakeholders (with limited data and technical knowledge) and limited exposure to the bank's technical architecture or data structures. During 2008, integration with other bank or third party applications was needed on a particular BI Portal pricing sub-project and Service Level Agreements (SLAs) were established to govern this – but even this small measure was only performed as a reactive measure after one of the parties negligently debited Fortune Bank customers with fictitious fees that were on a test script that was not supposed to have run in a Live environment.
Alignment: FBCBI worked in the same physical area as many of their business stakeholders (e.g. sponsors and users), which they perceived to cause challenges between themselves as BI providers and the stakeholders as their BI customers. FBCBI staff often expressed that it was frustrating and unproductive to sit in proximity of these stakeholders as they would "*meddle in development of their BI requirements*", "*waste the time of the BI developer*" and "*cause dissention among FBCBI staff*". Stakeholders often approached FBCBI developers directly, instead of channeling requirements in accordance with FBCBI's process, where requirements would first be assessed by a project office in terms of priority, capacity and impact (among other variables) before being allocated and developed.
Personnel and skills: Fortune Bank BI departments struggled to find true BI resources. It was often discovered, after hiring a BI resource, that he/she is an IS professional or is only proficient in an IT product. Fortune Bank contributed to this by focusing recruitment efforts on IS and IT competences.
Sponsorship: A gap appeared to exist between the typical BI sponsor (typically in an executive position)(as the BI customer), the BI department developing the sponsor's BI solution (BI provider) and the end-user for whom this solution was developed (BI customer). When end-users were reluctant to use the BI solutions that the BI sponsors had envisioned and invested in, many BI sponsors turned to change management practices to gain acceptance of their BI solutions in efforts to engage with and change end-users' opinions of BI solutions (which only worked to a limited extent).

Challenge description – per literature study category
ROI is difficult to determine: After heavily investing in BI, BI sponsors could clearly identify BI costs in terms of, e.g. licence and COTS application fees paid to BI vendors and funds transferred to Fortune Bank BI departments for time spent developing and implementing BI technology solutions. However, they found it difficult to link these costs to the benefits they perceived they would experience once implementing BI solutions. In contrast, when business benefits could be attributed to being informed by BI, the BI department was not given acknowledgement for this. An example of this is where BI was used to identify pricing opportunities that lead to new revenue streams and a performance recognition award for a BI user, where the user did not acknowledge FBCBI's role in this.
BI is an ill-defined discipline: BI was understood to mean different things to different people. Some saw reports and data to constitute BI and referred to them as BI. Others indicated that they did not believe Fortune Bank performed "true BI" (which they stated they saw to be analytics). Discussion of "the definition of BI" at a bank-wide BI forum turned into an inter-departmental squabble. An example of a point of contention was that some individuals perceived that FBCBI only provided reports and data and therefore did not have a right to have "BI" in their department's name.
IS implementation*: Analysis of project lessons learned documentation and reflection on project progress according to plan as well as the number of cancelled projects or projects that got an "abandoned" status (where the BI sponsor abandoned the project) highlights that Fortune Bank BI departments experienced a number of IS implementation challenges.

5.2 Challenges raised by case study participants

Case study participants described their challenges during interviews and in their RFP responses. Table 11 reflects participants' "voices", where each "voice" is attributable to the first participant listed in the "Participant" column; further participants that expressed a similar statement are also listed in this column. Challenges have been categorised by the researcher according to the main categories established in the literature study, although there is much overlap between categories – as reflected by references to multiple literature study categories within Table 11's "category" rows. A comparison of the literature and case study and the new insights that emerge are discussed below Table 11.

Table 11: BI challenges raised by case study participants supporting the literature study

Key:
New findings not explicitly identified in the literature study are numbered and referenced (brackets)
BI – BI-specific challenge (as per opinion of the participant. Not all are in fact true BI challenges)
C/P – BI customer/provider perspective
C(V) – BI customer of a BI vendor *C(FB) – BI customer of a BI department in Fortune Bank*
P(V) – BI provider that is a BI vendor *P(FB) – BI provider that is a Fortune Bank BI department*

Participant's description of challenge (and reference to literature study challenge) *(sorted by customer/provider, per category)*	**BI**	**C/P**	**Parti-cipant**
Category: Use (A1; U1-7, U9)			
BI reports and data are open to interpretation	BI	C(FB)	IF, IH
Inadequate training is provided for the business to understand the data	BI	C(FB)	IC, ID
Even though BI is implemented, we still base decisions on experience	BI	C(FB)	IB
BI vendors' COTS solutions have too many features, intimidating our users and reducing use of BI		C(V)	IG
A "fear of the unknown". IS and IT are more familiar to users as they have had chance to get used to these – this is not the case with BI (1)	BI	C/P(FB)	IB, ID, IE, IK
Users are unwilling to try new things to use BI		P(FB)	IN
We produce much data/information that is not used by the business		P(FB)	II, IJ
An unready organisation in terms of its maturity level		P(V)	V4
Category: Data (A1; D1-3; I1; I2; U1; U3; U9)			
Intense reliance on data, if the foundation is wrong, BI is wrong (2)	BI	P(FB)	IA, IN
Most of my day is spent on data processing	BI	P(FB)	IJ, IG, IL
Ownership of BI and data at the different points in the data lifecycle (3)		P(FB)	IN, IE, II
The business does not know their own data		P(FB)	IG, II
There are many untapped data sources that we are not even using yet, but users still feel overloaded with data	BI	P(FB)	IE, IN
Data quality, managing data, sourcing data		P(V)	V3-5, 8
Sourcing intelligence from business processes, which are not static and are usually not even documented or known	BI	P(V)	V8
Refusal to sign-off on MIS data due to political reasons		C/P(FB)	IC, IE
The wealth of information in organisation's systems: extracting, managing and planning it	BI	P(V)	V5
Category: Integration (A1; D1; D2; I1; I2; Z1)			
It's difficult to understand where BI starts/ends and how it integrates (4)	BI	C(FB)	IH
Additional work is created for BI when "cowboy" (siloed) solutions must be incorporated for an area that was not supposed to create its own BI		P(FB)	IA, IG, IJ
Applications are built without consideration for BI needs upfront (5)	BI	P(FB)	IE, IG
BI brings together many areas and all their challenges (6)	BI	P(FB)	IE
Business analysts forget about data when writing their specifications for a BI solution and often rework their specifications as a result (7)		P(FB)	IE
Data exists in silos and the integration is not always understood	BI	P(FB)	IL
BI runs horizontally and not vertically along the typical functional verticals that the organisation is structured according to (8)	*BI*	P(V)	V8
People who are "married" to specific vendors' BI products		C(V)	IB

Participant's description of challenge (and reference to literature study challenge) *(sorted by customer/provider, per category)*	**BI**	**C/P**	**Parti-cipant**
Integration activities are commonly left out causing challenges later (9)	*BI*	P(V)	V1
Category: Alignment (A1; A2; D2; P1; U2; U8; Z1)			
BI resources have knowledge of systems development but not of the business environment	BI	C(FB)	IF
BI's structure under a single division (Business Banking) does not support the other divisions' needs (24)		C(FB)	IB, IC, ID, IM
More collaboration is needed than when implementing an IS system due to BI's reliance on data and monthly ongoing data feeds (10)	BI	C(FB)	IL
The business' need to make fast decisions is not supported	BI	C(FB)	IB, IF, IK
User requirements that change before BI is implemented mean that the BI solution is not used or is cancelled. Users only truly know their requirements when they see the BI deliverable (too late for changes)		C(FB)	IB, IC, ID
BI vendors who try to bypass us, selling "quick and dirty" solutions (11)		C(V)	IG
Availability of business to share data in a timely and accurate manner		P(FB)	IA, IN
Business does not understand that it's not technically feasible to have all our BI resources working on one dimensional data mart together	BI	P(FB)	IE
Business's lack of commitment and an unwillingness to partner in respect of risks or cost (they only commit for benefits)(12)		P(FB)	IE, IL
Competing project priorities, especially those with dependencies on each other resulting in a stale mate situation (13)		P(FB)	II, IJ, IN
No consistent definition of business rules		P(FB)	II, IN
Responsibilities between BI and business are not shared (14)		P(FB)	IE
There are disputes over who carries BI's costs (15)		P(FB)	IE, IN
When business processes or data change and business doesn't inform us, but we're in the middle of a BI project based on these (16)		P(FB)	II
Dealing with the organisation's various departments who all want BI, but do not consolidate their departmental requirements (17)		P(V)	V5
The BI department gets between the BI vendor and the business they are trying to support. The BI vendor then fails to get to know the organisation or the true BI need (18)		P(V)	V8
Category: Personnel and skills (A1; I2; P1)			
Costly dependencies exist on resources skilled in specific products (19)		C(V)	IA
A lack of resources with the right skill set and experience in BI	BI	P(FB)	IE, IN
BI resources experience a long learning curve and retention of these resources once they are marketable as a BI resource is difficult	BI	P(FB)	IN
Due to the dependency on a few key resources who have BI compe-		P(FB)	II, IJ

Participant's description of challenge (and reference to literature study challenge) *(sorted by customer/provider, per category)*	**BI**	**C/P**	**Parti-cipant**
tencies, these BI resources are over-worked			
Finding the right resources who are truly BI resources	BI	P(FB)	II, IJ, IG
There are few people in BI or in business who understand the bank's architecture and data structures (20). We often feel like we're in the dark		P(FB)	IJ
There is too much reliance on key individuals to use BI, we do not perform the necessary first line of analysis (21)	BI	P(FB)	IE
Finding the right vendor to partner with in terms of experience and skill		P(V)	V1, V6
Category: Sponsorship (A1; S1)			
A sponsor with an affinity for a particular BI vendor, when the vendor only offers stack solutions – locking us in		C(V)	IB
BI is often sponsored by a non-technical person who "saw something cool" at a convention, resulting in "quick and dirty" solutions		P(FB)	IE
Only the areas and individuals who have a culture of using facts come to BI to partner with them (22)	BI	P(FB)	IG
Sponsorship is one of the biggest challenges	BI	P(V)	V3
Category: ROI is difficult to determine (01)			
Calculating ROI after implementing a BI solution to justify future costs		C(FB)	ID
Category: BI is an ill-defined discipline, operating in an ambiguous environment (02)			
IT vendors pretending to be BI vendors just to increase marketability	BI	C(V)	IL
"What is BI?" – where do we even start? This is a challenge in itself as seen in the BI forum that we attempted	BI	P(FB)	IE, IG
People want "intelligence titles" but they work in the MIS or data layer (23)	BI	P(FB)	IN
Many vendors claim to provide BI, but are only involved in data or presentation layers for example, causing confusion and providing only part of a BI solution	BI	P(V)	V1
Category: IS implementation (A1; I2; U3; Z1)*			
Ad hoc requests change the scope of the project		P(FB)	II, IL
Resources are often pulled off of BI projects due to competing priorities in the bank, e.g. Basel II took a lot of resources		P(FB)	IL
Finding the right vendor to partner with in terms of costing, licencing and solution models		P(V)	V1
Identifying the right users		P(V)	V5
Overlooking change management results in major challenges later		P(V)	V3-5, 8
Structure of implementation is often a challenge, i.e. centralised or decentralised (depends on maintenance, support and architecture)		P(V)	V1

Participant's description of challenge (and reference to literature study challenge) *(sorted by customer/provider, per category)*	**BI**	**C/P**	**Parti-cipant**
Time to implement, integration and ease of implementation		P(V)	V1
Training and support are two of BI's biggest challenges		P(V)	V3

* Challenges in IS implementation are reflected (also reflected above in Table 10) to show that case study participants also raised these challenges when asked about BI challenges, in much the same way as the literature does. However, discussion of these challenges is discontinued from this point, as resolution of this challenge category is not in this thesis' scope.

5.3 Analysis and discussion of case study challenges

Above sections reflect that case study data supports findings from the literature. It also reflects new insights and challenges. New insights emerge, firstly, in the observations and challenges raised by case study participants and, secondly, through analysis of this data. A comparison of the literature and case study is now provided and then insights are discussed, with reference to the new challenges raised.

5.3.1 Detailed literature study challenges absent from case study participants' responses

Although the case study reflects support for each of the literature study's challenge categories, a comparison reflects that two detailed literature study challenges are not referenced directly in the case study observations documented this far (Table 10) or participants' views (Table 11). They are, however, supported by observations. These are:

- Experience of "Catering for different user needs across the organisation" (U8) was observed when the EDW Project identified that a bank-wide "one-size-fits-all" solution for BI would not be feasible as initially planned. Instead, in 2011 (as discovered in 2012 during follow-up discussions), project managers obtained permission to change the project objectives to provide MIS for all areas and BI for only a few. The aim of was to enable each area supplied with MIS to customise and provide their own specialised BI, based on the MIS.
- "Low use overlooked as use is often measured according to volume of software applications and licences sold" (U10) was a challenge experienced at Fortune Bank on the CMIS Project. Many user front-end query tool licences were ordered for Transactional Banking users (as BI customers of FBCBI and the BI vendor selling these licences) where only one or two users performed a trivial number of queries using the tool after implementation and then failed to use it again. Although it was reported that a high number of licences were purchased and im-

plemented, this inaccurately reflected the reality of the situation where BI was not used.

5.3.2 New insights and challenges that emerge through the case study

Case study data reflects consistent views from Fortune Bank's three BI departments, highlighting again that FBCBI represents a typical BI department in Fortune Bank. It also reflects that, in comparison with the other categories, case study participants raise alignment challenges the most and ROI challenges the least. Alignment challenges are specifically discussed in the upcoming sections as a result of this. They are discussed in the upcoming section on segregation of customer and provider viewpoints and the section on tension in BI relationships. The fact that only one ROI challenge emerged in the case study data may be because ROI challenges are not "top of mind" for case study participants, as Fortune Bank does not measure ROI directly on improvements or benefits resulting from BI investment. Instead, it measures BI success based on implementation of a BI IT solution or data processing performance measures. This is identified as a new insight and is discussed in the sub-sections that follow, along with the insights flagged as "new" (numbered (1 to 24) in Table 11).

BI is perceived narrowly as an IS or (even more narrowly) as an IT or data solution within an IS

The researcher asked participants what BI-specific challenges they experience or perceive in practice as the literature consistently raises generic IS challenges as BI challenges, presenting a gap. Reflecting on challenges in Table 11, it is evident that some challenges participants identify as BI specific accurately highlight BI specific challenges but that many challenges are in fact generic IS challenges. For instance: sponsorship, lack of personnel with the right skill set and experience, business does not understand what is technically feasible, etc. This indicates how case study participants think of BI narrowly in terms of it being an IS, or even as an IT or data solution within an IS. As an example of this, IE (the head of FBCBI) identifies that his department does not perform the first line of analysis that is necessary after a BI application or data is delivered ("new" 21), but rather focuses on IS development and implementation, believing that this alone meets the need for BI. Some BI customers (IB, ID, IE, IK) interviewed even highlight, "*IS and IT are more familiar to users – this is not the case with BI"* ("new" 1), potentially providing an explanation for the BI customers' failure to consistently raise BI-specific challenges. Case study participants also demonstrate that there is a propensity for BI providers to confuse BI with other layers such as data management or data warehousing activities as "*people want intelligence titles while working in the data or MIS layer*" (IN) ("new" 23).

As raised in the literature study, although BI is a type of an IS, it is far broader. Viewing BI narrowly as an IS (or even more narrowly as an IT or data solution within an IS) poses a significant challenge for BI for a number of reasons. Firstly, it restricts BI's actions to those that focus on IS development and implementation or data processing. It may even restrict the understanding of BI to

that of a BI IT solution or the output of a BI IT solution. This was seen at Fortune Bank where "the wrong type of sponsor" would express frustration and disappointment when implementation of a BI IT solution did not result in BI use and therefore did not manifest the anticipated benefits. Secondly, it results in failure to identify and address true BI challenges, as evidenced by the fact that case study participants struggled to consistently indicate BI specific challenges.

A third reason is that viewing BI in this way restricts measurement of BI success or use to BI vendors' volumes of software application and licence sales, IS project measures or data processing performance measures (e.g. accuracy, speed, productivity (such as using fewer resources to produce more), etc.). These only reflect that BI is purchased or delivered successfully and not whether it is used successfully. Not only does this contribute towards an inaccurate reflection of BI use, but this may contribute towards challenges in measuring ROI, as BI does not generate a return/benefit at the point of BI delivery/implementation where measurement takes place. Finally, viewing BI narrowly as an IS (or IT/data solution) may contribute towards BI providers seeking to recruit IS and IT professionals (as evident at Fortune Bank, described in Table 10) rather than other types of professionals (such as business, analytics, statistician, etc.) who could potentially contribute towards assisting the business to use BI.

BI is an ill-defined discipline operating in an ambiguous environment: failure to recognise this as a challenge leads to further challenges

The literature draws attention to the fact that BI is an ill-defined discipline operating in an ambiguous environment, as discussed in Chapter 3. This is confirmed in the case study, where it emerges in interviewees' landscaped diagrams and responses on the definition and scoping of BI as well as in BI vendors' responses on related questions in the RFP. However, only a few participants specifically raise this as a challenge, emphasising that the challenge of ambiguity is not seen as a significant challenge – or at least is not top of mind for BI practitioners. Failure to identify this as a challenge is perhaps an indication that BI practitioners are content to continue with this ambiguous environment due to failure to identify or understand the repercussions of this challenge.

Two examples of repercussions are: misaligned expectations between BI customers and BI providers (e.g. when "BI" is promised and data marts are delivered as occurred on the CMIS Project) and; that when the definition or scope of BI are unclear, it may be defined and scoped to suit a particular role player's perception or even objective – e.g. a BI vendor would define it as an IT solution, a typical BI user based in Finance would define it as an income statement (based on the case study at Fortune Bank where the latter did materialise in the case study findings).

Participants' challenges reveal segregated BI customer and provider viewpoints

Analysis of the challenges raised by case study participants highlights that they raise challenges mostly from their own perspectives, without consideration or apparent awareness of each other's

environments, context or challenges. For example, Table 11 reflects that only BI providers raise challenges in categories such as IS implementation, data and personnel/skills – which are categories that relate to aspects of BI that fall within typical "BI production" activities or the typical provider viewpoint of BI. While it could be expected that a participant would approach BI's challenges from their particular viewpoint and experience, the significant finding is the different viewpoints that emerge.

The case study highlights that challenges raised by BI providers – BI vendors and BI departments – tend to focus on their application development activities, data processing activities and problems related to these activities. Firstly, BI vendors' challenges all relate to data, finding the appropriate BI vendor from whom to acquire a BI technology solution or related consulting services and implementation of such a solution. Secondly, BI departments at Fortune Bank tend to focus on challenges related to development and implementation of BI solutions, without looking beyond this to how the BI they provide is used. For example, as stated above, IJ – an FBCBI senior manager – reveals "*we don't know how BI is used once we've provided it, we just meet the BI requirement".*

Furthermore, although Fortune Bank BI providers recognise that they have a dominating focus on data processing, the case study reveals that their intention is not to evolve from focusing on data processing to focusing on use of the resultant data. Instead (as discussed in Table 10), BI departments aim to evolve to spend more time developing BI applications – i.e. they remain within the "BI provider" world, largely separated from the customer.

Conversely, challenges raised by BI customers of Fortune Bank BI departments tend to revolve around problems they experience after the BI solution is implemented or their experience of the relationship with the BI provider while they wait for the BI solution to be delivered. The case study reveals that BI customers' involvement tends to take place during requirements gathering, User Acceptance Testing (UAT) and change management activities such as training. These are activities largely controlled by the BI provider. The BI customer is typically then a passive recipient, waiting to be involved by the provider. As BI providers focus on development and data processing activities and BI customers wait for BI solutions to be delivered (playing the role of a passive recipient), neither BI provider nor BI customer understands the other's context, process or environment and this situation often leads to frustration, misalignment and animosity. In addition, when the BI customer plays the role of a passive recipient, he/she is likely to have had little or no input into the BI that is then delivered – reducing the likelihood of the solution being customised for them and thereby also reducing likelihood of use.

Challenges raised by BI customers of the BI vendors highlight a certain amount of animosity towards BI vendors, who – in turn – raise challenges that reflect their frustration with these customers. This animosity and frustration is discussed in the next section, as it applies to the tension identified in these relationships.

Participants' challenges reveal tension in BI relationships

The section above touches on tensions between BI customers and Fortune Bank BI departments, the literature study identifies misalignment as a core challenge and case study participants raise the greatest number of challenges within the "alignment" category (Table 11). This highlights the tension in various relationships within the BI environment. Examples of additional tension identified in the various relationships are now discussed, highlighting misalignment between role players resulting from, e.g. failure to: communicate; understand BI (or the full BI process) from another's viewpoint; share common BI objectives; collaborate; recognise all or other role players.

- Fortune Bank BI providers and their customers

Challenges BI providers at Fortune Bank raise highlight their perception that many of BI's challenges result from BI customers' lack of understanding, incompetence or unwillingness. For example, they highlight challenges related to BI customers' inability to understand the complexity of BI or their competing priorities and dependencies and unwillingness to try new things ("new" 12). They also raise that BI customers do not inform them timeously of business changes, do not know their own data or requirements and do not share responsibilities and dispute costs ("new" 14-16). In addition, it was observed that – on the CMIS Project – when the data marts that were delivered were not used, FBCBI believed the problem was that users did not understand their data and could not generate useful answers to queries, i.e. they believed the problem lay with the users. Another observation in this regard was that FBCBI expressed irritation with interfering customers and a desire to move physical location from where they sat with their customers (identified in Table 10). At the same time, they expressed frustration that only those with a culture of using facts approached them for BI ("new" 22). The relationship was strained further when recognition was given to a BI customer for work he had been able to perform as a result of the BI FBCBI had provided him with (identified in Table 10) – highlighting that even where it is clear that BI has been used, it is not always acknowledged.

Conversely, challenges raised by BI customers tend to highlight their perception that: the BI provider does not provide sufficient training or change management, that there is fault with the BI that is provided (e.g. reports that are open to interpretation or the need to make fast decisions is not supported) or that they don't trust the BI provider as they don't understand the BI process.

In addition, conflict arose between the various BI customers as it was the BI department's approach to "*let the business fight about what they want and come to us when they're clear on their requirements*" (IE). Unfortunately, the business did not manage to "get clear on their requirements" and, due to the high number of urgent and important requirements raised by different BI customers, tension ensued around prioritisation of requirements, resulting in numerous prioritisation sessions. The fact that FBCBI reported to Business Banking but provided BI for the whole of the Corporate division contributed to negativity and strained relationships in this regard ("new" 13, 24).

- BI vendors and their customers at Fortune Bank

Challenges raised from the perspective of the BI customer of BI vendors highlight a certain amount of animosity towards BI vendors. For example, their view that vendors try to "lock" them in, that there are too many features that intimidate users, that the vendors try to bypass the BI departments or increase their marketability by passing off non-BI solutions as BI solutions or even the costly dependencies on resources skilled in vendors' specialist products ("new" 19). In addition, IE expressed irritation with and dismissed efforts of BI vendors that "*mislead sponsors or executives to believe BI is a quick and easy implementation*" ("new" 11). In the same situation, IL (another BI provider at Fortune Bank) would "*pacify"* the BI customer by implementing a *"quick win*" while continuing work on a more comprehensive BI solution that would ultimately replace the quick win interim solution. Conversely, it is also a notable observation that animosity towards BI departments is expressed by BI vendors, e.g. where the BI vendors raise that the BI department gets between them and the customer or express frustration in dealing with various departments in the organisation where these departments do not communicate with each other ("new" 17-18).

- BI sponsors and end-users (both BI customers)

As raised above, the case study identified the gap between the "*strategist that designs a solution in their ivory tower and the end-user who actually has to use the solution*" (IL). This was also an observation on the BI Portal and CMIS Projects. BI sponsors urgently raised BI requirements but, when these were delivered to the end users reporting to the sponsors, they did not share the urgency and did not even use the BI solution delivered, continuing performing their duties as before. BI sponsors were frustrated as their directors had invested in BI solutions, but they were still unable to provide them with the answers, facts or insights that they wanted and needed to conduct business.

- Internal teams within the BI department

FBCBI performed much rework as their teams – e.g. analyst, developer, report writer, database administrators – demonstrated a tendency to work in silos. In addition, FBCBI personnel also experienced difficulties in finding internal business staff representing the various areas that would be integrated in a BI solution. BI sponsors then made business representatives available for input during requirements gathering, but these representatives typically did not understand or take ownership of the data or their department's technical architectures to be able to help FBCBI ("new" 3, 20).

In addition to this, tension was identified between individuals and teams within FBCBI due to challenges related to lack of capacity and the frequent need for individuals who demonstrated competence (and willingness) to work overtime. There was also tension between operational *versus* strategic/project personnel as it was possible for non-operational staff to work some of the time at alternative locations (e.g. home, quieter offices), which was seen as an unfair benefit. These challenges are, however, not unique to BI. The insight in terms of this is the challenge in the fact that

the balanced work-life of the employee was often overlooked in favour of completing the BI process or producing deliverables.

Data needed to answer a query may overlap functions, departments or even the organisation's boundaries – resulting in challenges in ownership, governance and expertise

Observation reflects that, when they didn't "*forget this activity*" ("new" 7) BI business and data analysts experienced challenges identifying data sources as well as experts within Fortune Bank with expertise to assist them to source some of the data necessary to provide complex intelligence. The data or information needed to answer a BI query or populate a report or database does not always mirror the organisation's structure or the way its data is organised. Often data from various disparate sources is needed, where it is unclear who the data owners are or where the responsibility or expertise for this data lies. BI is not restricted to a business function or department and flows across (and beyond) the organisation ("new" 8). It is identified that "*it's difficult to understand where BI starts/ends and how it integrates"* (IH) ("new" 4). In addition, BI customers' demands grew to include more than just data from the bank's legacy, ERP and product systems (for example), they required "*RTBI and inclusion of new data sources such as social media data, Internet banking activity data*", etc. (IM).

IL identifies "More collaboration is needed than when implementing an IS system due to BI's reliance on data and monthly ongoing data feeds" ("new" 10). However, BI customers and BI providers appear to be "stuck" in isolated business *versus* IT thinking rather than collaborating. Challenges in alignment, ownership and responsibility where BI overlaps IT and business realms resulted at Fortune Bank, e.g. there were arguments about who should understand and take responsibility for business data, including the quality thereof. In 2010 FBCBI performed a change management initiative to establish a culture of data quality in Fortune Bank as, based on the queries that were logged at their help desk, "BI customers do not understand that the BI Portal just reflects their data, what they've captured, we cannot be responsible for their spelling or typing errors" (IJ).

In addition, the full impact of BI was seldom considered during BI initiatives conducted at FBCBI. On one BI Portal pricing project, for example, it was discovered that Fortune Bank customers were closing accounts with Fortune Bank after reaching a "saturation point". It was determined that customers left due to feeling exploited through heavy pricing. Had the full impact of BI been considered before the pricing project designed additional fees, the project's angle could have been changed to ensure that customers did not reach the point of leaving the bank. Where integration is omitted or where applications are built without consideration for BI needs upfront, further challenges occur later (In this section: "New" 5, 6, 9).

5.4 Attempts to solve BI's challenges

5.4.1 Case study findings

Much like the literature study, case study respondents indicated measures to address BI's challenges such as BI best practices (IE, II, IJ, IN, IL), CSFs (IE, II, IG and IN), BI frameworks and strategies (IA, IL, IN) and readiness and maturity assessments (V4, IN, IB). While BI vendors tended to raise measures related to their BI technology solutions, BI customers and providers within Fortune Bank raised measures related to BI methodologies and best practices (BI providers) and BI projects (BI providers and their customers).

In terms of BI projects, Fortune Bank BI providers tended to raise measures to address BI's challenges that related to aspects of the BI project that they worked on or perceived that they had control over, e.g. project management and design and development activities. Likewise, their BI customers tended to raise measures they perceived they had control over, e.g. establishment of steering committees (IC, IF, IK), project charters (IC, ID, IH) and governance (IK, IM). In addition, Fortune Bank BI providers were seen to encourage collaboration between their departments' internal teams – e.g. FBCBI's analyst, development, data and reporting teams tended to work in silos neglecting integration and IE and the senior management team discouraged this. IB, a BI customer of FBCBI, had complained several times that FBCBI prioritised their list of BI requirements in favour of Business Banking, at the cost of other Corporate business units. He made the suggestion to centralise FBCBI to provide the whole of the Corporate business division with BI. IE and the senior management team actually did aim to centralise FBCBI (though this had not materialised by 2012), but also wished to establish "*business satellite units*" in each business area that they partnered with. IE's vision was to mature his BI department into a BICC and thereby do this to overcome these types of challenges.

IN (a BI provider in Fortune Bank) explained that changing a BI department into a BICC through measures such as a name change, restructuring and even training do not guarantee success. During her interview, she indicated that her department only changed into a true competence centre when they reached the level of maturity whereby they were less data-intensive and more focused on developing BI solutions and automating routine processes. Another insight from her interview is that she saw "*focused morning coffee chats*" between her analysts and dedicated business representatives as critical to enable her department to identify "*what's top of mind for business*". She explained that most of her department's requirements stemmed from these discussions, as her analysts would "*get their hands dirty in the data to resolve business' questions shortly after these interactions*".

Reflecting on the scoping documents of the BI Portal, CMIS and EDW Projects, it can be seen that CSFs such as "availability and support of project sponsor and business stakeholders", "timely

reviews, approvals and sign-off" and "availability and know-how of business representatives" were raised at the start of these projects. However, it can be seen that this did not ensure that these factors were adhered to, ensured or that they materialised. Project risk and issue logs as well as lessons learned captured at various project milestones reflect that mere awareness of CSFs and documentation thereof at the start of a project does not guarantee success: many of the CSFs appeared later as risks, issues and later, lessons learned.

As expected, the BI vendors indicated their BI IT solutions are best used to overcome BI challenges. This emerged in all their responses (excluding V7 who provided a poor quality response). Vendors predictably raised measures such as change management (V1, V6, and V8), training and support on their specific BI IT solutions (V2, 3, 5) and pre-implementation readiness and maturity assessments (V4). Amongst these and similar predictable measures, two measures were raised that stand out, namely: "*align BI with business processes*" (V8) and "*partnership with the organisation*" (V6).

These measures also emerged at Fortune Bank: Not only did the Retail BICC's analysts' "*morning chats*" with the business show that partnership works well – aligned with V6's identification of this measure – but it was also evident within FBCBI. Where proactive business representatives approached FBCBI and were "*hungry for BI, making a reciprocal effort with my team*" (in the words of IE, head of FBCBI), FBCBI completed projects. The opposite was also true: where business sponsors were unwilling to partner, either by providing business representatives in their area with adequate knowledge of the business and data or through funding of BI initiatives, these projects tended to end up with a status of "abandoned" on the project register. The insight that alignment of BI with business processes is a measure to overcome BI challenges, as raised by V8 above, was also evident within FBCBI. Usage of BI applications that replaced and improved on existing processes was high, for example, the Customer Intelligence module of the BI Portal. Again, the opposite was true: II stated that "*where users have to go out of their way to use BI and it does not form a normal part of their everyday work life or represent something they need, they will not end up using it*". IA stated that implementation of user-friendly applications is a measure to overcome BI challenges, however, it can be seen that applications need to be aligned with and embedded in business processes before users will regularly use them.

5.4.2 Key insights from case study findings

As the literature study identified, current attempts to overcome BI challenges are not entirely successful. Current attempts seen in practice focus mainly on the project and implementation activities involved in implementing BI technology solutions. Case study respondents essentially focus on project success – e.g. that the project is implemented within cost, schedule and quality constraints – but neglect to address challenges they've raised regarding use, data, alignment, resourcing and sponsorship.

It is apparent that BI customer and BI provider are separated in their views of how to overcome BI challenges. BI customers and BI providers suggest measures that fit within aspects of BI that they are involved in or possibly have control over. Furthermore, BI vendors specifically suggest measures related to the BI technology product that they market and sell.

Two insights that emerge, however, are that collaboration as well as alignment and embedding BI in business processes are essential measures – raised by the BI vendors and seen at Fortune Bank. Observations of this highlight that for collaboration to be successful, all involved parties need to have a vested interest in a successful outcome and need to play an active role, providing what the other lacks/cannot provide. For example, for a partnership between a BI department and a BI customer to be successful, at least one of them must understand the business and its data and at least one must understand BI and how it can use this data to meet requirements.

5.5 Consolidation of literature and case study findings on BI's challenges

Table 12 reflects a list of the challenges that emerge for BI from the literature and case study. Challenges that originated in the literature are still referenced with the code allocated in the literature study. New challenges that emerged in the case study are referenced with a prefix "CS". While it has been necessary to examine the challenges at this detailed level to be able to compare literature and case study findings, the next chapter provides a more conceptual view of the challenges. The next chapter examines the relationship between the challenges and BI's worldview, referencing the coding reflected in Table 12 for continuity and traceability.

It is recognised that Table 12 reflects the researcher's interpretation of the literature and case study findings. However, as the intention is not to identify an exhaustive list of BI's challenges (this would be a futile attempt), the challenges reflected in Table 12 serve as an adequate basis for a) comparison with the worldview that emerges in practice and b) analysis through a G-D Logic lens. These are both performed in the next chapters.

Table 12: Consolidated list of literature and case study challenges for BI

Ref	Challenge
	Using BI optimally
U1	• Volume of data that is processed is overwhelming
U2	• Unfamiliar territory for users
U3	• Poor or absent metadata and training
U4	• A gap between the BI application or output and human decision-making
U5	• Adapting to use BI to make decisions
U6	• Providing BI that is relevant, timeous and valued by the user
U7	• Providing BI that is valued by and suited to the organisation's culture

Ref	Challenge
U8	• Catering for different user needs across the organisation
U9	• Dominant focus on data processing reduces time/capacity for use
CSU1	• BI providers aim to evolve to focus on BI development, still neglecting capacity for use
U10	• Low use overlooked as use is often measured according to volume of software applications and licences sold
CSU2	• Low use overlooked as use/BI success is measured according to successful implementation of IS project or completion of data processing
	Managing “big data”
D1	• The advent of unprecedented “big data”
D2	• Storing and accessing big data spread across the organisation in various formats/sources
D3	• Absence of information management methods, governance and data quality
CSD1	• Managing customer demands for data from new and unstructured sources
CSD2	• Ongoing data feeds and support long after deployment
CSD3	• Gaps in ownership or responsibility for data or data quality
CSD4	• Skills and competence on data are largely missing within the organisation, appointed business representatives do not understand the data or know where to source it
	Integrating BI across many complex technology, data and business layers
I1	• Overlooking integration activities (BI fails to consider integration with organisation’s ISs)
CSI1	• Failure to consider integration with BI upfront when acquiring/developing organisation’s ISs
I2	• Complexities related to the organisation’s technology, data and business layers
CSI2	• Skills and competence on IS/IT architecture are largely missing within the organisation, appointed business representatives do not understand IS/IT architecture
I3	• Complexities resulting from organisation-wide issues
CSI3	• More collaboration is needed than when implementing an IS/IT solution
	Aligning and balancing the needs of the various role players in BI
A1	• Misalignment between BI, IT and the business , BI vendors and the organisation and between departments and levels
A2	• BI infrastructure is complex, expensive, takes time and cannot be used until most of it has been completed
CSA1	• BI customers (of BI vendors) have negative impressions whereby BI vendors are seen to: “lock” them in, offer expensive solutions with costly dependencies on specialists and too many/intimidating features
CSA2	• BI departments get frustrated with BI vendors who try to bypass them

Ref	Challenge
CSA3	• BI provider and customer are separated: • BI providers believe BI challenges result from incompetence/unwillingness of BI customer • BI providers believe BI customers don't understand BI complexity, priorities, dependencies • Separate views on how to resolve BI challenges • Isolated business *versus* IT thinking – focus on differences rather than collaboration • Failure to learn each other's environments/contexts or offer knowledge to the other • BI providers focus on application development and data processing, neglecting use thereof • BI customers act as passive recipients, only participating upon request of BI provider • BI customers are unable/unavailable to provide adequate business input • BI providers believe BI customers forget to inform them of business changes • BI providers believe BI customers don't know their data/requirements or dispute BI costs • Communication and collaboration often fails • BI providers expect BI customer groups to collaborate independently (this fails to happen)
CSA4	• BI vendors expect the organisation's departments to collaborate and consolidate their BI requirements (this fails to happen)
CSA5	• BI vendors express frustration when BI departments obstruct direct relationships with users
CSA6	• Managing new customer demands (such as RTBI)
CSA7	• All role players needed in BI initiative are not successfully identified or brought in
	Recruiting, retaining and using BI personnel and their skills effectively
P1	• Specialist personnel are high in demand but short in supply
P2	• A broad skill set is required
CSP1	• BI departments recruit IS and IT rather than BI professionals/experts
CSP2	• Employee's work-life balance is overlooked in favour of completing BI deliverables
CSP3	• Skills and competence to assist BI departments are largely missing within the organisation, appointed business representatives are not able to assist
	Getting the right sponsor in place
S1	• Absence of a sponsor who understands BI
CSS1	• Sponsors who are "mislead" by BI vendors into believing BI is a "quick and easy" endeavor
CSS2	• Sponsors who expect BI IT solution to provide for full BI requirement
01	Realising and measuring ROI

Ref	Challenge
	• Realising and measuring ROI
CS01	• BI success (value/return) is measured at point of delivery of BI project or data process, making ROI harder to calculate
02	Operating in an ambiguous environment • BI is ill-defined and its environment is ambiguous • Treating BI the same as an IT project Resultant challenges: • Difficulties in raising BI specific challenges
CS02	• BI is perceived narrowly as an IS or even more narrowly as a data or IT solution. This results in further challenges (already raised above): • BI success is measured according to BI vendors' volumes of IT sales or IS project measures/data processing performance measures • BI providers seek to recruit IS, IT and data professionals rather than BI experts • More collaboration is needed than when implementing IS solutions, though this is not always acknowledged or performed
CS03	• Failure to recognise and address the fact that BI operates in an ambiguous environment results in further challenges (already raised above): • Misaligned expectations • BI is defined and scoped narrowly as an IS solution (or more narrowly as data/IT)

6. Conclusion

This part of the case study chapter establishes that BI is highly promoted and praised within Fortune Bank and by the BI vendors, as it is in the literature. It confirms that Fortune Bank's investment in BI is high and BI providers and customers within Fortune Bank see BI is a high priority. BI's purpose is confirmed – by the majority of participants – to be to inform decision-making. A strong perception emerges that, although there is a high demand and expectation for BI, BI does not consistently achieve expected results. Furthermore, it is identified that decisions to use BI are made at a strategic level, but that BI implementation takes place at levels which report to these strategic levels – where gaps emerge between the strategist who designs a solution and the end-user who actually has to use it.

The challenges that are identified in the literature study are confirmed in the case study, through observations and reflection on the case study participants' views that emerged in the interviews and RFP responses. Analysis of the case study data reveals additional insights and challenges which are categorised and discussed. Firstly, it emerges that BI is perceived narrowly as an IS (or even more narrowly) as an IT or data solution within an IS. Next, the fact that participants fail to recognise and address BI's ambiguity is identified, along with the resultant challenges, e.g. misa-

ligned expectations, confusion, etc. A third key finding is the segregated viewpoints of BI customers and BI providers and a fourth is the various levels of tension in relationships between participant groups within BI practice. A final category emerges in the challenge whereby data that is required overlaps boundaries but that case study participants' thinking and the organisation's structure are largely restricted to silos and BI provider *versus* BI customer domains.

The ways in which BI's challenges are addressed are then examined. As both BI customer and BI provider groups suggest that BI's challenges are addressed through measures related to aspects of BI that they are independently involved in, their separated viewpoints emerge. Views from BI vendors emerge that their BI IT solutions and services are the key to solving BI's challenges.

Finally, this part of the case study concludes with a consolidation of BI challenges raised in the literature and case study. Challenges are referenced with literature study coding where these originated through the literature study and new codes are assigned for challenges that were identified for the first time in the case study. These challenges are referred to in the next part of the case study and again in Chapter 5.

The next part of the case study examines the worldview of BI held in practice and relates the challenges, as identified in this chapter, to this worldview.

CHAPTER 4 PART 3: CASE STUDY INSIGHTS ON A DOMINATING WORLDVIEW FOR BI

Analysis of case study data to extract insights on the worldview of BI as perceived in practice

1. Introduction

This part of the case study chapter examines and analyses the case study data to discover insights on BI's worldview. The aim is to identify how case study participants perceive BI, whether there are common characteristics that emerge from their perceptions that form a common worldview and whether there are similarities with findings from the literature study. It identifies characteristics that constitute the various elements that make up a worldview and compares perceptions that stem from BI customers and BI providers, including Fortune Bank BI departments and their customers and BI vendors (as potential providers to Fortune Bank).

A consolidated worldview is then presented, based on the findings from the case and literature studies. BI worldview elements and BI challenges are then examined to establish whether there is a connection between challenges experienced and how the BI is understood, perceived and acted upon.

2. Research data used to inform this part of the case study

Questions that were used to elicit responses from interviewees and BI vendors are listed in Appendix B (Sections C to H) and D (Section B) respectively. Further insight is attributed to the researcher's observation at Fortune Bank as well as the 2012 follow-up interviews. As with Part 1 of the case study, interview and RFP findings and observations are integrated, except where observations highlight examples that do not come across clearly through the participants' voices. In these cases, they are documented separately.

3. Elements of BI's worldview

In the same way as the literature study does this, this part of the case study discusses BI's worldview according to the elements identified in the conceptual framework of a worldview (based on literature from Apostel and van der Veken, 1991; Heylighen, 2000; Vidal, 2008:4-6; and Funk, 2001). Analysis of the perceptions that constitute BI's ontology is also presented in its own section (4).

3.1 BI's model of reality as a whole (Ontology)

Case study participants' views on BI, including how they define and scope BI, confirm the literature study's findings that BI is ambiguous and made up of multiple perspectives. This also aligns

with the key finding in Part 2 of this Chapter, where it was established that the case study participants' challenges reflect that BI is an ill-defined discipline operating in an ambiguous environment.

This is true of the views from the BI vendors and Fortune Bank's BI departments (as BI providers) as well as from BI customers at Fortune Bank, although there is evidence that different perspectives are held by BI customer and BI provider groups. These are discussed below in Section 4. Divergent views are also visible on the topic of whether BI is a new concept that replaces concepts such as EIS, MIS, DSS, etc. or whether it is related to these terms but does not replace them. Some case study participants (V1, V6, V8, IB, ID, IE, IF, IM, IN) express views that BI is a new concept replacing concepts such as these "*that have lost popularity*" (IN), even stating that BI is being replaced by analytics as "*analytics is the latest term*" (IM). Others (V2, V3, V5, IA, IG-J and IL) express that BI is an umbrella term for these terms and, conversely, others (V4, IC, IK, IM) indicate that BI is a subset of a related term (e.g. IM, knowledge management, etc.). This reflects the ambiguity in the understanding and scoping of BI that mirrors that seen in the literature.

Also in line with literature study findings, the case study reflects that there is much debate within practice on the question "what is BI?". This is evidenced by, for example, the inter-departmental squabble on this question when it was debated during a BI forum at Fortune Bank (discussed in the observations in Part 2 of the case study), interviewee responses on questions in this regard and divergent views expressed on what BI is by the BI vendors in their RFP responses. An interesting finding highlighted in Part 2 of this chapter that was not evident in the literature study is that, despite their awareness of the ambiguity and debate surrounding the BI definition and scope, BI customers and BI providers did not express much concern about BI's ambiguity or express interest in resolving this. Only IE, IG, IL (BI providers) and IN (a BI customer) highlighted that the fact that BI is ill-defined results in the creation of additional unnecessary complexity and misaligned expectations between BI customers and providers in Fortune Bank. The remaining interviewees expressed that they were satisfied with the way BI is currently defined (IB, ID, IF), that "*BI will never be consistently defined as the technology moves too fast*" (IA) or that although BI is ill-defined, this is just a complexity of the environment (IC, IH, II, IJ, IK, IM) and "*comes with the territory*" (II).

Further new insights emerge in the context of BI's ontology. Firstly, when interviewees were asked to define BI and describe the BI process, all the BI providers (BI departments in Fortune Bank in this case – IA, IE, IG, II, IJ, IL and IN) used terms and descriptions related to the creation of BI up to the point of exchange of the BI product (e.g. report, application, etc.). Although BI customers' descriptions also described this, their descriptions extended to the use of the BI product, after the point of exchange, which was not evident in the BI providers' views. BI providers, for example, focused on the extraction, processing and presentation of data and information and on the phases of the development lifecycle for BI applications. BI customers brought in, for example, decision-making, interpreting reports and alignment with strategy. This highlights Fortune Bank BI provid-

ers' tendency to focus on production of BI and BI applications rather than the use thereof, resulting in a separation of BI customer and BI provider and in a dominant focus on BI technologies and data processing. Views from BI vendors simulated those of the BI providers at Fortune Bank, although a number of the vendors (V1, V3, V5 and V8) addressed change management (including support and training) as part of their proposed BI solution. Although change management may apply after the point of exchange, it relates to the support of the BI application, usually with a finite post-implementation support period.

A second significant insight from the case study in the context of BI's ontology stems from analysis of the case study data according to Kaisler's (2012) suggestion. As discussed in Chapter 3, Kaisler suggests that another way to establish how BI is perceived is to examine whether BI definitions focus on the organisation's processes and rules (i.e. are syntactic) or focus on the organisation's environment and context (i.e. are semantic). Analysis of participants' definitions and explanations of BI in various interview and questionnaire responses reflects a syntactic rather than semantic focus. This is evident in case study data from all types of BI providers and customers.

For instance, BI vendors' definitions of BI, in context with the rest of their RFP responses, reflect that six of the eight BI vendors framed BI syntactically (V1-4 and V6), one (V7) provided insufficient responses to evaluate this and one indicated Fortune Bank should aim to understand their customers (V5), i.e. a semantic definition. This is also evident in the BI providers at Fortune Bank, where only one interviewee (IE) described the external environment in his definition and explanation of BI. It is also evident in the views of the BI customers of Fortune Bank BI departments, where six of the seven focused on the organisation's processes and rules: IM was the only BI customer to bring the organisation's context and environment into consideration in defining and scoping BI. He explained the importance of understanding the customer's point of view for BI, providing an example (among others) of the data that can be collected on the customer experience when using the Fortune Bank website and how it is necessary, not just to collect and understand this data, but to understand where it fits in, i.e. its context from a customer viewpoint.

3.2 BI's model of the past (Explanation)

The history of BI at Fortune Bank – as observed and gleaned from interviewees' responses during the interviews – reflects that BI departments were established as a result of Fortune Bank employees recognising the need for information and intelligence to inform decision-making. FBCBI, the Retail BICC and the EDW department were all established as a result of the recognition of this need followed by action from individuals, who previously had worked in IS and IT departments, to establish these departments. As a result, BI departments were formed to provide BI to the various departments in Fortune Bank, as their BI customers. As such, the literature's view that BI stems from a systems and Engineering background for management and business support is also evident at Fortune Bank.

The same can be said about the BI vendors. Reflecting on the history of the vendors, it can be seen that most of the vendors were established as BI competencies by IT organisations or as BI vendors providing BI IT solutions and services. Furthermore, all the vendors indicate that technology is their primary business and that they have software and technology partners. Even the two smaller local BI vendors who responded to the RFP indicate IT as their primary business (V3) and verify that they have software partners (V1).

As with the literature study, no definitive explanation for the uncertainty in BI perceptions emerged.

3.3 BI's model of the future (Prediction)

The model of the future envisioned by case study participants simulates the focus on technological predictions that emerged in the literature study. An additional perspective from the case study is that BI customers (of Fortune Bank and the BI vendors) (IB, IC, IF, IK, IM) are typically concerned about the features and functions (e.g. ease of use, accessibility and fast response rate) that BI technology solutions will have in the future. With Fortune Bank's tendency and culture to use Microsoft Excel to document almost anything, a number of interviewees (IC, ID, IK, IM) expressed that they foresee BI becoming available in this application for them in the future. Some BI department members (BI customers of BI vendors) (IE, IG and IN) raise similar characteristics, but from their BI department viewpoint, e.g. performance, traceability of data and ability to track, control and monitor user access and use. Another insight aligned with this is that BI providers (Fortune Bank BI departments as well as BI vendors) are typically concerned with collecting and managing greater volumes of data, different types of data, BI delivery mechanisms and expanding the "*audience to whom BI is rolled out to*" (V6). For example, a number of BI vendors raise "*big data*" (V1, V4, V5) and "*BI to the masses*" (V1, V3, V5, F8) in their responses on BI's future. The technology focus continues in both types of BI customer and BI provider views through speculation about BI's integration with existing, new and emerging technologies (mobile devices; social media platforms; document management systems; etc.) – much akin to what has already been raised in the literature study.

In addition, a number of interviewees (IE, II, IJ, IG, IL, IN) from each of Fortune Bank's BI departments shared the view that the future would entail "*freeing up BI resources' time from data processing to automate and develop more BI*". Although this is perceived as "*an evolutionary step*" (IN, IE, II), it only shifts a BI department's focus to development activities – i.e. more technology and production focus and not to the BI customer space where BI providers could potentially assist with the use of BI.

The BI vendors' dominant focus on technology was expected, given that they market and sell BI technology solutions. However, it was not expected to such an extent from the Fortune Bank in-

terviewees, specifically since they had been asked in the interviews to think beyond IT and current BI technology solutions. The fact that they still raised technological advancements along with the BI vendors' dominant technology focus confirms the literature study finding that people think BI is predominantly about technology or impossible without technology (Ackerman, 2005:22; Herschel, 2010b). In addition, in 2011, FBCBI changed their name to BI Technology Solutions (BITS), indicating even more of a propensity to focus on BI technology and the production of this.

An unexpected case study finding was the sentiment expressed by interviewees that they have an awareness of and desire to change the current separation of the BI customer and BI provider in the future. Some BI providers at Fortune Bank (IE, IG and IN) indicated that they believe there will be an evolution of the "*BI resource*" (IG) resulting from increased pressure to demonstrate competence in business, IT and BI – "*resulting from the demand for resources who know the business and how to apply BI in the business*" (IN). This was also evident in the BI customers who admitted that they are often unable to interpret BI reports or data and need a "*BI analyst dedicated to my area who can understand and interpret reports and have conversations with me about their findings*" (IB). Surprisingly, BI vendors also appeared to share this sentiment, indicating that the future will see BI vendors equipping the end user (V2; V3) and performing extended user support periods (V2; V5). However, the sentiment was not shared by all, some BI department providers (II, IJ) expressed frustration with the interference of their BI customers and a desire to even move physical location.

3.4 BI's values (Axiology)

As stated in the literature study, BI's axiology is identified by understanding its value and purpose (Lee, 2011). Part 1 of the case study identified that BI is seen by BI customers and BI providers (including Fortune Bank customers and providers and BI vendor providers) as a top priority, that it is in high demand and receives substantial funding. It also established that BI's primary purpose is seen by case study participants to be to inform decision-making, but that there are also views that BI is used for consistent measurement, to answer queries and to influence and drive business activities and the bank as a whole. This establishes the purpose of BI, as seen, interpreted and reported on by the researcher and the case study participants.

BI's axiology also emerges when examining what the organisation measures and strives towards, in other words, what it values. The researcher analysed what Fortune Bank measures by examining how they measure performance of the organisation and the employee. She analysed what it strives towards by examining its vision and mission. She also analysed what the BI vendors place value on in terms of BI by analysing the benefits and purposes they list for BI in their RFP responses. Insights from this analysis are discussed in sub-sections 3.4.1 to 3.4.3 below.

Insights highlight that, although case study participants view that BI's purpose is to inform deci-

sion-making, BI case study participants do not measure success or determine value at this point. Instead, as reflected in sections 3.4.1 to 3.4.3 below, case study participants typically measure success and determine value according to quality, cost and schedule measures performed on BI projects (typically delivering IT solutions) and determine value at the point of completion, delivery or implementation of the BI IT solution.

3.4.1 Fortune Bank performance measures

Fortune Bank has a performance driven culture resulting from their belief in the maxim "what you measure you get", which various of its managers attribute to Kaplan and Norton (1993:135) who developed the Balanced Score Card (BSC). The BSC is used to plan and measure performance – from employee, to business unit, right up to organisational level. As such, the BSC defines what the organisation values – i.e. its purpose or reason for existence – and provides a measure against which performance can be quantified according to these values. Thereby, by analysing Fortune Bank BSC measures related to BI, the values that shape its BI worldview can be identified.

The researcher analysed several BSCs from FBCBI (representing a typical Fortune Bank BI department) and their BI customers. Table 13 reflects high level measures related to BI from an FBCBI Business Analyst's (BA's) BSC as an example. These high level measures are typically broken down into more detailed measures applicable to the period of measurement. They also include additional categories which are not directly related to BI, e.g. organisational learning (3%) and transformation (5%). Analysis of these BSCs highlights a few key findings, discussed below Table 13.

Table 13: Examples of typical BSC measures (based on actual BSC of FBCBI Business Analyst)

BSC category, measure and weighting
Financial: Grow Economic Profit (EP) through successful completion and delivery of BI Projects or Operational deliverables (12%).
Client: Become client-driven through proper requirements management, throughout FBCBI project process, i.e. from conceptualisation to delivery and change management (60%).
Internal processes: Enhance productivity and execution by delivering quality work with minimum rework through use of templates and adherence to process (20%).

Firstly, measurement takes place upon completion and distribution or implementation of a "deliverable" or output, i.e. value is measured at the point of exchange. The point of exchange is, for example, the point when a BI department has completed a project milestone, e.g. implementation, post-implementation support, etc. and has handed a tangible BI deliverable (output) over to a BI customer. For a BI provider this may be, for example, an application, report, design specification

or an operational output such as completion of a month-end ETL process. For a BI customer this may include, for example, production of monthly financial statements, design of a new banking product, restructuring of fees, etc. BI customer deliverables may even involve implementation of a BI solution in their department, facilitated by a BI department.

Secondly, measurement takes place from the point of view of the provider. The word "deliverable" already reflects that value is measured from the provider's viewpoint, i.e. from where delivery is provided and not from where it is received (it is not a "receivable"). This was also evident in the actions of BI customers and providers at Fortune Bank as, firstly, performance appraisals were performed by an individual's manager, based on observation, team feedback and assessment of deliverables in terms of cost, quality and schedule measures and, secondly, customer input to performance appraisals was discouraged. Although at a stage FBCBI provided performance input for their stakeholders' performance appraisals and *vice versa*, this practice was later abandoned (senior management identified issues resulting from bias due to personal relationships and politics). Another insight gained from analysis of the BSCs is that Fortune Bank aims to optimise its internal "deliverable production" processes to maximise quality (as determined by the provider) output. Focus is on requirements management and project management, even where the BSC indicates "client-driven" as a category.

A final insight stems from observation at Fortune Bank. It was observed that Fortune Bank individuals do not provide BI vendors with feedback on use or performance of their BI applications solutions once implemented, unless a problem or an exceptional interaction is experienced and a complaint or compliment is submitted.

3.4.2 Fortune Bank vision and strategy

The essence of FBCBI's BSC measures stem from their business unit's vision and strategy, as was also evident in the other BI departments' measures and their corresponding business units' strategies. Business Banking's vision was to improve performance in key areas, according to the strategic measures reflected in Table 14. These measures highlight how Fortune Bank focuses on identifying and targeting customers, selling to them and optimising production processes – including the employee as a means of production.

The customer appears to be something that Fortune Bank markets and sells to and it appears to view markets as opportunities to be captured or taken advantage of. Although Business Banking's vision applies to the "man-on-the-street" customer of Fortune Bank, it was evident that these sentiments were also embodied in exchanges and activities within the bank, e.g. FBCBI's BI projects had to be linked to one or more of the measures if staff were allowed to work on the project.

Table 14: An example of Fortune Bank strategic measures as part of their vision

Strategic measure	Key observations
Acquire Primary Banked Clients	1 Identify, target and sell to customers
Sales Force Productivity and Size	2 Sell to customers 3 Optimise productivity/production
Cross Sell	Same as 1, 2
Easy to do Business	Same as 3
New Markets and Products	Same as 1, 2
Talented, Skilled and Energised People	Same as 3

3.4.3 BI benefits and purpose identified by BI vendors as BI providers

As identified in the literature study, BI vendors tend to promote and place value on intangible benefits or the features of their BI IT solutions (Pendse, 2009), e.g. enablement of analysis (V4, 5, 6); consistent delivery enablement (V1); faster response rate (V4); or improved communication (V1, 3, 6). Analysis of RFP responses also identifies that some BI vendors (V1, 7) identify BI's benefit and purpose to be "*customer value*" or "*happy customers and happy users*" as the output of implementing their BI solution, which results from performing a generic "*analyse-design-build-deploy*" methodology. Others see their BI solutions resulting in value such as: enablement of strategic business decisions and strategies (V1-5, 8); "*delivering fast ROI through identification of quick win areas to deliver value*" (V1); delivering actionable insight (V3); promoting expertise throughout the organisation (V2); or providing a comprehensive view of the organisation (V8).

This highlights how BI vendors assume they can determine value upfront or unilaterally. It also highlights that – in the same was as reflected in the measures and actions of BI department as BI providers – BI vendors believe value takes place at the point at which their solution is implemented, which can be seen as their view of the point of exchange.

3.5 BI's guiding principles (Praxeology)

Aside from guiding principles identified within the category of philosophy and theory (e.g. ANT, as identified in academic literature (Papadopoulous *et al*., 2010:25)), case study participants identified the same guiding principles that were identified in the literature study, e.g. strategy, CSFs, maturity models, etc. Many of these were also observed in various stages of adoption and were used within FBCBI at various points during the case study observation period. This was an expected finding, since Fortune Bank BI departments were observed to consistently perform research and attended industry conferences with the aim of "*keeping up with the best in the BI industry*" (IN).

The case study revealed additional guiding principles that were used within FBCBI (as a repre-

sentative of a typical BI department/BI provider in Fortune Bank) that were not explicitly identified within the literature study. For example: Projects In Controlled Environments (PRINCE2) project management processes; Kimball's (Kimball *et al*., 1988:117) requirements gathering process, technical frameworks and dimensional modeling guidelines and; BI strategies and roadmaps compiled by the BI department head. These focused largely on "the next wave of BI technologies". Further examples are: BI's architectural design; bank-wide standards to implement a Service Oriented Architecture (SOA) approach to analysis, design and development activities; data processing, archiving and retrieval methods and; data governance methods. This draws attention to the technical nature of FBCBI's guiding principles whereby the focus is on the BI IT application or on the processing of data – an insight that also emerged in the literature study.

Although the BI vendors did not explicitly state which methodology they use by name, the RFP responses reflect a similar view to the Fortune Bank BI providers, i.e. a view that is highly technical in nature and focused on BI IT solution development and data processes. According to the BI vendors who responded to the RFP, BI is or should be guided by a linear software development process and implementation methodology. A number of vendors (V1, 2, 4, 6, 8) indicated that BI is the result of a typical waterfall software development lifecycle or that it results from completion of data processes such as "create data, deliver information, analyse delivered information" (V3, 4, 5). While the latter hints at analysis as a process to create BI, none of the BI vendors explain how analysis or decision-making take place once their solution is implemented and change management has wrapped up – despite many of them raising decision-making as the ultimate purpose of BI (V1, 3, 6) in other answers. In fact, this was also observed with the BI providers within Fortune Bank's BI departments. Again, these are not new insights as they are similar to those that emerged in the literature study.

A new insight that emerges is that BI is guided by practices and principles defined and implemented unilaterally by BI providers, without significant input or influence from BI customers. This emerges through analysis of FBCBI's activities as a provider to various BI customers (stakeholders) in Fortune Bank. It also emerges in the fact that BI customers of BI departments responded to interview questions on this topic indicating that BI processes are largely the responsibility of the BI department and that they "*only get involved when we are needed for User Acceptance Testing (UAT) or to give input in the form of our requirements*" (IC, ID). Furthermore, BI customers of FBCBI expressed that they find it difficult to understand the BI process, specifically where it starts and where it ends (IH) and that, although they believe they are familiar with IT and IS software development processes and life cycles, they "*feel lost when it comes to BI processes*" (IF). This highlights the separation of the BI customer and the provider and the BI provider's tendency to drive the BI process, delivering BI to a passive BI customer who gets involved as per the BI department's request, if that.

Another new insight is the identification that BI guiding principles – from BI vendors and BI de-

partments as BI providers – tend to revolve around design and development of the BI technology application and the data sourcing and processing activities, without extending to the human decision-making processes on the "use" side of the BI process. No case study participants raised any guiding principles that relate to how BI should be used or to decision-making. Furthermore, although IE and FBCBI's senior management team indicated a desire to change from a traditional software development lifecycle approach to an agile approach, the collaboration they envisioned related to collaboration between analyst and development teams within FBCBI and did not involve a BI customer, other than as per typical IT development methodologies in requirements gathering, UAT and training and/or change management activities.

3.6 Source of knowledge on BI (Epistemology)

The source of knowledge of the case study participants emerges through interviewees' educational backgrounds and previous work experience, analysis of the type of people recruited for BI customer and BI provider roles and understanding of what these types of interviewees base their activities and actions on (discussed in Sections 3.4and 3.5 above). It also emerges by identifying the BI vendors' primary business and by understanding what qualifications and experience they seek in the people they recruit, as reflected in their websites' recruitment information. This is now discussed. A summary of interviewees' and BI vendors' backgrounds can be found in Appendix G.

All the BI vendors indicated IT as their primary business and their websites reflect that, aside from support functions such as finance, human resources, etc., BI vendors seek to employ people with IT backgrounds, specialising in BI (including BI-related disciplines such as IM, analytics, MIS, etc.) or data administration or management. Interviewees' educational backgrounds and previous work experience reflects that they have been informed by various fields, some directly related to BI and banking and others not at all related to BI and banking, e.g. ministry, the medical industry. However, as indicated in Chapter 2, a commonality that emerges between Fortune Bank's BI providers is their background in Engineering and IT fields and between BI customers of Fortune Bank BI departments is their background in Accounting, Finance and Business fields. When asked what types of qualifications and experience are required to work in their departments, BI customers indicated Bachelor of Science (BSc) or Bachelor of Commerce (BCom) degrees or diplomas, with specialisation in IT, IS, Computer Science or IM and experience working in BI, IM or IT. BI customers indicated BCOM degrees or diplomas, with specialisation and experience working in, for example, Accounting and Finance or in Sales and Marketing – depending on the department and function. Reflecting on the interviewees' educational background and work experience, however, it was apparent that these are not fixed resource requirements; individuals with experience outside of these fields were also recruited.

This reflects that BI customers (excluding BI departments as BI customers) are typically informed by Business and Finance fields and BI providers are typically informed by IT disciplines, with a

gap between BI customer and BI provider in this respect. This epistemological limitation could be expected, based on the identification of the dominance of IT in BI's axiology and praxeology (identified in the two sections above), the challenges in alignment between BI customers and BI providers and the literature study's finding that there is a shortage of BI experts with skills in IT and business (Davenport, 2006:7).

An unexpected finding resulted from the observation that BI customers and BI providers at Fortune Bank would typically complain about their lack of knowledge of the others' expertise and environment when raising challenges related to BI customer-provider alignment, rather than focusing on what they could do to breach this gap – e.g. sharing their knowledge/expertise. This insight emerged through the interviews where a number of BI customers (IC, ID, IH, IK) expressed frustration and distrust due to lack of understanding the BI provider's processes, focusing on this rather than on assisting the BI provider to better understand the business environment. At the same time, BI providers (II, IJ) complained about the business' failure to share relevant expertise and knowledge, rather than focusing on educating the business (their BI customers) on their world (e.g. the BI process).

Another new insight is that, although BI customers and BI providers have their specific areas of expertise/are informed by diverging disciplines, BI is not consigned to Business/Finance, on the one hand, or IT, on the other: "*BI's complexity is that it runs, like a golden thread, through the organisation, irrespective of business function or department*" (IL). The case study revealed BI customers (of Fortune Bank BI departments) had expectations that these BI providers would understand *all* Fortune Bank data (including their business data – location, structure, source, etc.), while BI providers had expectations that the BI customers would have expertise on their business data – or at least knowledge of where it was stored and where it originated. This emerged in the interviews (identified by IC, ID, IE, II) and was also apparent in challenges experienced on projects when BI customer and BI provider would reach a stalemate about, for example, responsibility to identify where data resides or to explain data structures. This gap in also became clear in challenges resulting from the business' reluctance (as perceived by BI providers – IE, IL) to take ownership and responsibility for their data (e.g. quality of what they captured, responsibility to clean-up or identify data, etc.).

4. Contextualising BI's perceptions

Analysis of the way BI customer and BI provider interviewees defined BI using the landscaping approach, analysis of their verbal responses on this as well as analysis of the BI vendors' RFP responses on this provided insight into how BI is contextualised in practice. While the main perceptions that were identified in the literature study also emerged in the case study, the case study identified new findings. For instance, new ways of defining BI emerged, which the researcher is not aware of in the literature. Consider the following definitions from BI providers at Fortune Bank

and their BI customers:

> *BI brings together the tools, technology, data, super-user knowledge, industry and business knowledge and other facets of knowledge (IE).*

> *BI is the information/analysis/analytics that empowers the business to understand the business better, make business decisions and have a strategic view (IK).*

IE's definition highlights BI as a point of integration and identifies the resources or components that are integrated through the activity of BI. His (IE's) definition, however, does not specify what the aim of the integration or collaboration of these resources and components is. IK's definition provides a better view of the aim of integration or collaboration, namely, identifying business understanding, ability to have a strategic view and the ability to make business decisions. Together, IE's and IK's definitions provide the insight that BI involves collaboration of various resources and components that jointly aim to achieve the ability to understand the business, make [informed] business decisions and enable a strategic view. The researcher adds "informed" as business decisions are made daily, with or without BI, but BI can assist in informing decisions. In addition, consider the following BI definitions from the BI vendors' RFP responses:

> *BI is an action (V4).*

> *BI is a series of interactions with products, services, communications, etc. over a period of time (V1).*

> *BI is a software capability that, together with systems and methodologies, enables a number of other capabilities in the organisation (V8).*

V4's definition of BI as an action may be considered to fit within the process perception as the process perception (as per this thesis) refers to a series of activities or actions. V1's definition may also be considered to fit within the process perception, but also offers support for the view of BI as a series of exchange activities (interactions) and highlights the various resources involved in the creation of BI, in a similar way to IE's definition above. V8's view of BI software as a capability reflects a new approach to define BI in terms of the skills and competences – or capabilities – that it consists of. However, defining BI in terms of a software capability alone is short-sighted as – even from a purely technical point of view – BI consists of more than just software.

Another new insight is that case study participants' BI definitions – for all BI providers and customers – focus on BI development and data processing, typically as linear processes, without mentioning decision-making or another type of use of the BI application or data that is developed or processed. Further new insights emerge when comparing how BI providers (BI departments

and BI vendors), BI customers and academic and practitioner literature define BI, as reflected below in Table 15. Insights are discussed below Table 15.

Table 15: Summary of BI provider, BI customer and literature perceptions of BI

BI P(V) – BI provider that is a BI vendor BI P (FB) – BI provider that is a BI department

BI C (FB) – BI customer (of a Fortune Bank BI department)

	Dominant perceptions that emerge of BI in the literature and case study			
	Technology	**Process**	**Product**	**Capability**
Overall case study	*Frequently defined* • Mostly BI providers (V and FB) • A few BI customers (of FB)	*Most frequently defined* • All Fortune Bank BI customers and providers • A few BI vendors	*Frequently defined* • Mostly BI providers (FB) • Some BI providers (V) and customers	*Seldom defined* • Mostly BI providers (FB) • No BI customers • One BI provider (V)
BI P(V)	• 6 define BI as a technology (all except V2 and 7*)	• 3: V2, 3 and 6 define BI as a process	• 3: Reference to BI as a technology solution offering (V1, 4 and 5)	• 1: V8 identifies BI is a software capability
BI P(FB)	• 5 define BI directly as a technology (all except IA, II)	• 7: All reference BI as a process • 4 reference/imply BI as/is a linear process (IA, G, I, N)	• 7: All reference tangible and intangible BI products	• 3 identify BI as a capability (IA, IL, IP)
BI C(FB)	• 2 directly as technology (IB, M) • 1 mentions technology (IF)	• 7: All reference BI as a process	• 1 directly defines BI as insight (IK) • 3 mention in/tangible BI products (IC, F, H)	• 0: None identify BI as a capability
Literature	*Frequently defined* • Mostly BI vendors • Some research houses and consultancies • Some academic writers	*Frequently defined* • Mostly academic writers • Some BI vendors • Some research houses and consultancies	*Less frequently defined* • Mostly academic writers • Some BI vendors • Some research houses and consultancies	*Seldom defined* • A fair spread between academic writers, BI vendors, research houses and consultancies

* V7's responses on this question were of too poor a standard to take into account.

The literature study's finding that BI is defined as a technology mostly by BI vendors is supported by the case study finding that mostly BI providers (Fortune Bank and BI vendors) define BI in this way. Reflecting on the comparison in Table 15 above, it is apparent that BI vendors' dominant perception is that BI is a technology and BI customers (of Fortune Bank BI departments) predominantly see BI as a process. BI departments at Fortune Bank (as BI providers) tend to view BI dominantly as a process and product, but also as a technology.

What is perhaps the most significant finding is that the same dominant perceptions emerge with similar consistencies in the case study as in the literature. A potential reason is that, to keep abreast of industry developments, Fortune Bank BI providers read and are influenced by practitioner literature, which they apply to BI practice and thereby influence their BI customers. This literature typically consists of best practices, methodologies, etc. from BI vendors, research houses and consultancies and constitutes a significant volume of available literature. The findings also align with the key finding in Part 2 of this Chapter, where – based on the challenges raised by case study participants – it is identified that there is a strong perception that BI is seen as an IS or as an IT or data solution within an IS.

5. Consolidating a worldview of BI from literature and practice

Table 16 reflects a summary of the characteristics that are seen to constitute the dominant BI worldview experienced and perceived in practice by the case study participants, alongside the dominant worldview that is reflected in the literature on BI. It is recognised that this is an interpretation of case study participants' perceptions and experiences and of the literature's reflections and that, like anything else, the worldview is subject to change. However, on the whole, it can be seen that a dominant worldview emerges, which emulates the worldview that emerges in the literature study. While each characteristic is not directly supported by both the literature and case study, no findings are in conflict with another.

Table 16: Summary of the BI worldview (informed by literature and case study findings)

Key:
E – Element *L – Literature study (the finding is informed by the literature study)*
C – Case study (the finding is informed by the case study)

E	Worldview characteristic	L	C
Ontology	1. BI operates from an ambiguous and unstable model of reality, where BI is perceived as a: technology, process, product and capability (one or multiple of these perceptions).	✔	✔
	2. Although there is much debate, few people express concern about BI's ambiguity.		✔
	3. BI is defined as a technology by BI providers more than by BI customers.	✔	✔

E	Worldview characteristic	L	C
	4. BI vendors' dominant perception is that BI is a technology. Fortune Bank BI departments (as BI providers) view BI mostly as a process and product, but also as a technology. BI customers see BI mostly as a process.		✔
	5. A few individuals see BI as a process enabled by technology to understand the business, make informed business decisions and enable a strategic view.		✔
	6. BI is generally understood (by BI providers and customers) to consist of a linear series of development or data processing activities up to the point of exchange (e.g. implementation/delivery), potentially including change management. Only a few individuals define BI beyond this point, these typically are BI customers.		✔
	7. BI is generally understood by BI customers and BI providers in terms of the organisation's processes and rules (syntactically) rather than in terms of the organisation's environment and context (semantically).		✔
Past	8. No definitive explanation for uncertainty in BI perceptions.	✔	✔
	9. BI emerged (to provide management and business support) from a hard (mechanistic, deterministic) systems and Engineering background.	✔	✔
	10. Fortune Bank BI departments were established by individuals with dominant IT backgrounds responding to business' need for information/intelligence.		✔
	11. BI vendors were established with an IT focus or by an IT organisation.		✔
Prediction	12. Technological advances are envisioned for the future. E.g.: customisation, enhanced technology characteristics and improved delivery mechanisms.	✔	✔
	13. FBCBI demonstrated a renewed technology focus by changing its name to BITS.		✔
	14. BI customers are concerned about future technology solution's features and functions.		✔
	15. BI providers are concerned with collecting and managing greater volumes of data, expanding their BI target market (audience) and improving delivery mechanisms.		✔
	16. BI providers wish to reduce time spent on data processing to be able to spend more time developing and automating BI technologies.		✔
	17. Frustration is experienced due to customer "meddling", but there is a desire to close the BI customer-provider gap through, e.g.: conversations in business jargon; a new type of BI resource (with expertise in business and IT); longer support periods to equip user.		✔
	18. A return to focus on decision-making is expected – enabled by analytics.	✔	
	19. Data (enabled by technology) is the new driver of BI.	✔	
	20. Collaboration and interconnected solutions receive attention.	✔	✔

E	Worldview characteristic	L	C
Axiology	21. Value is measured by the BI provider at the point of exchange of a tangible BI output.		✔
	22. BI's purpose is seen to be "inform decision-making" but value is measured according to cost, quality and schedule measures on the BI IT solution and implementation thereof. Furthermore, BI is aligned with marketing and banking strategies that target and acquire customers and markets.	✔	✔
	23. BI vendors don't typically receive feedback on use or performance of their BI solutions.		✔
	24. Fortune Bank targets customers, selling and marketing to them and optimises its processes to do this as efficiently as possible.		✔
	25. BI vendors promote and value intangible benefits or features of IT solutions, assuming "customer value" is the output of their software development process that takes place upon implementation (exchange) and can be defined unilaterally by vendor, upfront.		✔
	26. BI values the BI environment and applications (neglecting use of BI).	✔	✔
	27. BI's purposes are largely intangible, subjective and hard to measure (ROI).	✔	✔
	28. BI is a top priority/value. BI is for all levels of the organisation ("everyone").	✔	✔
Praxeology	29. Various strategies, CSFs, frameworks, etc. (grounded in IT) are provided by BI providers to manage, govern and guide the BI environment and its technologies.	✔	✔
	30. BI's guiding principles are defined and implemented unilaterally by the BI provider, without interference or influence from the BI customer.		✔
	31. BI consists of a linear series of activities in a software development process or a data warehousing process, guided by relevant IT/data methodologies.		✔
	32. The decision-making process is referred to, but not described. Focus is on delivery of BI technology solution and/or product and the activities to do this.		✔
	33. BI customers don't typically participate in BI solution development unless required to by BI provider e.g. for requirements gathering, UAT, training.		✔
	34. Agile development approaches are strived towards to increase collaboration within BI departments (i.e. between data, development, analyst teams) and to increase the BI department's productivity and deliver BI requirements at faster response rates.		✔
Epistemology	35. BI is informed by various disciplines, Science and business functions, but focuses on BI's IT and IS aspects, causing an imbalance.	✔	✔
	36. BI providers (BI vendors and Fortune Bank BI departments) typically have a IT, Engineering and Science backgrounds while BI customers (excluding Fortune Bank BI departments) typically have Business, Finance and Accounting backgrounds.		✔
	37. A limitation is identified in the gap between BI customer and provider competencies.	✔	✔

E	Worldview characteristic	L	C
	38. When raising challenges, BI customers and providers restrictively focus on their lack of knowledge of the other's expertise rather than on sharing their expertise.		✔
	39. BI flows across the organisation, irrespective of business function. BI providers and customers restrictively think of BI in terms of function, creating gaps where BI overlaps between business, BI and technical realm – e.g. business data ill-understood by all.		✔

6. BI's challenges: in the context of the dominant worldview that emerges for BI

The previous chapter ends with a summary of the prevailing challenges experienced in BI according to literature and case study findings, stating that these will be discussed at a more conceptual level in this chapter. This chapter examines BI conceptually to understand how it is perceived, identifying common characteristics that make up a dominant worldview that is held of BI according to theory and practice. It is now necessary to examine whether there is a relationship between BI's prevailing challenges and this dominant worldview. Challenges are referenced according to the headings and coded references provided in the consolidated list of literature and case study challenges for BI in Chapter 4 Part 2 (e.g. as U1, A1, etc. and the relevant heading – summarised) as a means to maintain continuity. They are, however, now reflected at a higher level to facilitate a discussion in the context of BI's worldview. The four dominant perceptions that characterise BI's ontology are used to frame this discussion and provide structure for Table 17. Consider the examples in the next paragraphs and further examples below in Table 17.

Firstly, where BI is perceived narrowly as a process (i.e. that it is only a process or that it is predominantly a process), it is likely that there will be a strong focus on processing as much data as technology will allow for (e.g. in terms of processing, cleansing, storage and distribution capabilities). This results in reduced time for the BI provider to spend on analysis and insight activities. It potentially also overwhelms the BI customer, as when great volumes of data are delivered, many busy executives or other types of decision-makers do not know where to start – or do not have the time or inclination to identify what is important and relevant to them over and above their normal workloads.

Another example is where BI is perceived narrowly as a technology, it may be construed that simply by implementing a "quick and easy" technology solution that BI benefits will materialise. This may result in the same type of scenario that took place at Fortune Bank on the CMIS Project. FBCBI delivered data marts and a front-end for CMIS BI users, but the solution was not used. As the success of the CMIS Project was measured on implementation of the technology according to being delivered on time (i.e. on the technology), at the right quality and within budget, the sponsor did not understand why the technology he invested in had not resulted in BI benefits. In this case, viewing BI narrowly as a technology caused the sponsor to overlook communication with the end

users and to neglect to ensure that the end users were involved throughout development so that they understood the data and how to use it upon delivery.

Even where BI is understood as a combination of the perceptions that emerge – i.e. where it is understood to be a process, product, capability and the underlying technology that enables or results in these – challenges are evident. For example, where it is believed that the BI provider is the BI department that has the IS, data and IT capabilities to develop BI applications and perform the BI process – to the exclusion of participation from the BI customer.

Further examples are provided in Table 17, where BI's challenges are framed in terms of scenarios such as these, linked to the detailed challenges raised in Part 2 of this chapter and also linked to the worldview characteristic that is seen to underlie or contribute towards manifestation of the challenge. Chapter 5, which follows, examines BI's worldview to identify G-D Logic characteristics in this worldview and how S-D Logic can be applied to explore new avenues to overcome these challenges.

Table 17: BI's challenges in the context of BI's dominant worldview

Key:
WV ref – reference to worldview characteristic numbered in Table 16 above
Challenge reference – Reference to consolidated list in Chapter 4, Part 2

WV ref	Challenges associated with BI's worldview (per perception identified in BI's ontology)	Challenge reference
	BI is perceived as a TECHNOLOGY	
1-5, 9-11, 13, 14, 22, 25, 26, 29, 31, 32, 35, 36	BI is an ill-defined discipline operating in an ambiguous environment. This, and failure to consistently recognise or address this, results in misalignment and confusion. BI is then largely defined by BI providers. They typically operate from a systems and engineering-centric worldview focused primarily on BI as an IS (or data/IT solution). As a result, a dominant focus on BI technology and its features, processes, etc. overshadows other components and resources that are also needed in BI, e.g. ability to use data/IT solution, relationships, etc.	CSU1, CSI3, A1, CSS1, CSS2, 02, CS02, CS03 *(Use, integration, alignment, sponsor, ambiguity)*
1, 3, 4, 15, 16, 18, 24-26, 28, 32	Where there is a focus on BI as only hardware and software, BI providers tend to aim to increase their installed user base - "BI to the masses" (failing to customise for specific user needs). Integration and data are largely overlooked. BI's low use is overlooked as use is measured according to volume of software applications and licences sold/installed and/or on successful implementation of the hardware/software or successful completion of data processing.	U8, U10, CSU2, I1, CSA1 *(Use, integration, alignment)*

WV ref	Challenges associated with BI's worldview (per perception identified in BI's ontology)	Challenge reference
	BI is perceived as a PROCESS	
1, 4, 5, 6, 7, 15, 25, 31, 32	There is a dominant focus on the organisation's internal data processing (enabled by technology) and BI IT development activities, performed by the BI provider. This is compounded when BI customers demand more data or "all the data" but don't even use what is provided. This results in: separation of BI provider and BI customer; data overload; and an unproductive and inefficient spend of BI provider's time where insight and analysis activities are neglected. This can also be seen as an effect of the technology perception.	U1, U9, CSU1, D1, CSA6, CSA3, CSP2 *(Use, data, alignment, personnel)*
1, 17, 21, 30, 31, 33, 37, 39	Costs associated with producing a prototype of a BI solution are regarded as high. However, the alternative is a long wait: BI is only usable when the infrastructure is complete and interfaces successfully with existing infrastructure. This leads to: involvement of the BI customer at a late stage after development processes when requirements are likely to have changed (e.g. new data sources and requirements have emerged); costly changes often involving rework; and BI customer frustration, distrust and lack of empathy for BI 's processes - often resulting in interim "rebel" solutions or independent dealings with BI vendors leading to further BI provider/customer separation.	U6, U7, I2, I3, CSD1, A1, A2, CSA2, CSA3 *(Use, data, alignment)*
	BI is perceived as a PRODUCT	
1, 3, 4, 18, 25, 26, 32, 39	BI use is low as BI is often misunderstood (often by sponsors) to be a non-complex, easy feat solved by simply implementing a BI IT tool/product; human decision-making processes are neglected in favour of implementing the tool/product; training focuses on the tool/product and not underlying data or how to adapt to making decisions using BI or ask the right questions	U2, U3, U4, CSS1, CSS2, S1 *(Use, sponsor)*
1, 3, 4, 14, 17, 21, 25, 26, 29, 31, 32, 36-39	More emphasis is placed on the actual BI product or output and its features than on integration with underlying data and business processes or alignment with the organisation's competences. Integration with organisational infrastructure (e.g. SOA, EA, information security) is not considered or conducted properly. BI personnel are recruited based on their knowledge of BI products (e.g. ETL or development products) but lack proficiency in the business environment, cannot communicate with the business as they use IT jargon and don't have ability to perform analysis or insight activities. Business representatives allocated to BI projects to fill these	U4, CSD3, CSD4, I1, I2, I3, CSI2, CSI3, A1, CSA3, P1, P2, CSP2, CSP3 *(Use, data, integration, alignment, personnel)*

WV ref	Challenges associated with BI's worldview (per perception identified in BI's ontology)	Challenge reference
	gaps often also do not have adequate knowledge of the organisation's data or IT infrastructure.	
	BI is perceived as a CAPABILITY	
1, 3, 6, 7, 10, 14, 25, 26, 30-33, 35-38	The BI capability is largely seen as an isolated function performed by a group of IS (or data or IT) specialists whereby a solution is delivered to the business and the job is thereby completed. The fact that BI provides ongoing support after delivering the BI solution tends to be forgotten, as well as the role of the business and other role players who need to participate and then support and use the BI solution after implementation. The organisation's environment and context are also largely forgotten as the focus is on technical capabilities. The assumption is made that if the BI that is delivered is user friendly, the BI customer will use it and knows how to adapt to making decisions based on it and knows how to ask the right questions and use it in context of the organisation's environment. The BI provider experiences difficulties involving the right people and groups, motivating them to participate and neglects to build a BI capability in the organisation, aside from developing BI and processing data.	CSD2, CSD3, CSD4, I2,CSI1, CSI2, CSI3, A1, CSA3, CSA4, P2, CSP1, CSP3 *(Data, integration, alignment, personnel)*
1, 3, 4, 6, 14, 17, 19, 21-23, 25, 26, 32, 37	When BI feasibility assessments are done, they tend to focus on the BI IT product's capabilities or on gathering and processing "all the data" rather than on the organisation's core competences . BI investments are then typically linked to intangible benefits that BI vendors promote and BI success is measured on the IS project success or successful processing of data. It may then be difficult for BI users to adapt to use the BI solution and make time for it as it's not embedded in their specific business processes. It also becomes difficult to measure ROI.	U9, CSU1, D1, D2, CSD1, CSA3, CSA6, CSP3, S1, CSS1, CSS2, 01, CS01 *(Use, data, alignment, personnel, sponsor, ROI)*

7. Conclusion

This part of the case study chapter identifies characteristics of BI's worldview, using the worldview framework identified and discussed in the literature study. In doing so, a common or dominant worldview emerges for BI, which reflects many similar findings to those discovered in the literature study. New insights are also identified.

After discussing each element of BI's worldview and identifying key characteristics, a common worldview is constructed, using the viewpoints of the case study respondents and complementing these with findings from the literature study. The challenges identified in the previous part of this chapter are then compared to the worldview characteristics and the relationship between these is discussed. A correlation is established where the common dominant worldview that emerges for BI can be seen to be associated with the challenges that are experienced.

The next chapter examines this dominant worldview and its associated challenges through G-D and S-D Logic lenses and proposes a shift to S-D Logic based thereon.