CHAPTER 1: INTRODUCTION AND BACKGROUND

Background, context, scope and foundation

1. Introduction

Business Intelligence (BI) is highly promoted and praised in the media, specifically in terms of the benefits that the organisation is described to gain after implementing a BI solution. However, by examining BI literature and practice, it is established that benefits are not consistently or fully achieved and not all organisations realise the benefits that are promised. Instead, numerous reports of BI failures and challenges prevail. Conversely, even organisations that state that they benefit from BI are on the lookout for opportunities to improve. This highlights the need for research within the discipline of BI to assist BI practice to overcome its challenges on the one hand and, on the other, the need to identify and act on opportunities to improve.

This thesis examines BI's challenges, identifying the persistent challenges that emerge within BI theory and practice. It identifies and compares current measures proposed to address BI's challenges. In doing this, it establishes that existing attempts to resolve BI's persistent challenges are largely ineffective and that a paradigm shift is needed. Rather than attempt to address BI's challenges in the same manner as previous attempts do, this thesis applies a new approach.

This thesis analyses BI at a conceptual level to identify the worldview that currently dominates BI, with a view to determine what contributes towards the occurrence of BI's challenges. It then examines the dominant worldview of BI that emerges in the literature and case study through philosophical lenses. In doing so, this thesis determines that there is an inherent underlying logic influencing BI theory and practice that can be associated with BI's persistent challenges. Based on this, this thesis proposes that a shift in this underlying logic in BI's worldview has the potential to introduce new ways to address many of BI's prevailing challenges, thus allowing for increased BI successes and achievement of anticipated benefits.

2. Background and context

This thesis offers an improved understanding of BI at a conceptual level through analysis of BI literature and practice. It analyses BI based on the conceptual understanding that BI is a series of exchange processes performed by role players operating within a BI landscape based on their own perceptions and accepted behaviour – i.e. their own worldview. Analysis of BI theory takes place through a literature study. A case study is used to analyse BI practice. The case study is set at a large bank in South Africa, using insights gained from BI customers, BI providers and their activities and interactions. Although context is provided on South Africa and the banking industry to facilitate understanding of the case study environment, this research identifies that there is not a clear distinction between South African and international BI markets or landscapes, or specifi-

cally between BI performed within the South African banking industry or BI performed in general.

Background and context are therefore provided on the conceptual understanding of BI as a series of exchange processes, the BI landscape, this thesis' specific case study context and considerations that may result from this, the concept of a worldview and the lenses through which this worldview is viewed and examined in this thesis.

2.1 The conceptual understanding of BI as a series of exchange processes

In the context of this thesis, BI is understood conceptually as the broad series of exchange activities performed with the ultimate purpose of providing actionable information and/or intelligence for use in decision-making. BI is contextualised in terms of exchange as it is identified that there are various exchange activities that take place throughout the BI process, e.g. the process whereby data is extracted, transformed, loaded, presented and used as information or intelligence for the purpose of decision-making. In addition, understanding BI as an exchange process offers opportunities to understand the various relationships, interactions, handovers, checkpoints and the end-to-end flow that takes place from when data is sourced until it is used – in another form (e.g. information or intelligence) – for decision-making.

With decision-making raised consistently as BI's foremost purpose (Bardoliwalla, 2009; Hočevar and Jaklič, 2010:95), it is apparent that BI is not a new phenomenon; BI is primarily aimed at addressing the age-old managerial issue of the need for actionable information for decision-making (Mendell, 1997:115-118; Pirttimäki, 2007b:4). Many solutions, methodologies, technologies and tools have been promoted – typically by BI vendors selling these – over the years as the solution to address this need. For example, Decision Support Systems (DSS), Executive Information Systems (EIS), Management Information Systems (MIS) and analytics. Further examples are even of solutions where the extent of impact on decision-making support is unclear, e.g. Customer Relationship Management (CRM), Information Management (IM), Corporate Performance Management (CPM), etc. (Payne and Frow, 2005:167). While it is recognised that there are various differentiations that can be made in terms of scope, type of data, type of decision support provided, audience and orientation of application (Frolick and Ariyachandra, 2006:42-43), there is still much debate on which of these types of solutions are included within the scope of BI (Wright and Calof, 2006:453). As this contributes towards much of the ambiguity that exists on BI's scope and definition (Olssen and Sandell, 2008:29; Pirttimäki, 2007b:2), it poses a challenge for those working in a BI or BI-related discipline.

As the research presented in this thesis is conducted at a high enough conceptual level, it is possible to address the challenge of ambiguity in BI and BI-related disciplines but include BI-type exchanges that take place in terms of solutions such as DSS, EIS, etc. within the scope of BI and therefore this thesis.

2.2 BI exchange within the BI landscape

2.2.1 Literature's view: a BI market for technology

Literature on the BI landscape is dominated by market reports written predominantly by BI vendors and research houses with a narrow focus on BI vendors and their technical BI products. Market reports focus on, for example: vendor size, mergers, capabilities, performance, new or emerging vendors as well as on BI technology trends, licencing, integration and evaluations of BI technologies. This highlights the narrow perception where the BI landscape consists of BI vendors and BI customers operating in a BI market selling BI technology and related products. In terms of this, BI customers are perceived on the demand side, demanding BI technology solutions that they anticipate will enable decision-making (Shetty, 2011) and BI providers are seen on the supply side, providing for this demand. BI providers are categorised according to whether they are "IT titans" selling a full range of their IT products to their installed user base or specialised ("pure play") vendors that specialise in a specific BI offering (Sallam *et al.*, 2011:1).

Unfortunately, this presents a short-sighted view of the BI landscape as it omits many of the role players. For example: role players who facilitate the integration of legacy applications and data into BI solutions, or those who sell entire databases of data (e.g. the Companies and Intellectual Property Commission (CIPC)) or even governing and authority role players (e.g. regulatory and legislative bodies such as the Competition Commission). In addition, available literature reflects inconsistency and confusion on the scope, categorisation and segmentation of the BI landscape (e.g. Shetty, 2010 vs. Daems, 2008). Many vendors contribute to this confusion by marketing themselves as BI vendors, with the view of increasing market visibility and thereby sales, without actually providing a true BI solution (Glancy and Yadav, 2011:49; Haasbroek 2012; Joubert, 2012). As a result, there is a need to describe the current BI landscape in broader terms for the context of this thesis – as per Section 2.2.2 below.

2.2.2 Broader perceptions of the BI landscape

In general terms and in the context of this thesis, BI exchange activities are seen to be performed by various economic, social and technical actors interacting with each other and engaging in relationships and agreements, fulfilling various roles such as BI customer, BI provider, or even integrator, authority or competitor in a broad BI landscape. BI customers are seen as entities that seek to receive benefit (e.g. the ability to use actionable information/intelligence for decision-making) in exchange for reward, reimbursement or payment, through relationships they engage in with BI providers. These relationships are typically governed by authorities (e.g. those administering data governance or enforcing legislation) and the benefit is ultimately aligned with the aim to out-perform competitors. BI providers are seen in the same context, but are seen as the entities that seek to receive reward, reimbursement or payment and aim to provide the BI customer with

benefit. Typical exchange activities may consist of marketing, sales, consulting services, implementation and support of BI technology solutions, or a combination of these.

In terms of this, it can be understood that, typically, a BI vendor (in the role of a BI provider) sells a Commercial off the Shelf (COTS) or bespoke BI technology solution or BI consulting services to an organisation (as the BI customer). The BI vendor may sell this directly to a BI user or sponsor or indirectly the BI user or sponsor through a BI department that facilitates the relationship, makes customised changes or implements the solution. An alternative scenario is where the BI department develops the solution or offers the service to the organisation themselves, thereby acting as the BI provider (e.g. an in-house solution).

2.3 The South Africa BI landscape and banking industry

The case study was conducted within the South African banking industry. Despite this it is believed that, as the research findings are at a conceptual and not detailed banking- or country-specific level, use of the research findings is not restricted to a South African or banking industry audience. Simultaneously, it is necessary to provide context on the case study environment, given that the case study context will naturally have bearing on the researcher, the research process and the research findings. In addition, it is necessary to provide perspective for the reader so that they can have a sense of "being there" (Stake, 1995:63). Relevant context is now provided.

Available literature does not distinguish between the South African and the international BI market or landscape. In fact, both in South Africa and internationally, this market is said to be dominated by a handful of IT titans such as SAP (including Business objects), IBM, Inform (former Comshare and MIS), Oracle (including Hyperion), Microsoft and SAS (Kanaracus, 2011; Pendse, 2009). Many of these IT titans operate in South Africa and internationally, which is possibly a reason why many of the same trends are noticed in South African and international BI literature on BI vendors, e.g. the mergers and acquisitions (Sallam *et al.*, 2011:1); awareness of the need for integration between BI vendors, the organisation and vendors of other hard and software in the organisation (Daems, 2008; McKnight, 2009). In addition, the congruence between the South African and international BI landscape or market was noticeable during the case study, as firstly, the bank's senior managers selected vendors to approach locally, based on an international and not a local vendor guide and, secondly, the majority of vendors that participated in the case study are international vendors.

In general, the banking industry sees BI as a crucial means to face today's changing environment, risks and challenges. BI is implemented in the banking industry to serve a number of functions, for example: manage risk; sell additional products to existing customers; reduce "churn rate" (losing a client to a competitor); segment customer groupings according to profile, behaviour, etc.; manage "client lifetime value" (define and target clients based on their potential value over their lifetime;

and activation (forecasting which clients will not activate banking products they have purchased and stimulating them to use the product to generate income) (Ćurko *et al.*, 2007:57).

South Africa has well-developed, sophisticated financial infrastructure and support systems for payment processing, credit risk, information management and enterprise risk management (Watson and Donkin, 2005:5) and its financial-sector legislation is streamlined to meet international norms and standards (Financial Forum, 2010). South Africa's banking industry forms part of the finance industry, which is one of South Africa's largest industries (Statistics South Africa, 2011:4). The South African banking industry is comprised of 24 locally controlled banks, seven foreign controlled banks, 42 international banks with authorised representative offices in South Africa, two mutual banks and a number of savings and credit co-operatives. Total banking industry assets amount to R2,967 billion, with the largest four (known as the "big four") banks accounting for 84,6% of this (OECD, 2008; Financial Forum, 2010). These big four – ABSA Group Limited, First National Bank, Nedbank and Standard Bank – also rank as the top four banks in Africa, according to rankings of Africa's top 200 banks according to asset size (Africa Report, 2010). The case study was conducted (anonymously) at one of these big four banks.

As is the case for the international banking industry, the South African banking industry is subject to various challenges brought about by environmental changes and challenges, risks, regulation and compliance. Examples of these are: globalisation, mergers and acquisitions, competition from non-financial institutions, product, market and technological innovation and re-engineering (Nadeem and Jaffri, 2004:1; Ćurko *et al.*, 2007:58). Today's key concerns include: detection and suppression of fraud, risk management, customer management, product management and loss prevention (Ćurko *et al.*, 2007:57). In addition, the South African banking industry also experienced the impacts of the global economic crisis: almost a million jobs were lost between the fourth quarter of 2008 and the first quarter of 2010 (Burger, 2011). This was, however, not believed to be to the same extent as this was experienced in other countries such as the USA and Europe (OECD, 2010:21). In the wake of the global financial crisis, the South African banking sector is benefiting from the economic upswing that gathered momentum towards the end of 2009, though it is still impacted by the crisis' secondary wave or aftershock (Winterboer and Grosskopf, 2009:25,21).

In addition to challenges and risks shared with the international banking industry, South Africa's banking industry faces distinct challenges brought about by its unique conditions. A few examples are: the shortage of resources skilled in BI, data warehousing and banking – aggravated by the large-scale emigration of skilled and educated people (the "brain-drain") (Watson and Donkin, 2005:5); higher relative costs for BI and data warehousing than in Europe and North America (*ibid*); increased competence to operate in a multicultural work setting resulting from South Africa's specific demographic profile (Burger, 2011) and; complexities resulting from South Africa's specific reporting, compliance and legislative requirements. Examples of the latter are: the Broad-

Based Black Economic Empowerment (BBBEE) Act, the National Credit Act (NCA), the Protection of Private Information (PPI) Act, Anti-Money Laundering (AML) requirements, etc. (Institute of International Bankers Global Survey, 2008:152-155).

2.4 The concept of a BI worldview

In terms of the conceptual understanding of BI, this thesis identifies that many of the actors involved in BI exchange have perceptions and engage in actions that shape their interactions and relationships and shape the various BI exchange processes they are involved in. By analysing these perceptions and actions, this thesis identifies typical characteristics and common assumptions that are shared amongst many of BI's actors. These are seen to guide the understanding of the nature of BI, establish the underlying paradigm of BI, organise what is known about BI and make sense of new information that emerges on BI – thereby forming a common BI worldview (Leo Apostel Center, 2012). While some of the concepts and shifts discussed and proposed in this thesis (which fall within and beyond BI or even IS) may not be novel, it is the integration of these and other concepts (e.g. S-D Logic concepts) within the context of a worldview that provides a new approach (Akaka, 2007:17). Existing concepts and shifts that may be related to or which may have preceded this approach are discussed further in section 2.5.2, specifically in the context of existing paradigm shifts within BI and, more broadly, within IS.

A worldview is, simply put: a view of reality that affects behaviour (Heylighen, 2000). It can be held by an individual or collectively by a group. It is not believed that there is only one BI worldview or one set of characteristics and common assumptions shared amongst BI actors (also referred to as role players or entities). However, analysis performed in this thesis identifies distinct, recurring characteristics and assumptions shared amongst BI actors – both in practice and theory – that point towards a dominating BI worldview that distinctly drives and influences BI.

2.5 New lenses to examine BI's dominant worldview

2.5.1 Goods-Dominant (G-D) and Service-Dominant (S-D) Logic

This thesis uses G-D and S-D Logic as lenses to view the dominant BI worldview that emerges. G-D and S-D Logic are – simply put – lenses, perspectives, mindsets or philosophies according to which the notion of economic and social exchange can be viewed (Vargo, 2011b:4), including BI as a series of exchange processes. G-D and S-D Logic may be seen to fit within the multidisciplinary research area of Service Science (Maglio and Spohrer, 2008:18). Service Science is supported by S-D Logic as a philosophical foundation, Service Systems Theory as a theoretical foundation and practical developments such as Service Management and Service Computing, among others (*ibid*; Spohrer *et al.*, 2007:71; Spohrer *et al.*, 2008:4-6). Service Science studies the Service System, which refers to configurations of social, economic and technical actors and re-

sources, connected through relationships wherein a specific beneficial outcome is proposed (*ibid*). Service, in the context of S-D Logic, is defined as the application of competences (skills and knowledge) through deeds, processes and performances for the benefit of another entity or the entity itself (Vargo and Lusch, 2004b:324-335).

G-D Logic is a term coined by Vargo and Lusch in response to their argument that a conceptual shift is needed from traditional views of exchange to an S-D Logic view of exchange. G-D Logic's focus is on production and distribution of saleable goods, embedded with utility and value during the production and distribution processes. It promotes value-in-exchange and a separation of producer and consumer (Gummesson, 1995:250; Vargo and Lusch, 2006:51; Normann, 2001:99; Vargo and Lusch, 2006:14). It focuses on the product (technology), means, producer and production (Vargo and Lusch, 2004a:8; Vargo and Lusch, 2006:18).

Conversely, S-D Logic – with its central tenet that service is the basis of all exchange (Vargo, 2009b:373-379) – questions G-D Logic's traditional views of service (Barret *et al.*, 2011). It represents a shift from G-D Logic's focus to a focus on the use, the customer, the process, the intangible, the relationship and doing (Lusch and Vargo, 2006:xvii; Normann, 2001:99). S-D Logic perceives that exchange consists of a sequence of activities (i.e. a flow of service) whereby customer and provider collaboratively interact with each other, and with others involved in the exchange. Focusing on the customer and the relationship, they co-create value. They simultaneously benefit two or more of the parties involved, providing a service rather than simply a tangible product (though the service may be embedded in a tangible product) (Lusch and Vargo, 2005:89-96; Lusch and Vargo, 2006:xvii; Spohrer and Maglio, 2008:238-246).

Although G-D and S-D Logic are not new, they have not yet been applied explicitly to examine BI (to the researcher's knowledge). This thesis suggests that a shift is made to BI's dominant worldview so that instead of being grounded in G-D Logic, it is shifted to S-D Logic. This offers a new approach for BI to potentially overcome many of its challenges. S-D Logic is seen to be specifically relevant and potentially beneficial for BI.

2.5.2 Application of G-D and S-D Logic to BI

BI represents an integration point for many capabilities that may exist independently (e.g. in other systems) or may not even currently exist (Glancy and Yadav, 2011:48) and may still need to be created. For integration to take place, BI relies on various resources (e.g. data, applications, etc.) and actors (e.g. IT, business, BI) to engage in collaborative activities with the purpose of achieving their own interests. For example, a user must interact with data and a BI application to access information to create the intelligence to be able to make a decision. Various actors – BI, IT, the user, the business product/customer/competitor from where the data comes, etc. – are involved in this. As such, BI represents a highly networked and complex world where a broad range of role

players' interests need to be consolidated.

Lusch and Webster (2011:129) argue that S-D Logic is especially useful in such a context. S-D Logic is especially useful for BI as a complex and adaptive environment: it offers a multidimensional view of all of BI's role players, resources, relationships and integration points. It views all social and economic actors as resource integrators (Vargo and Lusch, 2008b:5), broadening the view that BI is all about technology (Herschel, 2008a). Not only can BI be seen in the full context of its end-to-end flow of activities, but use of S-D Logic offers the opportunity to understand the detail of the relationships, from the customer and relationship viewpoint, in context of the use or value that can potentially result from the interaction (Vargo and Lusch, 2008c:27).

When examining the opportunity offered for BI by S-D Logic, an important consideration is that concepts such as these – service, relationship and value-add – are not new to the business environment, to IS or even to BI. Resulting from heightened complexity and competitiveness in today's business environment, the paradigm shift from producer to consumer has already taken place (Korhonen, 2010). Various business and environmental changes – perhaps chiefly technological advances – have lead to paradigm shifts in the way resources are perceived. Compared with a few decades ago, there is a new focus on human knowledge, skills and core competences to escape the finitude of natural resources (Korhonen, 2010). This highlights that the shifts advocated by S-D Logic are not new and may have been inevitable at a point in the future (given the finitude of natural resources for example), even without the emergence of S-D Logic. Further to this, it is identified that these and other S-D Logic concepts (such as a focus on use, a focus on the customer or bringing customer and provider together) are neither exclusive to nor invented by S-D Logic (Akaka, 2007:17).

With this in mind, the researcher draws attention to the cohesive whole – the worldview perspective of BI through G-D ad S-D Logic lenses, wherein concepts such as these are drawn together – thereby providing a new approach. It is believed, however, that there is merit in investigating and comparing what may be considered predecessor or related concepts and suggested paradigm shifts such as customer-orientation, user-centric design or even service-oriented design and Software as a Service (SaaS) in context of the approach suggested in this thesis and in the context of S-D Logic. This may even be extended beyond BI and IS to the organisation, for example, to paradigm shifts such as: from in-house specialisation of a function to outsourced services; or from mass production to mass customisation. As this thesis presents a new approach to BI, exploring the benefits associated with integrating S-D Logic concepts into what is identified as an existing BI worldview, a comparison of existing concepts and paradigm shifts is beyond its scope. It is therefore raised as an area for future and further research.

3. Definition of key terms

Appendix A provides definitions of key terms in a glossary.

4. Purpose

The purpose of this thesis is to analyse BI at a conceptual level to identify the underlying cause of its persistent challenges and, based on this, suggest a new approach to address these challenges to position BI to be able to more readily and consistently achieve beneficial outcomes. Analysis of BI at the conceptual level is conducted across the full breadth – including both IS/IT design (provision of data/information, system development, etc.) and business perspectives on BI (supported decisions, required information, etc.).

5. Problem statement

A number of challenges are experienced by BI practitioners adopting BI, restricting them from consistently and completely achieving BI's intended purpose or benefits. Existing solutions to these challenges tend to address these challenges symptomatically. In this thesis it is argued that in reality the challenges arise at a conceptual level, and that sustainable ways of addressing these challenges should start with an improved understanding of BI at a conceptual level. Based on this understanding, a new approach is suggested to address BI's persistent challenges.

6. Research questions

The core research question is:
- By shifting the worldview that currently dominates BI from a conceptual grounding in G-D Logic to a conceptual grounding in S-D Logic, are new avenues to overcome BI's prevailing challenges opened for those who practice or study BI?

Secondary research questions are:
- What are the core challenges currently experienced in BI?
- What attempts have already been made to address BI's core challenges?
- What worldview characteristics emerge in terms of BI through perceptions, past and predicted behaviour, values, actions and source of knowledge of academics and practitioners studying and working in the field of BI?
- Are there differences in the worldview characteristics (including perceptions) that are held by BI customers *versus* BI providers?
- Do the worldview characteristics identified for BI constitute a typical or dominant worldview that is currently held of BI by these academics and practitioners?
- Can a pattern be detected in BI's worldview characteristics, revealing that BI's worldview is

grounded in G-D Logic?

- Is there a relationship between BI's dominant worldview, its prevailing challenges and a grounding in G-D Logic?

7. Key contributions made by this thesis to existing research

The research presented in this thesis offers four key contributions to research areas wherein research gaps are currently identified.

Firstly, this research contributes towards understanding BI at a broader and more conceptual level by analysing perceptions, beliefs, behaviour and actions that currently shape and inform the BI discipline as a whole. In doing this, it contributes towards the understanding of a socio-technical view of BI. There are few authors who make quality academic contributions towards understanding BI at a conceptual level, none of which share this thesis' approach. For example, contributions include: Ackerman's (2005) research on a definition and process for BI; Glancy and Yadav's (2011) discourse on a true BI system; Middelton's (2006) conceptual framework for IM; Pirttimäki's (2007) conceptual analysis of BI and related terms; Vanmare's (2006) research of BI benefits and; Venter and Tustin's (2009) study of BI and CI availability in South African organisations.

Analysis of BI at a conceptual level leads to the identification of a dominating BI worldview, which is then examined in this thesis. To the researcher's knowledge, this is a unique approach to examine BI and provides novel insight to the discipline of BI. It thereby forms a second contribution.

By examining the BI worldview through G-D and S-D Logic lenses, a third contribution is made. Although G-D and S-D Logic are not new topics, research that spans BI and G-D or S-D Logic remains largely unexplored at present – there are only a few quality academic contributions (e.g. Goul *et al.*, 2012; Lin *et al.*, 2012). Although the shift from G-D to S-D Logic is discussed at a conceptual level on topics such as value co-creation for Enterprise Architecture (EA) (e.g. Chuang *et al.* (2010)), similar discourse at this level appears to be largely absent from a BI (or related) viewpoint. This limitation is specifically evident for less technical and more conceptual and managerial aspects of BI. Hsu (2008:425) and Zhao (2008:416) stress the need to bridge the gap between computing and management, highlighting MIS' need for a service orientation. While this is not a direct plea for research on BI and S-D Logic, it is logical that research on BI and S-D Logic can contribute towards closing the gap Hsu and Zhao identify.

Finally, a fourth contribution that this research makes is towards understanding BI's specific challenges. While many challenges are raised in current literature, most of these are generic IS challenges and few are unique to BI (Clavier *et al.*, 2012:4140). Similarly, Keith *et al.* (2007:1) identify the typical technical nature of data warehousing challenges discussed in the literature. Their (*ibid*) work may be seen to overlap this thesis' research in terms of challenges and the service ap-

proach. However, Keith et al. apply a Service Oriented Enterprise (SOE) structure to address selected data warehousing issues, providing a network-based research methodology for understanding the impacts of service orientation in the business-modelling sense.

Although this thesis is aimed at an international audience, it is relevant to note that it also provides much needed research from the Southern hemisphere (Korpela *et al.*, 2008:1), specifically in terms of BI. Available academic literature on BI from South African authors tends to focus narrowly on specific subsets of BI, without addressing BI as a whole or at a conceptual level. For example: Bernstein, Grosof and Provost (2001) provide BI research in terms of IS research; Conradie and Kruger (2006) and Marshall and de la Harpe (2009) provide research on BI and data or information quality; Hart (2006) and Hart *et al.* (2002) examine data mining; O'Brien and Kok's (2006) research on BI's potential to produce higher profits in the South African telecommunications industry; Ponelis and Britz (2003) concentrate on data marts and; Porter and Hart (2004) focus on Online Analytical Processing (OLAP). In addition, although extensive literature is available on Competitive Intelligence (CI) from South African researchers[1], this is not the case for BI (Venter and Tustin, 2009:90).

8. Methodology

This research represents an enquiry within the interpretive paradigm, based on a qualitative approach. A literature and a case study have been used to collect and analyse data. Both aimed to gain an understanding of the perception of BI, its challenges and attempts to address the challenges as experienced by participants in the case study and reported in the literature. This understanding is aimed at BI at a conceptual level, but also involves examples to support this from pragmatic levels of BI. Existing research on S-D Logic has informed the conceptualisation of the research that was undertaken and existing research on worldviews provided the basis of the framework that was used to analyse, structure and represent data. This approach resulted in an explicitly socio-technical perspective on BI.

The case study is based at one of the "big four" banks in South Africa, located in Johannesburg. It is referred to as "Fortune Bank" (a pseudonym ascribed by the researcher) in this thesis due to the bank's request to remain anonymous. The case study was conducted from January 2008 until the end of March 2010 (two years and three months), with an informal follow-up observation between January and April 2012. Three research techniques were used: participatory observation, semi-structured interviews and questionnaires (largely open-ended and qualitative). Questionnaires were conducted as part of a Request for Proposal (RFP) process that Fortune Bank was engaging in at the time of the case study.

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[1] E.g. from Begg and Du Toit (2007); Brummer *et al.* (2006); Sewlal (2004); Sewdass (2009); Viviers *et al.* (2005); Viviers *et al.* (2007); and Viviers *et al.* (2002).

Results of the case study provided a rich data set and a deep understanding of the research phenomena. Results consist of descriptions and narrations, as open-ended questions were asked in the interviews and questionnaires and observations were documented in words and diagrams. The data was analysed through comparisons within and between data sets and the literature study. Specific themes emerged through this analysis and were categorised accordingly. Data was analysed according to these categories and the research questions.

The research methodology is detailed in Chapter 2 of this thesis.

9. Scope of thesis

9.1 Clarification on aspects that are in the scope of this thesis

The following are in the scope of this thesis and must be clarified:

- BI at a conceptual level, including all actors (human and technology) and activities (exchanges) involved in the exchange of data, information and intelligence that enable decision-making needed for the conduct of business. This includes:
  - The full BI process (from sourcing data to using intelligence).
  - Terms that may be used to describe the same concepts or concepts that may be considered to be similar when viewed at a conceptual level, e.g. market intelligence (or marketing intelligence), product intelligence, competitive intelligence (Venter and Tustin (2009:89) state that competitive intelligence may be used in the same context as BI).
  - Solutions, technologies and methodologies that may be used interchangeably to refer to BI or subsets/over-arching concepts of BI, e.g. DSS, EIS, MIS, reporting, analytics, CRM, CI, IM, CPM, etc. insofar as these are involved in the exchange of information and intelligence that enable decision-making needed for the conduct of business.
  - The end-to-end flow of BI exchange rather than the level at which BI exchange occurs. This may include BI exchanges within or beyond the organisation, i.e. at micro and macro levels.
- A literature study across different industries, on academic and practitioner literature and on South African and international literature. Although the focus is on recent (e.g. 2005<) literature, there are some cases where older literature is still relevant and has been referenced, e.g. Luhn's 1958 article, or S-D Logic literature from previous decades/centuries.
- A case study at Fortune Bank in South Africa. As research is conducted at a conceptual level without delving into industry- or country-specific detail and the majority of participating BI vendors are internationally based and do not specialise in a specific industry, case study findings are applicable internationally and across industries.
- BI challenges. All challenges identified in the literature and case study are documented in the thesis. However, certain of these challenges are omitted from discussion in the solution

(Chapter 6), namely: IS implementation challenges. The thesis is aimed at BI specifically and not at ISs in general and, additionally, IS implementation challenges presents a broad topic, warranting separate discourse.

9.2 Aspects that are out of scope for this thesis

The following are beyond the scope of this thesis, as they do not contribute to the research topic, answer the research questions or else result in too broad a scoping:

- The debate on data, information, knowledge, wisdom (DIKW): It is recognised that there is much debate on the process and point at which data is turned into information, knowledge and wisdom (Ackoff, 1989:3; Kaipa, 2000:153; Zins, 2007:479) and on what these different terms mean to different actors. However, this debate is identified to be out of scope.
- Setting the scope of BI.
- Providing a universal definition for BI.
- Testing the proposed solution. Although the solution is discussed in terms of practical applicability the solution is not tested in this thesis.
- IS implementation challenges.
- An exhaustive list of beliefs, actions and challenges within BI. While this thesis aims to reflect an accurate representation of today's literature and practice, an attempt to identify and document all possible beliefs, actions and challenges is seen as futile and unrealistic.
- BI successes.
- Analysis of BI's roots in terms of Military Intelligence (MI) or Information Science.
- Evaluation of G-D and S-D Logic.

10. Potential limitations

Potential limitations are identified. These can be highlighted as opportunities for future research:

- Although BI successes are recognised, this thesis does not identify or discuss them. It is recommended that future research incorporates a study of BI success stories, using this research as a foundation.
- Although vendor perspectives are incorporated in this thesis by means of analysis of vendors' RFP responses, the vendor-perspective in terms of BI successes and how vendors currently do or would apply S-D Logic is excluded.
- A possible limitation of participatory observation that the researcher forms part of the research process and cannot be separated from the research phenomenon – more so than through the use of other techniques. While this is recognised as a limitation, it is mitigated through use of alternative research techniques (interviews, questionnaires) that supplemented the observation. The benefit of participatory observation is also noted, i.e. the opportunity for intense, prolonged exposure to the subject matter allowed the researcher to easily collect multiple perspectives and artifacts, ensuring a richer data set for evaluation and analysis.

- Although this research makes use of a single case study this is not seen as a limitation for two key reasons. Firstly, even a single case study can contribute towards scientific development (Flyvbjerg, 2004:421). Secondly, the case study presents a rich and complimentary set of techniques rather than a single technique or method, consolidating and comparing views from heterogeneous groups within and beyond a single organisation.

11. Target audience

This thesis is aimed at specific groups of academics. The first group consists of academics within the disciplines of BI, Information Systems (IS), Information Science, Computer Science, Management Information Systems (MIS) and related academic fields. A second group consists of academics interested in the inter-disciplinary field of Service Science, including the philosophical branch of S-D Logic and the theoretical branch of Service Systems. A third group consists of those who are interested in interdisciplinary research and application of worldviews in terms of the worldview as the social layer of reality within value systems, society and culture – specifically science and technology (Leo Apostel Center, 2012).

Practitioners working in these or related fields could also benefit by applying the recommendations and solutions proposed in this thesis to realise – or realise more of – BI's benefits. The recommendations are sufficiently pragmatic and can therefore serve this purpose. In addition, practical developments related to these fields are informing and are informed by academia and can also therefore benefit from reviewing and/or applying the recommendations and solutions.

12. Thesis outline

The thesis is split into six chapters, some of which consist of a few parts. These are:
1. Introduction: Provides a foundation for the thesis by setting the context and parameters.
2. Research methodology: Explains how the research was conducted in terms of the paradigm, philosophy, approach and techniques. The rationale for the various research methodology choices is also provided.
3. Literature study: Provides a view of current dialogue available in the literature, in three parts:
   - Part 1: The promise and challenge of BI: Discusses what is expected from BI (the promise), the major challenges preventing BI from consistently meeting this expectation (the BI challenge) and previous attempts to overcome BI's challenges.
   - Part 2: Towards understanding the cause of BI's challenges: Takes the first step towards understanding BI's challenges by identifying BI's worldview and examining BI's challenges in respect of this worldview.
   - Part 3: G-D and S-D Logic: Uses the worldview structure identified in Part 2 to frame a discussion of the emerging body of knowledge on G-D and S-D Logic.
4. Case study: This chapter is split into the following parts:

- o Part 1: Background and context: Provides a foundation for the case study by setting the context.
- o Part 2: Results, analysis and comparison (BI challenges): Discusses BI challenges that emerged in the case study data.
- o Part 3: Results, analysis and comparison (BI worldview): Discusses BI's worldview as per the case study.
5. Analysis of BI's dominant worldview and challenges that emerged in the literature and case study through G-D and S-D Logic lenses. This is followed by a proposal for a shift from G-D to S-D Logic, along with a discussion of the benefits and implications of such a shift.
6. Conclusion: Describes how the research questions have been answered, outlines the thesis' contributions and provides suggestions for future research.

The following appendixes are provided:
A. Glossary: Provides a list of acronyms and a glossary of key terms used in this thesis.
B. Interview questions: Lists interview questions that were used to guide the interviews.
C. Interview tools: Provides examples of cut-outs and diagrams used during the interviews as props or tools. An example is also provided of a completed "landscape diagram".
D. List of artifacts used: Lists the artifacts from Fortune Bank used to inform this research.
E. Interviewee background and profile: Summary of interviewees' background and profile details.
F. RFP: Reflects the Request for Proposal (RFP) that Fortune Bank distributed requesting vendors to respond with a proposal to partner with them to implement a BICC.
G. Vendor background and rating: Summarises the background of the BI vendors who responded to Fortune Bank's RFP. Fortune Bank's initial rating of responses is also reflected.
H. G-D Logic evident in BI's worldview and challenges: Presents a summary of examples of G-D Logic characteristics evident in BI's worldview and challenges.

13. Conclusion

This chapter provides the purpose, scope and outline of the thesis. It defines the research problem and lists the research questions, explaining briefly what the methodology and approach are to address this problem and answer the questions. Guidelines are provided to assist in locating specific information and key topics within this thesis. In addition, existing research and interested parties are detailed.

Chapter 2 provides more detail on the research methodology used in this thesis.