CHAPTER 5: A CONCEPTUAL SHIFT FROM G-D TO S-D LOGIC FOR BI

Identification of G-D Logic in BI's dominant worldview and prevailing challenges, followed by a proposal for a shift to S-D Logic

1. Introduction

The previous chapter establishes the relationship between the dominant worldview of BI and its prevailing challenges. Continuing with this stream of thought, this chapter identifies the relationship between BI's dominant worldview, its prevailing challenges *and G-D Logic*, thereafter suggesting a shift from G-D to S-D Logic. Representing the culmination of this thesis' research, references are made to both literature and case study findings presented in this thesis.
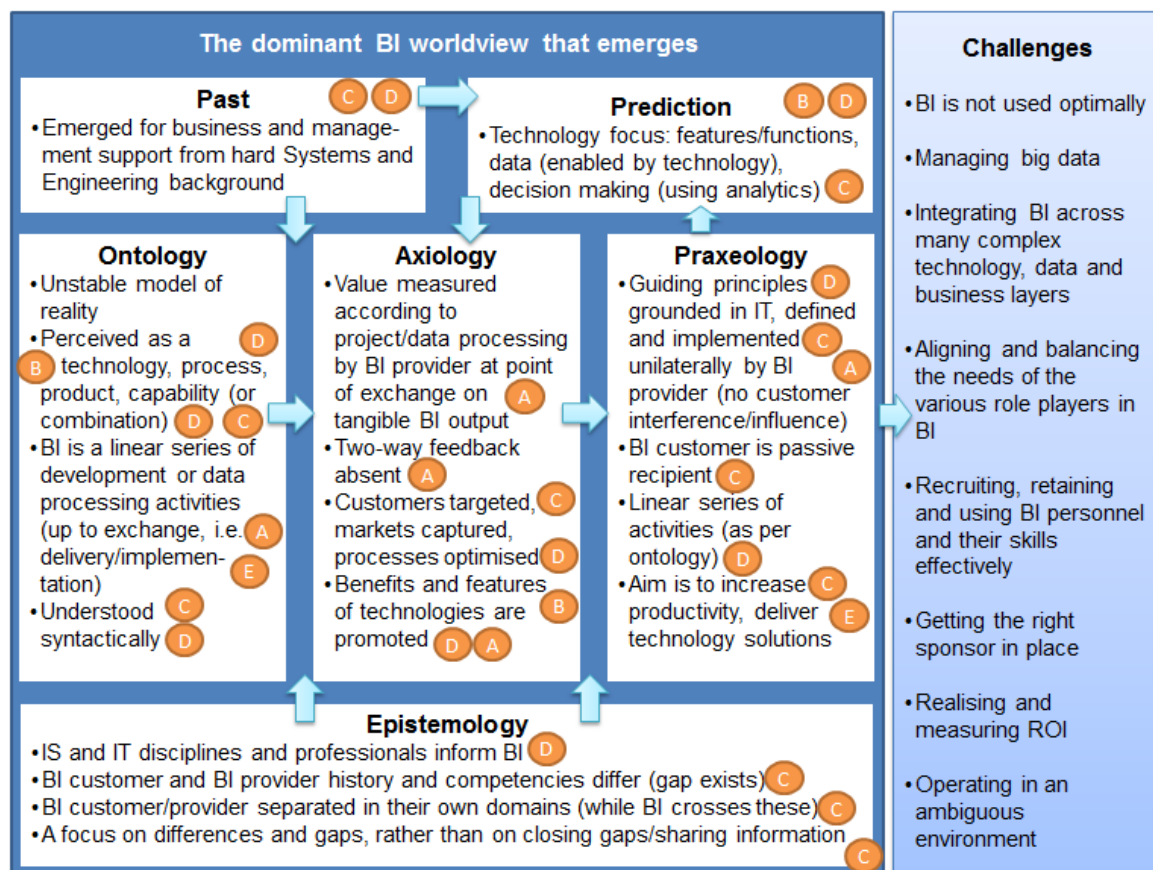
This chapter starts by examining the dominant BI worldview identified in theory and practice, as reflected in the worldview summary in the last part of Chapter 4, through a G-D Logic lens. In doing so, it determines that BI's worldview is grounded in G-D Logic and that this contributes to the prevalence of BI's challenges – which are also examined in the context of G-D Logic. It then argues for a shift to S-D Logic, discussing a conceptual shift from G-D to S-D Logic for BI and how this presents new avenues to overcome BI's prevailing challenges. It explores conceptual approaches to apply S-D Logic to BI as a foundation for a future pragmatic shift to S-D Logic and future research. Finally, it examines the potential implications of such a shift, not only in terms of the potential new opportunities to overcome BI's challenges, but also in terms of potential complications, implications and challenges that may arise from such a shift.

2. BI's dominant worldview grounded in G-D Logic

By analysing BI's dominant worldview through S-D and G-D Logic lenses, the G-D Logic inherent in many of BI's worldview characteristics becomes apparent. As an example, consider the BI worldview characteristic "BI is a linear series of development or data processing activities (up to exchange, i.e. delivery/implementation)" which reflects the G-D Logic characteristics whereby value is perceived in exchange rather than use (Gummesson, 1998:247) and a focus on means, production and producer (Gummesson, 1995:250; Normann, 2001:99; Vargo and Lusch, 2006:51). In fact, analysis through a G-D Logic lens reveals that each BI worldview element demonstrates inherent G-D Logic.

This is reflected in Figure 17 (below) and in detail per worldview characteristic in Appendix H. The G-D Logic characteristics that are identified are based on application of the available G-D and S-D Logic literature to the dominant BI worldview identified in theory and practice (at the end of Chapter 4). G-D Logic characteristics are explained below, in Sections 4.1 to 4.5 and not directly within this section to facilitate a streamlined discussion and comparison with the shift that is recommended to S-D Logic. It is recognised that there are many ways to categorise the G-D Logic char-

acteristics identified in the dominant BI worldview and its prevailing challenges. The categories of G-D Logic characteristics provided in Figure 17 reflect just one such way. These categories are used because analysis of the case study data reveals that they provide thorough yet concise categories for analysis of BI's worldview and challenges. How this inherent G-D Logic identified in BI's worldview contributes to BI's prevailing challenges is discussed next in Section 3.

Figure 17: BI's dominant worldview reflecting challenges and G-D Logic characteristics

Based on the prevalence of G-D Logic characteristics in each of BI's worldview elements, the statement can be made that BI's dominant worldview is fundamentally grounded in G-D Logic. It may, however, be interpreted that there are some characteristics that emerge in BI's prediction

worldview element (described in detail in the previous chapter) that subtly reflect S-D Logic. For instance, the prediction of trends of customisation and collaboration, a return to focus on decision-making (i.e. use of BI) and the desire to close the customer-provider gap. While these predictions reflect that BI may be inclined to demonstrate characteristics of S-D Logic in the future, they also focus on technology (production, means, provider-viewpoint) and reflect BI provider frustration due to customer "meddling" – which can be seen as G-D Logic characteristics. It is therefore believed that BI is firmly grounded in G-D Logic, despite these hints of potential for S-D Logic in the future. A recommendation for future research is, however, to examine BI in terms of whether examples of S-D Logic characteristics emerge in other environments or under other conditions, how they can be enhanced and also whether G-D and S-D Logic characteristics may co-exist within a group or individual's worldview without creating separate factions or other types of tensions.

3. How the G-D Logic in BI's worldview contributes to the prevalence of BI challenges

Challenges raised in the literature and case study are summarised in Table 12 in Chapter 4 Part 2. They are then reflected again in Table 17 in Chapter 4 Part 3 where they are described, consolidated and contextualised in terms of BI's dominant worldview, specifically in terms of BI's dominant perceptions. The latter establishes that BI's dominant worldview contributes towards the occurrence of its prevailing challenges. Furthermore, as BI's worldview is inherently grounded in G-D Logic (discussed above in Section 2), it should follow that this inherent G-D Logic contributes to the prevalence of BI's challenges.

This section now continues this reasoning. It examines BI's prevalent challenges, at the same consolidated and descriptive level provided in Table 17 in Chapter 4 Part 3, identifying examples of G-D Logic characteristics in BI's worldview that contribute towards the occurrence of these challenges. This is reflected below in Table 17, per worldview perception (technology, process, etc.), alongside examples of G-D Logic that are evident in BI's worldview. Reference is made to G-D Logic characteristics A to E, listed above in the key for Figure 17.

Appendix H supports this by reflecting G-D Logic examples at the more detailed level originally provided in Table 12 in Chapter 4 Part 2. Examples of G-D Logic characteristics can be seen for all but one of these detailed challenges. This is "specialist personnel are high in demand but short in supply" (P1), which is a fairly generic challenge. While the prevalence of G-D Logic characteristics in BI's challenges indicates that there is a relationship between G-D Logic and BI's challenges, it cannot be said that G-D Logic is the sole cause of these challenges. For example, complexities resulting from the data, technology and business layers (I2) or organisation-wide issues (I3) may result from an array of technical, social or managerial reasons. Nonetheless, the pervasiveness of G-D Logic examples in both the dominant BI worldview and BI's challenges points towards an underlying G-D Logic that contributes notably towards the occurrence of these challenges and the potential for a shift from G-D to S-D Logic to provide a significant new approach to as-

sist BI to overcome these challenges.

Table 18: Challenges associated with BI's dominant worldview

Key:

A: Value-in-exchange   B: Compete through goods and their features

C: Separation of BI customer and BI provider   D: Focus on means, production and producer

BI challenge	G-D Logic characteristic in BI worldview
BI is perceived as a TECHNOLOGY	
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, typically operating from a systems and engineering-centric worldview focused primarily on BI as an IS (or data/IT solution). A dominant focus on BI technology and its features, processes, etc. then overshadows other components and resources that are also needed in BI, e.g. ability to use data/IT solution, relationships, etc.	• BI is defined and scoped from the provider's point of view, as linear series of production activities (Edvardsson *et al.*, 2011:540; Vargo and Lusch, 2004a:5). **D** • A focus on the means, production and producer (Gummesson, 1995:250; Normann, 2001:99; Vargo and Lusch, 2006:51). **D** • The full service flow is not understood. **E** • A focus on BI technology and its features (goods and their features) (Gummesson, 1995:250; Normann, 2001:99; Vargo and Lusch, 2006:51). **B, D**
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.	• A focus on BI technology and its features (as above). **B, D** • Producers typically perceive that they "capture the market" by selling more outputs than their competitors and, through the sale of goods (e.g. licences), making a profit (Vargo and Lusch, 2004a:5). **B** • Value-in-exchange is perceived rather than value-in-use (Gummesson, 1998:247; Nam and Lee, 2010:1764; 6:37). **A**
BI is perceived as a PROCESS	
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	• A focus on the means, production and producer (as above). **D** • Most of BI's time and effort are spent on collecting/processing operand resources (e.g. data). These represent discovery ra-

BI challenge	G-D Logic characteristic in BI worldview
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.	ther than use activities in terms of the BI value coin (based on Spohrer, 2008a:417). **D** • Separation of customer and provider leads to loss of knowledge of each other's environments and context (Chesbrough and Spohrer, 2006). **C, E**
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.	• Co-creation of value through use of a prototype as an operand resource (as input to value co-creation and source of competitive advantage (FP 4)) is overlooked in favour of completing the BI production process quickly, which is seen to be more cost effective without customer interference (Lusch, *et al.*, 2008:6; Vargo and Lusch, 2009:7). **B, C, D** • Value can be determined by the provider alone (Grönroos, 2000:24-25; Gummesson, 1998:247). The producer is able to make assumptions about the consumer's environment and how they will use/benefit from the BI product (Chesbrough and Spohrer, 2006). **D** • Separation of customer and provider (as above). **C**
BI is perceived as a PRODUCT	
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.	• Focus is not on competence and skill to co-create an operant resource, but rather on production (Vargo and Lusch, 2006:18). **D** • Production of a product is seen as the end of the value chain (Vargo and Lusch, 2008c:27). **B, D** • A focus on BI technology and its features (as above). **B, D**
More emphasis is placed on the actual BI product or output and its features than on integration with underlying data and business processes or	• Focus is not on competence and skill to co-create an operant resource, but rather on production (as above). **D, E**

BI challenge	G-D Logic characteristic in BI worldview
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 gaps often also do not have adequate knowledge of the organisation's data or IT infrastructure.	• Technology is the provider of the service, entities such as people, relationships, etc. are not adequately acknowledged (Vargo and Lusch, 2005:1). **D, E** • A focus on BI technology and its features (goods and their features) (as above). **D** • BI technology is not seen as a transport mechanism of competence (Michel, *et al*, 2008:152; Spohrer *et al.*, 2008:10). It is seen as paramount to other entities in the BI service flow. **D, E** • Separation of customer and provider (as above). **C**
BI is perceived as a CAPABILITY	
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.	• Value can be determined by the provider alone (as above). The producer is able to make assumptions about the consumer's environment and how they will use/benefit from the BI product (as above). **C, D, E** • Value is not personal, experiential, contextual or meaning-laden (Vargo, 2009a). **A** • Customer and provider are separated (as above) and do not switch roles (Vargo and Lusch, 2008c:27). BI customers are seen as passive recipients and, where they get involved, to "interfere" (Lusch, *et al.*, 2008b:6). This separation means that BI customer and provider lose out on contextual knowledge and understanding of each other's environments (Chesbrough and Spohrer, 2006:37). **C, E**
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	• Producer determines the value upfront (Grönroos, 2000:24-25). **D** • Value can be embedded in goods (Gummesson, 1998:247; Lusch and Var-

BI challenge	G-D Logic characteristic in BI worldview
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.	go, 2006:19) – and is measured according to goods' intangible features. **A, B**

4. A conceptual shift from G-D to S-D Logic in terms of BI's dominant worldview

By shifting BI's worldview to a foundation of S-D rather than G-D Logic, it may be possible to change BI's current actions and behaviour, potentially reducing the prevalence of its challenges and failures and augmenting the successes and benefits it is acclaimed for.

The shift from G-D to S-D Logic is described comprehensively in academic literature in terms of the conceptual shift that is proposed for exchange. However, to the researcher's knowledge, there is no literature available that describes the shift specifically from a BI or even a BI-related point of view. By describing the changes needed for BI to shift to an S-D Logic informed worldview, this section provides research that can potentially start to narrow this gap in the literature.

In terms of the literature on the conceptual shift proposed for exchange, an article from Vargo and Lusch (2005:89-95) reflects one of the earlier contributions on this topic. This is followed by further contributions by authors such as Akaka (2007:22), Michel *et al.* (2008:152-153), Nam and Lee (2010:1765) and again by Vargo (2007:13, 29; 2009:376), Vargo *et al.* (2008:148) as well as in recent S-D Logic presentations, e.g. Lusch and Vargo, 2012:2-3; Lusch et al., 2012:15, 18, 19). Nam and Lee (2010:1765), for example, provide a summarised comparison of G-D *versus* S-D Logic perspectives. While they (*ibid*) describe the shift fairly generically for exchange, Akaka (2007:22) describes the shift specifically from the perspective of value creation. She (*ibid*) describes the shift in: the value driver (from value-in-exchange to value-in-use); the role of the customer (from "using up"/"destroying" value to co-creating value); the creator of value (from the organisation often with supply chain input to the organisation with network partners and customers); etc.

The next sections describe the shift from G-D to S-D Logic specifically from a BI perspective, integrating references to the S-D Logic FPs as relevant, summarised in Table 19 below. Vargo (2012a) advocates a focus on a few of the S-D Logic FPs rather than all of them when applying S-D Logic to BI. However, after attempting to do this by focusing only on certain FPs, the researcher reached the conclusion that, in BI's particular case, a broader foundation is first needed whereby

S-D Logic is applied to BI at a conceptual level. This resulted from the absence of an S-D Logic approach to BI combined with the findings that, firstly, each S-D Logic FP can be related to BI and secondly, each shift proposed for BI is supported by various of the S-D Logic FPs. Table 19 now references the S-D Logic FPs alongside the G-D to S-D Logic shift that is proposed, showing all ten FPs are associated with the shifts that are proposed.

Table 19: Summary of the G-D to S-D Logic shift for BI, based on G-D Logic characteristics identified in BI's worldview and challenges

Reference	G-D to S-D Logic shift	Associated S-D Logic FP
A	Value-in-exchange to value-in-use	6, 7, 10
B	Compete through goods and their features to competition through operant resources embedded in value networks	3, 4, 7
C	Separation of BI customer and BI provider to a customer-oriented and relationship focus	2, 4, 6, 7, 8
D	Focus on means, production and producer to a focus on both production and use activities and role players	9
E	From "services" to "service" and BI as a service flow informed by S-D Logic	1, 2, 5

4.1 A shift from value-in-exchange to value-in-use (A)

4.1.1 The G-D Logic evident in BI's worldview: value-in-exchange

G-D Logic typically sees value in the linear series of activities of manufacturing and distributing tangible goods, designed and built by a producer, with a consumer in mind (Edvardsson *et al.*, 2011:540; Vargo and Lusch, 2004a:5). The point of exchange is where value is seen to occur, rather than the point of use, and is referred to as "value-in-exchange" (Chesbrough and Spohrer, 2006:37; Nam and Lee, 2010:1764). As a result, most focus in terms of time and effort is spent on the production and distribution activities that the provider performs leading up to the point at which value is perceived (exchange) and measured by the provider according what he/she unilaterally determines to be valuable upfront (*ibid*). Even communication takes place from the viewpoint of the provider: through "promotion" by the provider, pushed to the customer, instead of through bi-directional dialogue between customer and provider (Vargo, 2009a).

BI's current dominant worldview perceives value at the point of exchange, focusing on the technology or product exchanged and the process of producing this. Characteristics of value-in-exchange are seen in BI's:

- Ontology: BI is understood as a linear series of development or data processing activities up to the point of exchange (e.g. implementation and/or delivery).
- Axiology: Value is measured by the provider at the point of exchange of a tangible BI output. Two-way feedback is largely absent: it is not typically given to BI vendors on use of their BI

solutions after exchange, unless as a complaint or request for technical support. BI vendors are seen to 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 the BI vendor, upfront.

• Praxeology: Although the decision-making process is referred to, focus is on delivery of a BI technology solution which is exchanged for a monetary cost (seen as value).

4.1.2 The shift to S-D Logic: value-in-use

A shift to value-in-use is proposed as, in focusing dominantly on exchange, BI loses sight of the decision-making and resultant action (i.e. use) that it is actually intended for. BI then focuses inefficiently on exchange and production activities, losing sight of other components involved in realising value-in-use.

Consider the following examples from the literature that emphasise that BI is valuable when acted upon. Ackerman (2005:217) emphasises that BI must be "actionable" and Brown (2005), Lönnqvist and Pirttimäki (2006) and Popovič *et al.* (2010:5) recognise that BI has no value of its own: value is only created by acting on the intelligence delivered or when improvements are created in the organisation. Miller (2000) draws attention to the human role in BI by explaining how information that has been driven to a decision point and can be acted on is valuable and is what distinguishes a business leader. In the same vein, English (2005) identifies the importance of the human role in BI, stating that BI cannot exist without people to interpret meaning and significance of information and to act on knowledge that is gained. Another example is from Williams and Williams (2003:13) who recognise the dominant focus on BI implementation – recommending that, to realise BI value, focus is shifted to post-implementation activities.

Although the literature emphasises that BI is valuable when acted upon, to the knowledge of the researcher, existing BI literature unfortunately does not clearly highlight the need to move beyond traditional IS post-implementation support activities to the actual use of BI. It also does not advocate that use should be the focus from the outset of a BI initiative or highlight the dependency on the BI customer to co-create value through use. For instance, although Williams and Williams (2003:13) indicate that post-implementation activities are the domain of business Subject Matter Experts (SMEs), their view of these activities narrowly focuses on process engineering and change management activities involving integrating BI applications into the organisation. This highlights the inappropriate focus that BI currently has on the technology and the product at the cost of focusing on decision-making based on intelligence and insight (i.e. use).

The shift from value-in-exchange to value-in-use relates to three of S-D Logic's FPs – 6, 7 and 10 as formulated by Vargo and Lusch (2008c:25-38) – discussed in the following paragraphs. In addition, what is also relevant to this shift is that Vargo (2012a) reasons: if value is placed on ex-

change, then value-in-use is neglected, whereas if value is placed on use, then it is more likely that value is also achieved in exchange.

FP 6 "the customer is always co-creator of value" highlights the customer's interdependent relationship with other Service System entities and their joint role in realising value-in-use (Spohrer and Maglio, 2008). The lifecycle of a BI product does not end at the point of exchange, implementation or even post-implementation support, it continues through use by the customer. This entails a shift from the current focus on data and technology to a focus on the customer and decision-making. While BI's dominant worldview already reflects characteristics of user-enablement and extended support, S-D Logic sees the BI lifecycle as a service flow – extending beyond support into use.

The BI provider must ascertain whether the customer is able to assist in value co-creation and the BI customer must take an active role in value creation. FP 7 "the organisation cannot deliver value, but can only offer value propositions" highlights that value is not delivered by the provider alone, the BI provider cannot impose a BI solution in the world of a passive user/decision-maker with the aim of this being valuable to them. The provider can only propose that what is delivered could offer value if it is acted on by the customer. This makes the BI provider responsible to learn the BI customer environment – including the customer organisation's data, culture, architectures, etc. – and link compelling value propositions to the customer's competences (i.e. where the customer shows potential ability to co-create value). A potential opportunity in terms of this is if BI customers link their BI investment and BI providers link their potential earnings to the value proposition, BI ROI may become more tangible and measurable than is currently the case (where it is typically linked to intangible technology features (Williams and Williams, 2003:13)). A savvy BI vendor will see the opportunity in creating a win-win value proposition where they can potentially link earnings to the organisation's revenue generated when realising the value proposition. This has the potential to create a long-term revenue stream for the vendor that is worth more than once-off BI technology implementation fees or even perpetual software licence fees.

FP 10 "value is always uniquely and phenomenologically determined by the beneficiary" indicates that value is created in use by the customer and, based on this use – which is personal, experiential, contextual and meaning-laden – the customer determines whether or not the service is valuable (Vargo, 2009a). BI literature already supports this by, firstly, recognising that BI value is context, format, decision-maker, time, etc. dependent (Coulonval *et al.*, 2010; Ghoshal and Kim, 1986; Herschel, 2008a). Secondly, by recognising that knowledge, insights and intelligence that stem from BI have no limited or fixed capacity: the generation of a new idea may have a great impact or none at all (Huggins and Izushi, 2007:2). Therefore, while it is important for BI customers and providers to identify what is valued, so that they can focus on and produce this (Fallis and Whitcomb, 2009:176), they must also recognise that this value is subjectively determined by the customer.

4.2 A shift from the view that competitive advantage is gained through value embedded in goods and their features to competitive advantage gained through operant resources embedded in value networks (B)

4.2.1 The G-D Logic evident in BI's worldview: competing through the perception of value embedded in goods/features

Goods are seen as the end of the production line and value chain (Vargo and Lusch, 2008c:27) and, along with their features, are focused on in terms of G-D Logic (Gummesson, 1995:250; Michel *et al.*, 2008:152-153; Normann, 2001:99; Vargo and Lusch, 2006:51). They are seen to provide a sustainable competitive advantage (Quinn, *et al.*, 1990:60) where the provider can uni-laterally determine and embed value in goods and their features (Chesbrough and Spohrer, 2006:37; Gummesson,1998:247; Grönroos, 2000:24-25). As a result, value is not personal, expe-riential, contextual and meaning-laden (Vargo, 2009b:375). The focus is not on the competence and skill that are needed to co-create an operant resource, but rather on production (Vargo and Lusch, 2006:18). The producer is typically seen to capture the market if they manage to outdo their competitors in terms of selling more outputs or units, and through the sale of goods, makes a profit (Lusch, *et al.*, 2008:6; Vargo and Lusch, 2004a:5).

BI's current worldview sees that goods and their features provide a way to compete. This is evi-denced by, amongst other things, the "flashy" feature-laden BI applications (Pendse, 2009) and over-emphasis of intangible BI benefits such as performance, agility and collaboration (Williams and Williams, 2003:13). Furthermore, this perception comes across in the BI worldview in its:

- Ontology: BI is defined as a technology by BI providers (specifically the BI vendors) more than by BI customers, potentially highlighting BI providers' focus on technology as a means to compete or participate in BI exchanges.
- Prediction: Technological advances are envisioned by BI providers and BI customers. BI cus-tomers raise concerns about future ease-of-use of technology features and BI providers about being able to capture more of the market by extending their installed user base.
- Axiology: Value is measured on a tangible product according to measures such as cost, quali-ty and schedule (typical IS project measures that measure the IS solution (product) and its features) and BI vendors promote and value intangible benefits or features of IT solutions. The BI customer links their BI investment to the intangible benefits – e.g. performance, agility (Williams and Williams, 2003:13) promoted by the vendor.

4.2.2 The shift to S-D Logic: competing through operant resources embedded in value networks

According to S-D Logic, where the provider's knowledge and capabilities transferred with the BI technology are easily transferred, copied or combined, the ability to compete is reduced: there is

much room for quick imitation (Quinn *et al.*, 1990:60). Conversely, by embedding knowledge and skills in resources that are difficult to copy (e.g. operant resources), the ability to compete is increased - as per S-D Logic's FP 4 (Vargo and Lusch, 2008c:25-38). Competitive advantage can be increased even more if knowledge is not just embedded in goods or techniques, but is embedded in a value network or value chain. Even where tangible BI products are exchanged, service takes place: BI products are just distribution mechanisms for service provision, as per FP 3 (Vargo and Lusch, 2008b:7). Therefore, the shift to the view that competitive advantage is gained through service whereby operant resources embedded in value networks is advocated for BI.

In terms of BI, an example of quick imitation is of the current flood of analytics applications and vendors since analytics has been identified as "the next big thing" in the BI market (Gladwell, 2009). Although "IT titans" try to embed their software "stack" in multiple layers within the organisation's architecture (Info-tech, 2010:5) as a means to compete, organisations' requirements for integration across multiple vendors' solutions creates the need for new ways to compete. This shift to S-D Logic can assist in providing this.

In line with this, in an article on knowledge competitiveness where Huggins and Izushi (2007:1-2) explain how organisations that mobilise their knowledge and skills to create novelty in their products face better prospects when competing in advanced economies. They emphasise the interaction between the various actors and identify that knowledge (in terms of BI: knowledge, insight, intelligence) is the outcome of the intensity of this interaction. The creation of knowledge as an operant resource is grounded in a proper combination of human networking, social and intellectual capital and technology assets, facilitated by a culture of change (Edvardsson, 2011:1-2; Vorakulpipat and Rezgui, 2008). This is difficult to copy, transfer, split or combine (Spohrer *et al*, 2008:10) and the service taking place between the value network's entities facilitates a flow of information (Evans and Wurster, 1997:72). This flow of information and service leads to understanding of the full value network. This enables the value network's Service System entities to provide value-propositions to each other, thereby gaining a competitive advantage for themselves and – potentially – others in the value chain (Normann and Ramirez, 1993:65-66). Recognising the service flow assists BI to focus on data and integration activities that align with the value proposition, organisational competence and processes. Resources (data, information, etc.) can be integrated according to the value proposition and service flow rather than according to organisation function or structure. In addition, recognising the service flow assists with management of the various handovers (exchanges) that take place, including the various responsibilities for ownership and integration into the organisation.

By shifting from competing through goods and their features, BI investments may be linked to operational terms realised through business processes, i.e. use – as advocated by Williams and Williams (2003:13). They (*ibid*) caution that BI ROI becomes more difficult to measure and value may actually be destroyed if BI investment is linked to intangible benefits and features typically pro-

moted by BI vendors. They explain that value co-creation is achieved through the use of business information and analysis linked to core business processes as outputs of BI (Williams and Williams, 2003:4).This also emerged in the case study, where it was identified that BI technologies that are part of the BI user's everyday work processes are more likely to be used. In addition, Davenport and Harris (2007:6) stress the importance of linking BI investment to the organisation's core competences. Lusch and Vargo (2006:415) take this further by advocating that, for investments to be the "fountainhead of economic growth", providers must define value propositions specifically to achieve the organisation's core competences.

An insight from this discussion is therefore that BI investment should be linked to a value proposition that is linked to a core competence and enabled through business process. This can potentially contribute to improving the ability to measure BI ROI and increase use of BI solutions as BI customers' (users') competence will be discussed and evaluated upfront and focus will be on use/realisation of the value proposition.

4.3 A shift from separation of customer and provider to a customer-oriented and relationship focus (C)

4.3.1 The G-D Logic evident in BI's worldview: separation of customer and provider

G-D Logic typically sees that the producer creates value unilaterally and upfront without the "interference of customers", who are the passive recipients (Lusch, *et al.*, 2008:6). After the producer and consumer have exchanged the goods, value is depleted from the producer and transferred to the consumer, who consumes or destroys the value of the goods (Edvardsson *et al*, 2011:540). The producer is seen to be the creator of value (in terms of place, time and use) and the consumer the destroyer of value (Edvardsson *et al*, 2011:540; Gummesson, 1998:247; Lusch, *et al.*, 2008:6). Never do producer and customer switch roles. As a result, the producer focuses on production activities, leaving consumption activities to the consumer, meaning that both producer and customer lose out on contextual knowledge of each other's environments (Chesbrough and Spohrer, 2006:37). Production and distribution are seen as the end of value creation (Vargo and Lusch, 2006:18). G-D Logic then perceives that the goods, as the output of production and distribution, are what are exchanged for funds, masking the fundamental basis of exchange, namely service for service (Vargo and Lusch, 2009:7). As a result, the customer and provider are separated, are seen to have distinct roles and do not understand each other's environments (Chesbrough and Spohrer, 2006:37) and no real need is seen to learn the data or each other's context (Chesbrough and Spohrer, 2006:37).

This concept emerges in BI's worldview in its:
- Ontology: BI customer and BI provider have largely separate perceptions of BI and, as BI is generally understood to be a linear series of activities performed by a BI provider up to the

point of exchange, further separation occurs. Furthermore, as BI is understood syntactically rather than semantically, the focus is on the organisation's processes and rules and not the organisation's environment and context, thereby excluding knowledge and context of the BI customer as part of the organisation's environment.

- Past and epistemology: BI customers and providers have different backgrounds, focus on their differences and are separated as a result of both these differences and the approach whereby they complain about this rather than share the knowledge that they can. Furthermore, as BI flows across the organisation, the separation of customer and provider and their restrictive thinking in terms of function creates gaps where BI overlaps the "IT *versus* business" silos that BI customer and provider tend to relegate themselves to.

- Future: While BI customers are concerned about future technology solution's features and functions from the point of view of their own ease-of-use, BI providers are concerned about collecting greater volumes of data and expanding their markets. The BI customer is separated further as BI providers tend to see them as markets that must be captured and dominated – releasing "BI to the masses" and expanding the installed user base.

- Praxeology: BI providers tend to prefer to be left alone to work productively or unilaterally define BI's guiding principles and strategies without "customer meddling", although there is a desire to close the BI customer-provider gap. BI customers play the role of passive recipient as they don't typically participate in BI solution development unless required to by BI provider.

4.3.2 The shift to S-D Logic: a customer-oriented and relationship focus

Separation of the BI customer and BI provider may occur on a number of levels, for example: physical separation where the BI customer and provider are located in different parts of the organisation some distance apart; separation as a result of not understanding each other's business/IT/BI jargon, acumen or contexts; different work cultures; different objectives; etc. Value creation fails, as value cannot be created by either the customer or the provider alone. Not only can't the BI provider determine value upfront without the "interference of customers" (Lusch *et al.*, 2008:6) as per FP 7 discussed above, but the customer is also responsible for co-creating value – as per FP 6. Unfortunately, the BI customer often plays the role of passive recipient (Lusch, *et al.*, 2008:6), waiting for the BI solution to be delivered to them. In addition, when the customer and provider are separated, they miss the opportunity to learn each other's environments and improve the service between them, including opportunities for providers to offer competitive value propositions offering value-in-use (Kowalkowski, 2011:289; Normann and Ramirez, 1993:65-66; Vargo and Lusch, 2004a:3-24).

The shift to S-D Logic is therefore recommended. This shift is not simply to bring the separated customer and provider together; it entails a shift of focus to the customer *and the relationship*, as proposed in FP 8 "a service-centred view is inherently customer oriented and relational" (Vargo and Lusch, 2008c:25-38). This entails a paradigm shift whereby the relationship, and not just the

customer, is key – both customer and provider (and any other involved entities must have a vested interest (value proposition) that they work on towards creating benefit for all involved). In terms of BI, this means that both the BI provider and the customer (e.g. the BI user, super-user, business user, sponsor, etc.) have joint roles in co-creating value and must both see benefit of the relationship.

In addition, customer and provider may be separated still further because the BI technology that is exchanged masks the actual service that is exchanged, as in FP 2 (Vargo and Lusch, 2008c25-38). By recognising this, BI customer and provider can rather focus on their relationship in terms of the skills and knowledge they are actually exchanging (i.e. the true nature of exchange) and their mutual responsibilities and roles in terms of this. BI literature reflects an understanding that BI IT investments deliver greater value when the responsibility for business value capture resides on the business side (Williams and Williams, 2007; Popovič *et al.*, 2010:11). Although this is a useful insight, it neglects visibility of the joint responsibility and the need to bring customer and provider together and should be expanded to include all parties in the relationship in terms of S-D Logic.

4.4 A shift of focus from the means, production and producer to focus on both production and use activities and role players (D)

4.4.1 The G-D Logic evident in BI's worldview: focus on means, production and producer

BI's worldview shows evidence of a focus on the means, production and producer, which is a G-D Logic characteristic (Gummesson, 1995:250; Normann, 2001:99; Vargo and Lusch, 2006:51; Vargo and Lusch, 2006:14). Organisations are seen to function to optimise production variables. There is a focus on standardisation, design for production efficiency and maximisation of outputs which can be sold for profit (Lusch, *et al.*, 2008:6; Vargo and Lusch, 2004a:5). In addition, the flow of service (Lusch and Vargo, 2008; Vargo and Lusch, 2004b:324) is not recognised. Key insights indicative of this G-D Logic are now discussed.

BI is seen as a linear production line of activities, performed from the producer's viewpoint
BI's worldview reflects that it is seen as a systems development lifecycle, a dependent value chain or a linear series of operational and managerial activities completed with a predetermined idea of the customer in mind. In addition to highlighting the focus on production, this insight emphasises that BI is seen from the provider's perspective.

Conversely, it may be argued that BI development involves the BI customer and develops the BI solution based on customer requirements. Like the typical IS development methodology, BI development typically involves BI customers in iterative or once-off Joint Application Development (JAD) sessions or similar requirement gathering sessions. However, the case study reveals ten-

sions resulting from requirements that are not gathered properly or are assumed, a gap between the BI customer and the ultimate end user upon whom the BI solution is "imposed" and that often BI customers are unable to provide their requirements due to insufficient understanding of BI or even of their own data. The latter highlighting that some BI customers may see the BI process solely as the BI provider's responsibility.

Furthermore, case study participants refer consistently to "BI deliverables", in the interviews and in the project documentation and RFP responses. The word "deliverable" has a G-D connotation, as it refers to a tangible good that is delivered and is stated from the producer's viewpoint (i.e. it is not a receivable). There is little evidence within BI literature of guidance and actions that are described from the user's point of view – e.g. of BI use or decision-making.

Goods as the output – where value is determined upfront by provider
BI's linear series of activities are seen to produce an output in the form of data, reporting, intelligence, ability, insight, information, knowledge or a BI solution. Some BI providers even state that "customer value" results from the BI production process. Emphasis on a product is typical of G-D Logic and the perception that value can be delivered indicates the G-D Logic belief whereby the provider determines value upfront and embeds this in the goods which are manufactured, making assumptions about the consumer's environment and how they will use/benefit from the product (Chesbrough and Spohrer, 2006). Furthermore, BI is guided by and consists of actions in a series of activities in software or data warehousing processes – typically in a water fall systems development approach.

Focus on technology (the means)
A dominant focus on technology emerges in BI's worldview – both from BI customer and BI provider – that draws attention to the G-D Logic inclination to focus on the tangible means and the tangible output of the means. Technology is not seen as a transport mechanism of competence (Spohrer *et al*, 2008:10; Michel, *et al.*, 2008:152), but is seen to be paramount to other entities in the BI process.

G-D Logic related to these insights is evident in BI's worldview elements, for instance:

- Ontology: BI operates from an unstable model of reality and is understood as one or more of four dominant perceptions. Although, this alone is not indicative of G-D Logic, these perceptions establish that BI is typically seen as a linear production line of processes performed by a BI provider (i.e. the capability) to produce an output with a dominant focus on technology as a means. Furthermore, the dominance of syntactic definitions of BI reflect that BI is defined and seen with an inwards focus, looking towards the organisation's rules and BI processes (largely technology enabled) rather than the context and environment.
- Past and epistemology: The fact that BI emerged from a systems and engineering background and is grounded largely in IS and IT/data solution thinking emphasises the focus on

technology as the means.

- Future: Technology advances are envisioned for the future. Although BI providers envision evolving towards decreasing their time on data processing, they aim to increase time and effort on the development of BI applications and automation of BI processes – still maintaining the focus on the means rather than the use. Their aim is to maximise output (e.g. data generated) with minimum resources (G-D Logic characteristics). In addition, even where analytics is seen as a trend for the future, it is seen from the perspective of the means as a BI hardware and software solution.

- Axiology: Value is measured according to the means – BI application development and data processing. The benefits and features of technologies are promoted.

- Praxeology: Not only is BI seen as a linear production line, but it is typically guided by principles grounded in IT.

4.4.2 The shift to S-D Logic: focus on production and use activities and role players

It may be argued that BI's current dominant focus on the means, production and producer serves BI as firstly, during the Industrial Era, information and data were in short supply and, secondly, the BI industry's focus on this has resulted in sophisticated technology that enables the processing and storage of great volumes of data which was previously unavailable (Russom, 2011:4). However, in today's post-industrial Information Age or Knowledge Era (Miles and Boden, 2000:1-3), the typical G-D Logic "software factory" view is seen to be restrictive. It creates challenges associated with a dominant focus on processing rather than using data and BI. Today's challenges do not exist because there is a lack of information and technology to generate great volumes of data and information, but rather because there is a lack of understanding and use of it (Gladwell, 2009). A dominant focus on technology creates challenges that range from, for example, inappropriately linking BI investments to technology rather than value propositions to difficulties in finding human resources competent in more than just a BI technology solution. In addition, the dominant focus on technology reduces the understanding of BI to BI as an IS, limiting its focus to IS development and implementation.

Today, instead of venerating technology and crediting the Industrial Revolution for triggering economic growth, it is recognised that economic growth started before the Industrial Revolution, independently of technological change (Mokyr, 2002:29). It is now acknowledged that economies can grow as a result of continuous re-allocation of resources (Mokyr, 2002:285). In line with this, Jones (2002:20) believes that the impressive achievements technology is credited with can, in fact, be achieved by simply investing in organisations that encourage invention and enterprise – independently of technology. Mokyr (2002:3,9) talks about the interconnectedness of society's collective knowledge as something that can be drawn upon by the producer who knows what they do not know but knows where to find this – thereby resulting in "useful knowledge" and innovation or, in S-D Logic terms, resource integration.

In terms of this, two major shifts towards S-D Logic principles are proposed. Firstly, a shift from the linear production line or software factory to an interconnected value network of Service System entities integrating resources (also described in section 4.2 above)– as per FP 9 (Vargo and Lusch, 2008c:25-38). Secondly, a shift to recognise value-in-use, also as described above (in section 4.1). The second shift to value-in-use does not advocate neglect of BI processing in favour of value-in-use but rather that they are treated as equally important aspects of BI. It is recognised that it is impossible to create value – i.e. improve, advance, innovate – without both sides. This is discussed further at a conceptual level in Section 5 where approaches and concepts to guide the application of these shifts are discussed.

4.5 A shift from "services" to "service" and BI as a service flow informed by S-D Logic (E)

4.5.1 The G-D Logic evident in BI's worldview: "services"

"Goods and services" reflects terminology representing G-D Logic, whereby service is seen in the context of goods as a byproduct of goods, i.e. "that which is not goods" (Miles and Boden, 2000:1-3). Reflecting on BI's worldview and the supporting literature and case study detail that resulted in it, insights emerge that demonstrate that BI operates from a G-D Logic lexicon that does not recognise "service" and is viewed from the context of the provider or production process.

This is evident in the use of "deliverables", as described above. It is also evident in statements from BI participants where a distinction is made between BI goods and services. Goods are referred to as the traditional physical products that are delivered (project plans, BI solutions, data, etc.) and services are referred to in the traditional sense of services – consulting, training, etc. or in terms of computing services such as SOA or web services.

Specifically in terms of BI's worldview, G-D Logic related to these insights is evident in BI's worldview elements, for instance:
- Ontology: Use of wording "deliverables" in descriptions indicating the understanding of BI.
- Praxeology: Focus is on the "deliverable" that results from technology solutions.

4.5.2 The shift to S-D Logic: BI as a service flow informed by S-D Logic

By recognising and understanding "service" as opposed to "services", there is an understanding of service as the application of competences (skills and knowledge) through deeds, processes and performances for the benefit of another entity or the entity itself (Lusch, Vargo, 2008; Vargo and Lusch, 2004b:324-335). There is also an understanding that service is provided through acts of service (i.e. the traditional services) as well as through goods (as per FP 3 (Vargo and Lusch, 2008b:7)). A benefit of understanding service in this way is that BI's focus can shift from the BI product or technology and its features (the goods) *versus* BI consulting and support (the services)

to BI's actual offering (i.e. insight, intelligence, etc. used for decision-making) and the flow of service involved in creating this – whether this results from something that is tangible or intangible (e.g. a report or insight). Immediately use and purpose become the focus, rather than technology or the exchange. Service is understood as the fundamental basis of BI as BI is understood as a service flow – as per FP 1 and FP 9 (Vargo and Lusch, 2008b:7) respectively.

The shift to recognise service also represents a shift from thinking about BI narrowly in terms of IT-type services. Although these may have practical application within BI (e.g. web services) or may be seen as a means to achieve BI's purpose (Doan and Kosaka, 2011:5), an S-D Logic approach to BI ensures that BI is not driven or dominated by these fast-moving developments. Instead, the shift advocates that when BI is informed by S-D Logic, it develops in parallel with practical developments.

5. Conceptual approaches to apply S-D Logic to BI with the aim of contributing towards overcoming BI's prevailing challenges

Section 4 describes a shift from G-D to S-D Logic, identifying these shifts as potential new avenues to assist in resolving BI's prevailing challenges. Reflecting on S-D Logic literature to identify how S-D Logic can be applied to BI at a conceptual level, specifically in terms of how the shifts advocated in Section 4 above can be facilitated, a few principal concepts or sets of concepts emerge. Firstly, the concept of the BI value coin (5.1 below) and an adaptation of the ten FPs of S-D Logic for BI (5.2 below) form a theoretical basis to apply S-D Logic conceptually to BI. Secondly, from a pragmatic viewpoint, the guiding principles reflected in 5.3 (below) provide an approach to guide the practice of BI. Although 5.1, 5.2 and 5.3 may be applied together or individually, it is recommended that the pragmatic approach (the guiding principles) is underpinned by the theoretical basis (the BI value coin and the ten FPs). This ensures that the actions proposed through the guiding principles are understood in the context of S-D Logic. A summary of how these approaches relate to the proposed shifts and BI's challenges is reflected below in Table 21.

The aim of this section is to provide a conceptual foundation which can be used as a basis for future research to ascertain the feasibility of shifting to S-D Logic as well as a basis for practical application of S-D Logic to BI. The section on guiding principles (5.3) specifically discusses how the shift from G-D to S-D Logic may assist in overcoming BI challenges. This is also summarised below in Table 21. Section 7 then examines implications of such a shift that may be created.

Although it is possible to derive ideal worldview characteristics for BI from the description of the shifts that are advocated in Section 4 above and thereby formulate an "ideal BI worldview", this is considered an unrealistic or utopic approach. Added to which, as a worldview emerges from an individual or a group's collected views of reality, beliefs, actions, etc. over time (Peck, 1978:32-33), it is assumed that it cannot be pre-defined and imposed on an individual or group for suc-

cessful adoption thereof.

Additional approaches also emerge in Service Science – specifically in Service Systems Theory – that may also be applied to BI. For example, BI may be seen as a Service System consisting of complex, dynamic arrangements of operand and operant resources in Service System entities which engage in dialogical, intense interaction to co-create mutually beneficial value (Spohrer *et al.*, 2008:9). However, as this thesis' focus is on an S-D Logic approach to BI as a foundational step towards applying S-D Logic to BI, Service Science and Service System approaches are not discussed further. It is, however, recommended that future research considers this, as well as approaches that use Service Science and overlap both its philosophical (S-D Logic) and theoretical (Service Systems Theory) branches.

5.1 The "BI value coin"

Literature from Spohrer (2008a:417) provides an analogy that can be made applicable to BI and to the shifts proposed in Section 4 above. In terms of the proposed shifts, Spohrer's analogy is relevant to achieving value-in-use (4.1 – A), treating BI customer and BI provider and their activities as part of the same service flow rather than separate entities or activities (4.3 – C) and shifting from the focus on means, production and producer (4.4 – D).

Spohrer (*ibid*) identifies knowledge discovery and knowledge application as two sides of the same coin, stating that this can potentially be referred to as the innovation coin and that, for innovation to take place, both sides must receive effort and attention. Figure 18 (below) reflects Spohrer's innovation coin and the derived BI value coin, based on the innovation coin. Spohrer refers to *knowledge* discovery and *knowledge application* and the *innovation* coin. His terminology is adapted in the analogy as it is applied to BI. "Knowledge" is omitted, since it may be – for example – data and/or information that emerge in discovery and insight, intelligence and/or knowledge that are applied as a result thereof. The "innovation coin" is changed to the "BI value coin" as, by successfully combining BI discovery and BI application, the probability that the purpose of BI (its value) emerges is increased. Finally, the word "application" is replaced with "use" to avoid possible confusion relating to understanding "application" as a noun describing, for example, a BI technology application.

The BI value coin can be applied to BI to assist in a shift from G-D Logic characteristics to S-D Logic characteristics. First, consider Figure 19 (below) which juxtaposes the typical G-D Logic exchange process (Part 1) and the typical BI process (Part 2) to highlight their similarities. In doing this, Figure 19 highlights the G-D Logic inherent in the BI process in terms of (amongst other things) the neglect of use of BI, focus on the producer's production and distribution processes (collecting and processing data and information and developing BI technologies), the perception that value is achieved in exchange (at the handover point) and separation of BI customer and BI
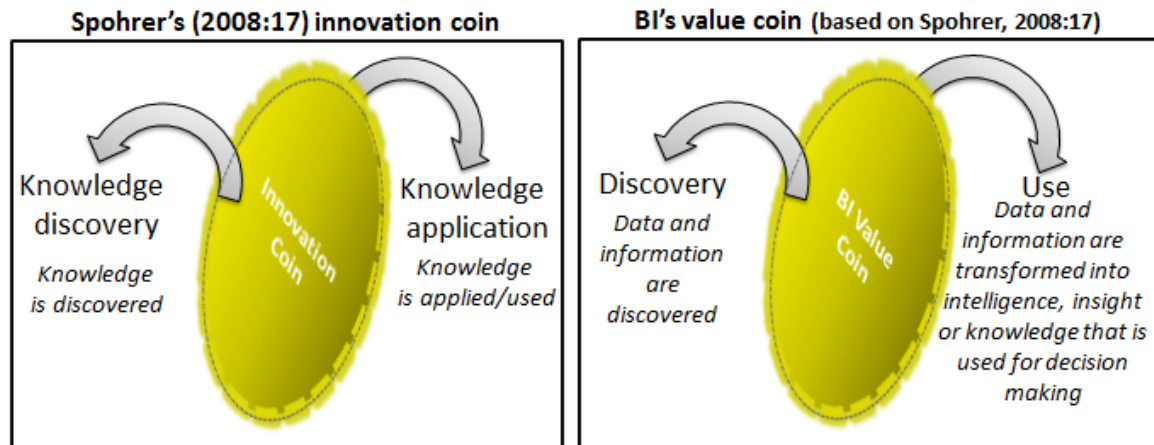
provider.

Figure 18: BI's value coin (based on Spohrer, 2008a:417)

Then consider Figure 19 which suggests an iterative BI process whereby a "discovery" aspect and a "use" aspect both receive attention. Figure 19 highlights the need for both the BI provider and the BI customer to focus on both discovery and use activities to be able to co-create value, based on the BI value coin. On the "knowledge discovery" side of the coin, BI activities may include, for example, data collection, data processing and application development. On the "knowledge application" side of the coin, BI activities may include application of and use of the data or application that has been discovered, e.g. decision-making based on actionable insight and intelligence. In line with this, Herschel and Jones (2005) state that in BI, intelligence is often defined as the discovery, explanation and use of hidden, inherent and decision-relevant contexts in large amounts of business and economic data.

Figure 20 also incorporates relevant S-D Logic FPs to show the BI customer's co-creation role (FP 6), that the BI provider can only offer value propositions and not value (FP 7), the service-centred and relational view (FP 8), the phenomenological determination of value by the BI customer (FP 10) and the creation of an operant resource such as intelligence/insight/knowledge upon use (FP 4).

This provides a conceptual basis to apply these FPs as well as the concepts highlighted through the BI value coin, i.e. value co-created through discovery and use, balanced customer-provider relationships and continuation of the service flow through discovery into use – and iteratively back again. In addition, this highlights that the BI value coin, as depicted in Figure 20, brings a new perspective to the BI process and not simply an iterative process and focus on the customer, which are not new approaches for BI – specifically in terms of the IS development involved in BI. Possibly the most significant of the concepts that the BI value coin highlights are: the service flow and the joint role and responsibility of the BI provider and BI customer in achieving value-in-use.
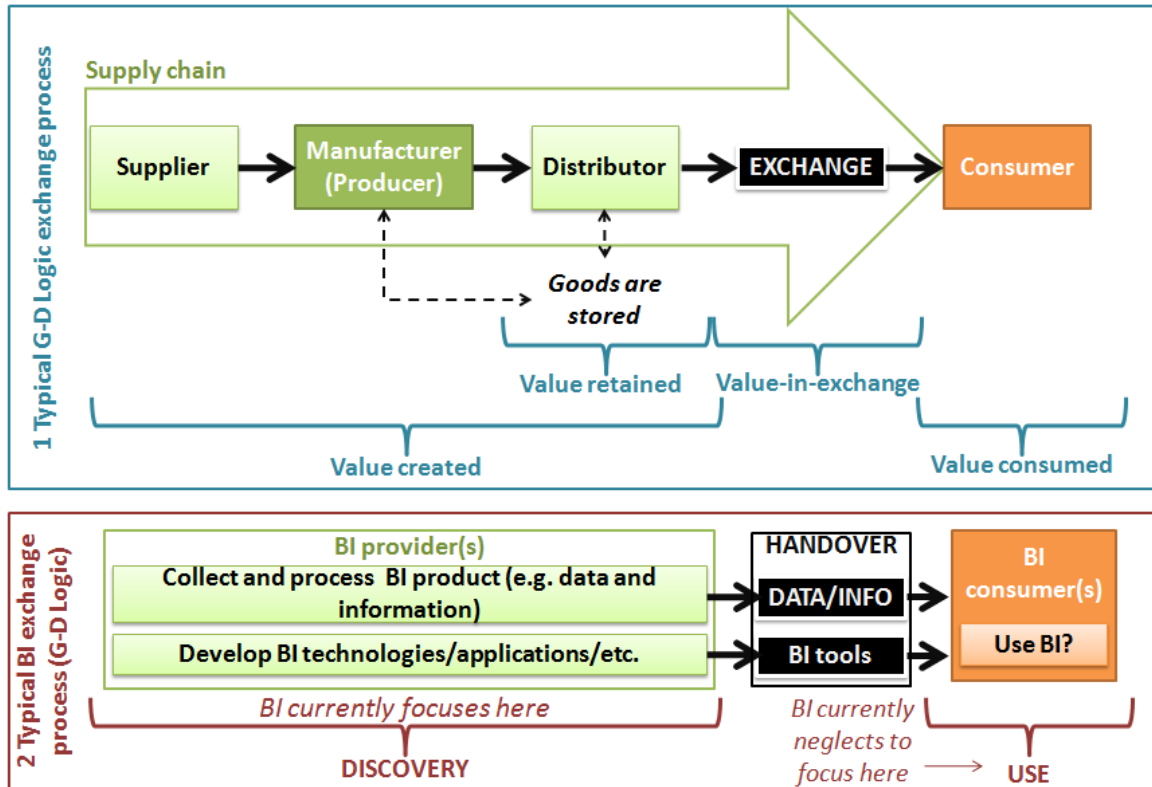
Figure 19: The typical G-D Logic exchange process and the BI exchange process in terms of discovery and application
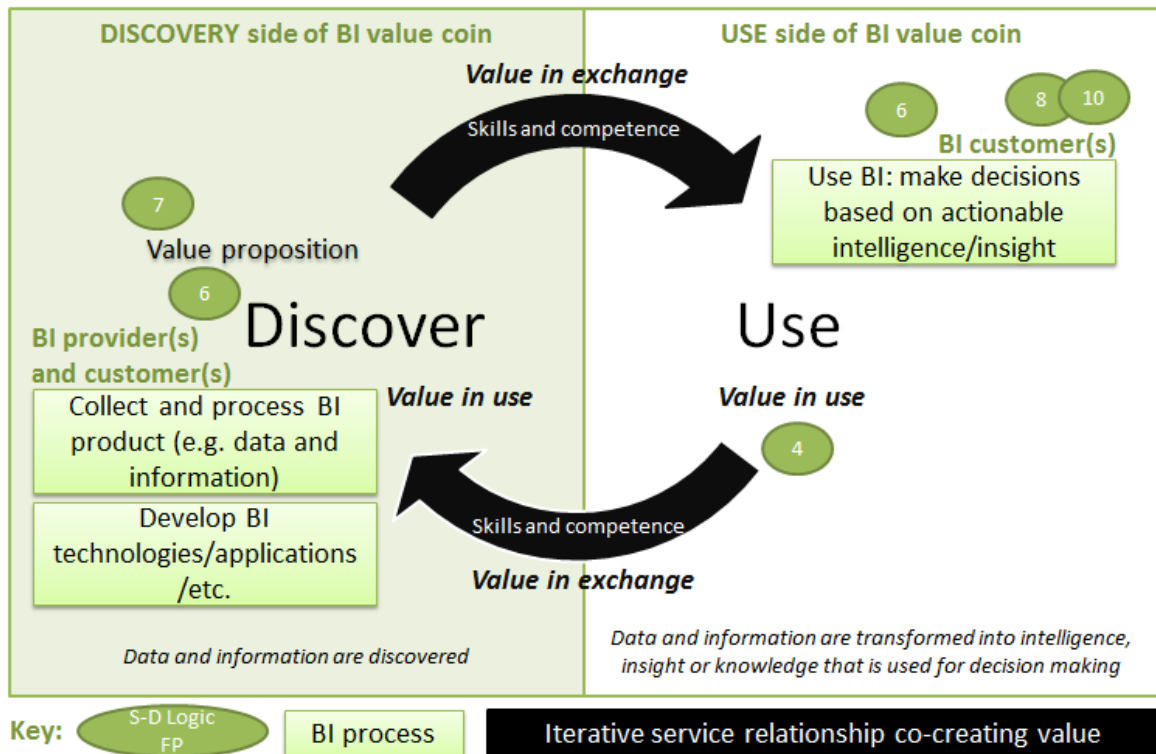

Figure 20: An S-D Logic view of the BI process (Based on Spohrer's (2008:14) knowledge discovery/application innovation coin and Vargo and Lusch's (2008:7) S-D Logic FPs)

5.2 The ten FPs of S-D Logic adapted for BI

As discussed in Chapter 3, Schultz and Gnoth (2008:129) apply the S-D Logic principles of exchange to the organisation, providing a revised list of FPs for the organisation. The same is now performed for BI, as reflected below Table 20. Section 4 (above) already associates S-D Logic FPs for exchange with the shifts proposed to move the dominant BI worldview from G-D to S-D Logic; these are referenced and reflected in the key below Table 20 and are also referenced above in Table 19, where they are reflected according to the shift. It is believed that each FP can be applied to BI at a conceptual level and that, by applying the FPs in this way, a foundation is created whereupon future research may be conducted to test – perhaps in a case study – which FPs are highly relevant or most beneficial for BI or whether one or more FPs may be applied in isolation while still benefitting BI.

Table 20: BI in the context of the ten FPs of S-D Logic (Vargo and Lusch, 2008b:7)

Key: Ref = reference to G-D Logic characteristic, namely:

A: Value-in-exchange
B: Compete through goods and their features
C: Separation of BI customer and BI provider
D: Focus on means, production and producer

#	S-D Logic FP	S-D Logic FP adapted for BI (BI FP)	Ref.
1	Service is the fundamental basis of exchange	Service (exchange) is the fundamental basis of BI	E
2	Indirect exchange masks the fundamental basis of exchange	Indirect exchange of BI technology products masks the fundamental basis of BI exchange	C, E
3	Goods are distribution mechanisms for service provision	BI products are distribution mechanisms for service provision	B
4	Operant resources are the fundamental source of competitive advantage	Operant resources – such as intelligence and insight (which are hard to copy) – are the fundamental basis of competing using BI	B, C
5	All economies are service economies	BI is a service economy consisting of service flows through which exchange takes place	E
6	The customer is always co-creator of value	The BI customer is always co-creator of value	A, C
7	The organisation cannot deliver value, but can only offer value propositions	The BI provider cannot deliver value, but can only offer value propositions	B
8	A service-centred view is inherently customer oriented and relational	A service-centred view is inherently oriented towards the oscillating BI customer-	C

#	S-D Logic FP	S-D Logic FP adapted for BI (BI FP)	Ref.
		provider relationship, including all entities involved therein	
9	All social and economic actors are resource integrators	All social, economic and technical actors are integrators of BI resources	D
10	Value is always uniquely and phenomenologically determined by the beneficiary	Value is always uniquely and phenomenologically determined by the BI customer (e.g. end-user, sponsor, bank customer, organisation, etc.)	A

5.3 Guiding principles to apply S-D Logic to BI

The BI value coin and the ten FPs of S-D Logic can be applied to BI, as indicated in Sections 5.1 and 5.2 above, providing a basic understanding of service flow, value-in-use and the core tenets of S-D Logic in terms of BI. However, for BI to shift successfully to an S-D Logic approach, it is anticipated that S-D Logic must also be applied practically. If this is not done, the conceptual foundation remains too vague and abstract for application in practice. For example, telling BI vendors or a BI department that the BI technology application they have developed is a distribution mechanism for their skills and competences will probably "be met with blank stares" – to quote O'Shaugnessy and O'Shaugnessy (2009:785-786). Although they (*ibid*) present a weak argument against S-D Logic – as discussed in Chapter 3 – they accurately draw attention to the need to position S-D Logic pragmatically.

Specific BI guiding principles are therefore formulated from a pragmatic basis. They are formulated based on S-D Logic concepts, principles, guidelines, findings of this thesis' case study and the G-D to S-D Logic shifts identified specifically for BI (reflected in Section 4 above). Guidelines draw specifically from those formulated to apply S-D Logic to exchange from Lusch and Vargo (2006:415) and, separately, from Tanniru (2008:418) – both of which were discussed in Chapter 3 Part 3.

Guiding principles can be applied to a BI exchange by any individual, group or organisation (including BI providers and BI customers) that desires to shift to an S-D Logic informed BI worldview. S-D Logic is especially useful in a highly networked world (Lusch and Webster, 2011:129) such as that presented by BI. However, it is also broadly applicable and applicable to many levels (Gummesson, 2001:27; Schultz and Gnoth, 2008:129). In fact, it is applicable to any exchange, i.e. as stated in Chapter 3 – any interaction or relationship that consists of at least three components: two nodes (e.g. giver and receiver) and a thread (e.g. whatever is exchanged) (Schultz and Gnoth, 2008:129). Although the guiding principles may be applied at the level of an exchange, based on Shift E that recommends that the full service flow is recognised, it is recommended that guiding principles are applied to all BI exchange activities and by all entities involved throughout

the BI service flow. However, as the scope of this thesis does not extend to the application and testing of the conceptual and pragmatic approaches suggested herein (i.e. Sections 5.1, 5.2 and 5.3), a comparison of the benefit of applying S-D Logic between – for example – a BI department and a BI vendor *versus* across a whole service flow is not measured. This is, however, another suggestion for future research.

The intention is not for the guiding principles to be used as a mechanistic set of steps applied rigidly, in isolation or applied to replace an engineering-centric IS project development methodology. In fact, this thesis proposes a shift away from the mechanistic and linear IS project development methodology where BI is perceived narrowly as an IS. This relates to the shift from a focus on means, production and producer to a focus on production and use activities and role players, i.e. the service flow or the whole BI value coin. Instead, the intention is for the guiding principles to facilitate this shift by guiding the actions of those practicing and studying BI so that the actions are congruent with S-D Logic principles. The guiding principles also highlight how S-D Logic may be applied to assist BI to overcome some of its prevalent challenges. This is summarised in Table 21 below and the potential advantages of shifting to S-D Logic are summarised in Table 22. Implications of the shift can be found in Section 7.

5.3.1 Guiding principle 1: Obtain clarity and knowledge of the BI service flow and the various environments this flows through

All individuals, groups and organisations involved in any type of BI exchange should ensure that they clearly understand the context of BI at the outset of any BI exchange. Firstly, in theoretical terms as provided in Sections on the BI value coin (5.1) and the ten BI FPs (5.2) and secondly, in the context related to the various environments that the service flows through. By understanding the theoretical terms, BI participants can contextualise BI exchanges in terms of where they fit on the BI value coin. Debates on scope and definition for EIS, MIS, DSS, etc. can thereby be avoided as it will be superfluous how these terms relate to each other or BI, based on the ability to see the scope and definition of the BI exchange based on whether it fits on discovery or use sides of the BI value coin.

Understanding the context related to the various environments entails effort to understand the full service flow, which entities and resources are or may be involved in this, the value networks, existing value propositions and relationships between entities, the operand to operant resource integration that does or may take place and – most importantly – the different business, economic, technical, social and managerial environments that the service flow crosses through. This involves a shift from defining and understanding BI just syntactically to defining, understanding and applying it semantically. In other words, it shifts from a dominant focus on the provider/production/means towards a balanced focus on the customer and other entities' environments, including the provider. When understanding the full service flow, BI participants can also under-

stand the importance of both the discovery and use sides of the value coin, implying a shift to value-in-use.

By following this guiding principle, BI participants – both customers and providers – may be able to reduce the ambiguity in the BI environment by contextualising BI appropriately, increase the likelihood of value creation by focusing appropriately on discovery and use sides of the BI value coin and position themselves better to identify opportunities for value propositions through knowledge of all relevant environments. This assists to overcome current challenges where there is a dominant focus on technology, ambiguity in the BI environment and restrictive thinking of BI as an IS (or data or IT solution within an IS) only. It also assists BI participants to learn each other's environments and context which can assist to alleviate challenges where the full service flow is not understood resulting in a lack of understanding of the business environment and neglect of organisational inputs such as data, or in situations where personnel and/or sponsors focus only on delivery activities or technology without understanding the full process. Challenges related to separation of BI provider and BI customer may also be somewhat alleviated through this, as customer and provider can be brought together in learning the full BI service flow, which includes both customer and provider environments. It may potentially also expand the BI department's current focus on recruiting IS and IT professionals to consideration of professionals in the various aspects that the BI service flow touches, impacts and needs to integrate successfully with.

5.3.2 Guiding principle 2: Identify needs, skills and competence and accessible resources

By understanding the service flow, BI customers and BI providers should be able to position themselves to understand the role/s that they could potentially play within the full service flow and where they could potentially contribute to realising opportunities that meet specific needs (Tanniru, 2007:418). At this point, they should see themselves as resource integrators, understanding their role in the bigger picture of the service flow, focusing on the competitive advantage available through an operand-to-operant resource co-creation process rather than on selling tangible goods (Tanniru, 2007:418). They should start to see what needs they could potentially fulfill using, not only their resources, skills and competences but also those that they have access to or those that they could assist to develop (Tanniru, 2007:418). BI customers and BI providers should also start to see who may potentially benefit from these outcomes as well as who or what they need to collaborate with or integrate to be able to realise the outcome. Responsibility to perform this assessment lies with both the BI customer and the BI provider, e.g. a BI vendor is in a position to assess an organisation's potential ability to assist in value co-creation and the organisation – as the BI customer – is in a position to identify what it needs from the BI vendor and what it needs to be competent in so that it is not just a passive recipient.

It is at this stage and from this perspective that BI providers may be inclined to ask questions such as "what organisational competence can I help support?", "who may benefit from this?", "what BI

resources do I have access to that can complement what the organisation aims to achieve?", "what don't I have (e.g. resources, skills, competence) that I need to integrate?". The BI customer should now identify BI needs in context of the organisation's competences, business processes and opportunities rather than in the context of intangible benefits linked to BI IT solutions. Both have a responsibility to look at the full service flow to comprehensively identify role players, resources, skills and competences that are needed to integrate resources to co-create the desired beneficial outcome.

At this point there is also a responsibility to assess the full service flow. BI providers and customers should be asking questions at this stage related to the ultimate outcome of the BI service flow rather than simply focusing on delivering a product or output. Ideally, the full service flow should not ultimately result in BI that is used to manipulate or dominate customers. BI is in a position of power where it collects data that can either be used to help the end customer, or harm and manipulate the end customer. It should follow from this that S-D Logic-informed professionals should not use S-D Logic principles to co-create outcomes that are ultimately harmful to an entity down the line in the service flow. Lusch and Vargo (2006:415) highlight the importance of transparency, symmetric information and seeing the customer as someone to collaborate with. It is believed that if this is practised by BI professionals who engage in BI exchanges that the outcome of these BI exchanges should also maintain these standards. BI customers and BI providers at Fortune Bank would need to consider shaping the Business Banking business strategy to focus on opportunities to extend the flow of service rather than target customers and "capture" the market, focusing on producing and using the employee as a means of production, as discussed in the axiology worldview element in Chapter 4 Part 3.

This guiding principle potentially can assist in overcoming challenges experienced later in the BI service flow whereby integration is overlooked, alignment is difficult or business, data or IT architecture expertise specific to the organisation's environment is unavailable or absent. It can potentially also assist relations between BI vendors as BI providers to the organisation's BI department and their BI customers as each entity's contribution can be clarified and recognised. Furthermore, issues of ownership and the capability to participate to co-create value are discussed and addressed before the relationship is entered into. This alleviates challenges currently experienced in BI whereby there are gaps in ownership or unavailable business representatives or sponsors to support the BI initiative.

5.3.3 Guiding principle 3: Invest in cultivating relationships to integrate resources and realise mutual benefit

Where BI providers are able to identify potential opportunities to co-create beneficial outcomes with BI customers, they should cultivate relationships with them (Tanniru, 2008:418). A long-term relationship should be the aim (Lusch and Vargo, 2006:415), although short-term or even once-off

service relationships are not discouraged and can also benefit from an S-D Logic approach (Vargo, 2009b:375). Long-term relationships should be strived towards simply due to the fact that much time, effort and trust are invested in learning the BI customer and BI provider context and environment – as already discussed in guiding principle 1 (5.3.3) . Lusch and Vargo (2006:415) aptly use the word "investment" in this context, explaining how a "fountainhead of economic growth" can be established by growing these specialised skills and knowledge.

This guiding principle may potentially assist to overcome challenges related to the BI customer and BI provider relationship, e.g. separation of BI customer and BI provider and alignment. It may also extend to assist with integration and sponsorship challenges. For example, cultivation of relationships may even result in better awareness of BI needs upfront, so that when decisions are made where BI integration will be needed later, BI can be involved in these decisions.

5.3.4 Guiding principle 4: Engage in value propositions, linking investment and income to value propositions

At this point, the BI provider should be in a position to offer compelling value propositions to BI customers. Bear in mind that this may even entail a value proposition for the customer to define their own value proposition as service and technology innovation continuously evolve to bring customers the ability to define value wherever, whenever and however they want (Goul, 2010:26). Value propositions must meet specific needs (Tanniru, 2007:418), where both BI provider and customer (and other role players involved in the interaction) can receive benefit. On the one hand, the BI provider needs to understand the full service flow (discussed above in 5.3.1) to link the value proposition to the organisation's competences. In other words, when the BI that is proposed is used, the aim is for the BI to assist the organisation to achieve in one or more of its competences (Davenport and Harris, 2007:6). On the other hand, the BI customer needs to link the investment that they will make in realising the value proposition to their organisational processes, to identify how they will use the BI that is proposed in the value proposition. The latter was identified in the case study: instances where BI is used are those where it is embedded in the organisation's existing processes. This guiding principle is reflected in Figure 21 in terms of the BI value coin.

Figure 21 also reflects that financial feedback results from the point of exchange, but that value-in-use continues after this, providing further feedback. Tanniru (2007:418) identifies that financial performance is used to gauge marketplace feedback and, in accordance with this, improve future offerings and performance.

Linking BI investment to organisational competence and to the organisation's processes may assist in overcoming challenges experienced where BI value is measured at the point of delivery of a BI IT solution – as well as current challenges in measuring BI ROI. At least through this approach, the focus is on how the BI is used – which is potentially easier to measure than the intangible

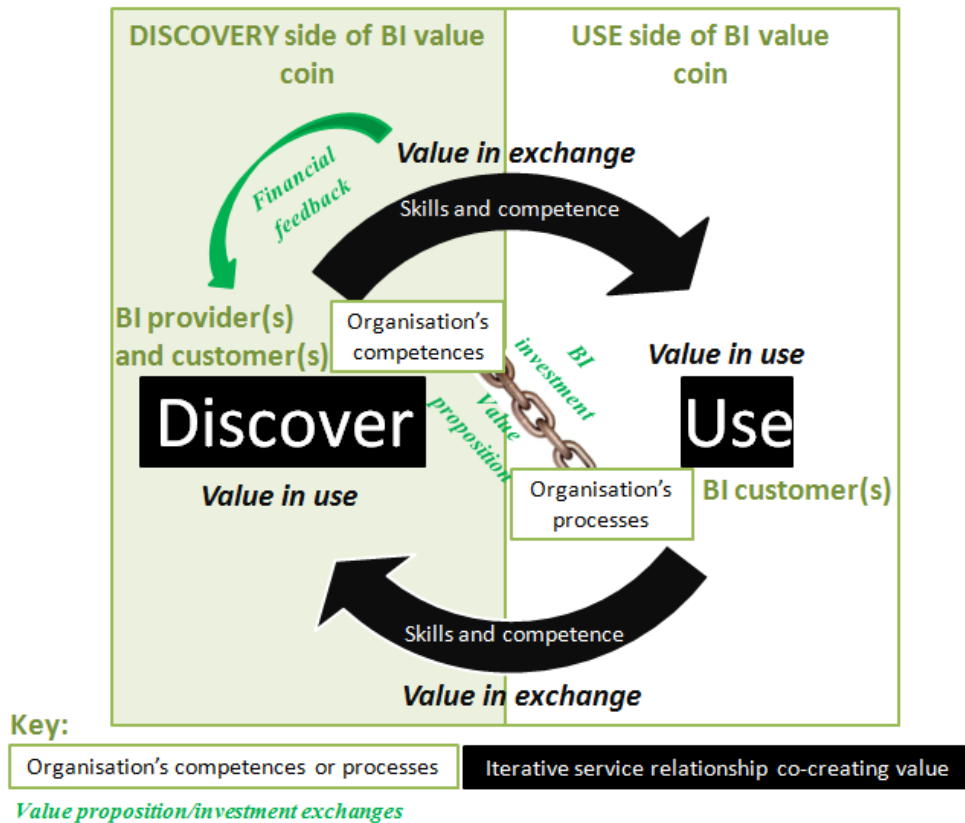benefits that BI vendors typically promote on their BI IT solutions.

Figure 21: BI investment - guided by S-D Logic

5.3.5 Guiding principle 5: Complete value proposition activities, perform measurement and give feedback

From the point where the BI customer accepts the value proposition and the BI exchange is engaged in, the BI customer and provider enter a process whereby actions take place, followed by measurement of those actions. This is reflected below in Figure 22, which also reflects that BI customer and provider need to measure compliance – i.e. tests or checks that the value proposed is realised. It cannot be assumed that, just because an S-D Logic approach is taken, that value will automatically be created. Entities involved in the service flow may engage in value co-destruction whereby they engage in actions that result in destructive outcomes – either purposefully or negligently (Plé and Cáceres (2009:431-434)).

Quality is currently measured in activities on the discovery side of the BI value coin within the organisation using Service Management methodologies such as TQM, Six Sigma, etc. (discussed in Chapter 3) and at the point of exchange (as identified in the case study of Fortune Bank), however, BI's current worldview does not demonstrate that it measures quality at the point of use. Based on this, it is identified that a shift to an S-D Logic worldview will entail introduction of further quality measures – on both sides of BI's value coin. BSCs should be updated to reflect measurement of the use of a BI solution – and not just users' activity on a BI solution, but actually value achieved

through the value proposition that is linked to the organisation's competence and realised through the organisation's processes.

Furthermore, as reflected in Figure 22, disputes could occur at either point in the exchange – discovery or use – and may occur between customer and provider or may be raised by a third party involved in the interaction (Spohrer and Kwan, 2009:10). Maglio *et al.* (2009:6-8) refer to the perfect *versus* the alternative scenario, where the latter is where disputes occur. They provide the Interact-Serve-Propose-Agree-Realise (ISPAR) process model whereby disputes can be handled. In the perfect scenario, a decision-tree flow of activities in an interaction reflect how a value proposal is communicated, agreement is reached and value is realised. In the alternative scenario, disputes arise as a result of the value proposal not being communicated or value not being realised. Following this, the alternative scenario identifies scenarios whereby – for example – there is a dispute or no dispute, resolution or no resolution, criminal activity and justice.
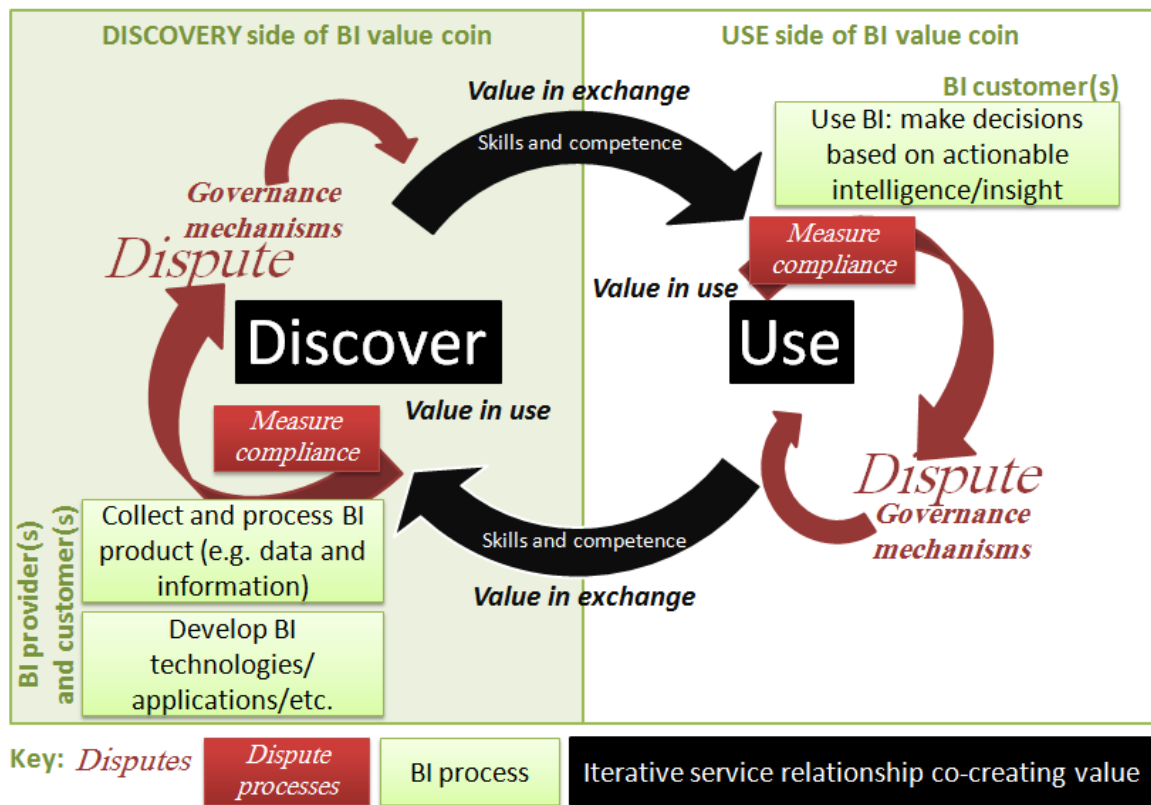

Figure 22: BI activities and actions - guided by S-D Logic

6. Opportunities to overcome BI's challenges

The guiding principles above (Section 5.3) recommend actions to shift from a G-D to an S-D Logic approach to BI. They also draw attention to the challenges that may potentially be overcome – or at least have their impact reduced – by taking these recommended actions. Table 21 reflects a summarised view showing the guiding principle and theoretical basis per shift, alongside references to the challenges that can potentially be overcome.

Each challenge raised previously and summarised in Chapter 4 Part 2 can potentially be over-come – or reduced – directly or indirectly through a shift from G-D to S-D Logic. This includes P1 "Specialist personnel are high in demand but short in supply", although it is identified that there is no direct G-D Logic characteristic that is evident in this challenge (raised above in Section 3). The rationale is that, in the longer term, an organisation adopting an S-D Logic approach to BI should build up dynamic value networks where entities integrate specialist skills and competence as op-erant resources within the value network, for a service for service exchange. This has the poten-tial to change – for example – the traditional model whereby these specialist skills are exchanged for salaries. Although in a service for service exchange, skills and salary may still be exchanged, recognition of the exchange of competence for another's competence offers more flexibility and resource integrators in a dynamic network may have more opportunities for flexible resource shar-ing.

Table 21: BI challenges potentially addressed or assisted through the application of S-D Logic to BI

G-D to S-D Logic shift		Guiding principle	Theoretical basis	BI challenge potentially overcome
A	Value-in-exchange to value-in-use	1, 3, 4, 5	BI value coin BIFP 6, 10	U2, U4, U5-7, CSI3, CSU1, U10, CSU2, CSD2, CSD4, CSA1, O1, CSI2
B	Compete through goods and their features to competition through operant resources embedded in value networks	1, 2, 3, 4	BIFP 3, 4, 7	U4, U5, U7, U8, U10, CSU2, CSD4, A2, CSA1, I2, P2, CSP1, O1, CSI2, CSI3
C	Separation of BI customer and BI provider to a customer-oriented and relationship focus	3, 4	BI value coin BIFP 3, 4, 6, 8	U2, U3, U6, U8, D3, CSD1, I2, A1, A2, CSA1, CSA3-6, CSP3, CSI3
D	Focus on means, production and producer to a focus on both production and use activities and role players	1, 3, 5	BI value coin BIFP 9	U1-4, U9, CSU1, CSD1-4, A1-2, CSA1-2, CSA4, CSA5-7, D1, I1-3, CSI1-3, D2, P2, CSP1-3, CS01-3, 02, S1, CSS1-2
E	From "services" to "service" and BI as a service flow informed by S-D Logic	1, 2, 5	BIFP1, 2, 5	D2, CSD1-4, A1, CSA2, CSA4-7, I1, I2, CSI1-2, P2, CSP1, CSP3, CSS1-2, S1, CS01-3, O2,

A summary is presented in Table 22 listing examples of the potential advantages of shifting from G-D to S-D Logic for BI. Examples are based on the description of the conceptual approaches to apply S-D Logic to BI in Section 5 above and are listed per guiding principle.

Table 22: Potential advantages of following the guiding principles to apply S-D Logic to BI

Examples of potential advantages of applying S-D Logic to BI, per guiding principle
Guiding principle 1: Obtain clarity and knowledge of the BI service flow and the various environments this flows through
• Ambiguity in BI environment is reduced • BI provider is positioned to make compelling value propositions, which are more likely to be val-ued by the BI customer • BI customers are presented with value propositions that are more realistic to their environment, competence and needs

Examples of potential advantages of applying S-D Logic to BI, per guiding principle
• BI customer-provider separation is reduced as they learn each other's environments
• Probability that BI is integrated successfully with the organisation's technical, data and managerial layers is increased, as these are investigated upfront
• Probability that sponsors understand the full BI service flow increases through knowledge of the full service flow and environments
• BI and other skills and competence that are needed are identified upfront
Guiding principle 2: Identify needs, skills and competence and accessible resources
• Accessible resources, their availability and accessibility are identified and planned for upfront, including business, data and IT architecture expertise to support the BI initiative
• Roles and responsibilities are determined based on need, competence and skill, thereby avoiding conflict resulting from situations where this is unclear and boundaries are overstepped
• Gaps in ownership (e.g. of data quality, business requirements) can be avoided as ownership is allocated upfront
• Probability of success is increased as BI customers' capability to participate and co-create a beneficial outcome is ascertained upfront
Guiding principle 3: Invest in cultivating relationships to integrate resources and realise mutual benefit
• BI provider and BI customer separation is reduced through cultivation of relationships
• Mutual benefit is identified early in the engagement, thereby creating incentive for BI provider and BI customer to participate in the relationship
• BI customer and BI provider gain access through interconnected relationships to a dynamic service flow where specialist skills, people, technologies, etc. are integrated and potentially available to engage in exchange
• Solid, long-term relationships and value networks creating operant resources that are difficult to simulate are developed, thereby improving the ability of those participating in these relationships and value networks to compete
Guiding principle 4: Engage in value propositions, linking investment and income to value propositions
• New ways to measure ROI are created as BI investment is linked to BI use and not intangible features and benefits of BI IT solutions
• As BI is targeted at the organisation's specific competence(s), its purpose is clearly indicated
• By linking BI investments to the organisation's processes where the BI investment is used, the probability that BI is used increases, as processes to use the BI are made clear from the start
Guiding principle 5: Complete value proposition activities, perform measurement and give feedback
• As BI customer and provider roles continuously change throughout the relationship, both have opportunity to give feedback on service and to improve the service
• Using the ISPAR process model to handle disputes maps out perfect scenarios as well as dis-

Examples of potential advantages of applying S-D Logic to BI, per guiding principle
pute scenarios, enabling planning for both • BI provider BSCs are updated so that value is measured in use and not at the point of exchange, creating incentives to ensure value propositions are set up and then executed correctly to result in value upon use

7.   Implications of and potential arguments against a shift from G-D to S-D Logic for BI

While G-D and S-D Logic are not new lenses, they have not yet been explicitly applied at a conceptual level to BI or a BI-related discipline (to the knowledge of the researcher). As reflected in the above sections, this offers an opportunity to examine BI from a fresh perspective wherein new insights to address BI's persistent challenges emerge or, more broadly, new insights to address persistent challenges related to information and intelligence for decision-making emerge. There are, however, arguments that may challenge this, as already discussed in the section on the G-D and S-D Logic debate in Chapter 3 Part 3. This section now examines such arguments in the context of applying S-D Logic specifically to BI. The aim is to highlight potential limitations so that they can be realistically acknowledged and mitigated by those practising or studying BI who wish to shift from G-D to S-D Logic.

7.1 The argument that S-D Logic is not a new perspective

The argument that S-D Logic in itself does not offer a fresh perspective may be based on the fact that many S-D Logic concepts are neither exclusive to nor invented by S-D Logic (Akaka, 2007:17), e.g. focus on use, customer and bringing customer and provider together. In fact, when considering BI specifically as a type of an IS (Bertstein, *et al.*, 2011; Euromed Marseille School of Management, 2011; Kelly, 2010), it is clear that concepts such as these are not new to ISs or to BI. Consider the examples of user-friendly IS interfaces or reports, collaboration with the end user or customer and joint application development involving various IS project stakeholders including end users, sponsors and other types of customers.

Believing that S-D Logic does in fact offer a new perspective – particularly for BI – the researcher draws attention to Akaka's (2007:18) counter argument in this regard. She (*ibid*) states that, while the individual concepts may not be new, it is the integration of these and other seemingly unrelated concepts within the frame of S-D Logic that provides a unified direction that makes S-D Logic unique and capable of offering a new perspective.

7.2 Arguments highlighting complications arising from the emerging nature of S-D Logic

Conversely, it may be argued that because S-D Logic is a new perspective, complications may arise when applying it to BI. S-D Logic is an emerging "pre-theory" (Vargo, 2011b:4) that is still

fairly conceptual in nature and does not yet represent established scientific discourse that is un-questioningly accepted. While this highlights the opportunity for BI to contribute to S-D Logic as an open source body of knowledge (Vargo and Lusch, 2011a:1319), specific challenges also result from this and may potentially be carried over to BI when BI is informed by S-D Logic. In addition, as raised in the first paragraph of this section, there is currently no explicit evidence – to the researcher's knowledge – of application of S-D Logic to BI at a conceptual level. This perhaps compounds challenges resulting from S-D Logic's emergent nature when it is applied to BI. As a result, it is expected that that those applying S-D Logic to BI are likely to experience initial "teething problems" and will, like any pioneer of a new approach, bear more of the cost and effort of initial research than later adopters do.

"Teething problems" that are anticipated for BI are identified in some of the challenges raised for in S-D Logic in general. These include: ambiguity in terminology resulting in misuse of S-D Logic or misunderstandings (Hilton, 2008:105; Prahalad and Ramsaswamy, 2004; Zhao, 2008:415); residual G-D Logic connotations causing misunderstanding or inability to truly shift to S-D Logic (Normann, 2011:98); non-acceptance of S-D Logic resulting in arguments, debate and division (Randall, 2007:3) and; the need to refine S-D Logic to be more actionable, specific and measurable (Maglana, 2007; Prahalad and Ramaswamy, 2000; 2003; 2004:7).

BI may face additional challenges in terms of ambiguous terminology and residual G-D Logic connotations due to the influence that IT-type services have on BI. IT-type services fall within the scope of the practical developments of Service Science wherein it is established (in Sections 4.5 and 4.5 above) that a typical G-D Logic lexicon and approach are reflected, e.g. typically referring to and applying services rather than service and focusing on IT as a product or production process. In addition, further clarification may be needed within BI due the overlap BI has across technical and managerial aspects of practical developments within Service Science (Zhao, 2008:414). While comprehensive academic literature exists on each of these, there appears to be a need for further research on their overlap with each other, relationships and boundaries. Furthermore, there is evidence that these have not advanced at the same rate in terms of recognition, acceptance and use of S-D Logic, as evidenced by practical developments' noticeable use of G-D Logic terminology.

In light of this it is, however, still believed that S-D Logic is a viable approach for BI that offers opportunities to overcome existing BI challenges – but it is advocated that S-D Logic is adopted within BI in a realistic manner. It is advocated that S-D Logic is adopted with a realistic view of what it is and where it originated, i.e. as a conceptual framework emerging across various disciplines, offering a new perspective that can be applied to BI for BI practitioners and academics to see opportunities that are currently beyond the scope of their vision of BI. In terms of this, guiding principle 1 (5.3.1) highlights the importance of first obtaining clarity and knowledge of the BI service flow and the various environments this flows through. This provides adopters of S-D Logic with the

opportunity to clarify concepts and terminology within, at least, their organisation or department that applies an S-D Logic approach.

7.3 The implication of significant paradigm shifts for participants in the BI service flow

S-D Logic presents significant paradigm shifts for those practising and studying BI that, if not successfully adapted to, could adversely impact the successful adoption of an S-D Logic approach to BI or the ability for S-D Logic to assist in overcoming BI's challenges. S-D Logic should be approached with awareness and cognisance of the key implications that it presents for BI, as raised above in Section 7.2. However, it is believed that it's worthwhile making these paradigm shifts as the benefits of making the paradigm shifts are likely to outweigh the effort and cost thereof.

Consider, for example, the high level of trust and symmetric communication that are needed to enable BI customer and BI provider to learn each other's environments and participate in co-creation of value. Although learning each other's environments as part of the full BI service flow is both advantageous and necessary (as indicated in Section 5.3.1 above), it presents a significant change with vast implications for BI customers and BI providers. For instance, an investment of resources' effort and time as well as potential disclosure of the organisation's Intellectual Property (IP), core competencies and possibly even the organisation's customers' data and information.

Additional implications of investing time and effort in this way may also result in, for example: longer-learning curves for new employees in BI provider and BI customer environments; resistance to allow new BI providers or BI customers to enter the BI value network due to rigid relationships or the establishment of cliques which may lead to future stagnation of long-term BI customer and BI provider relationships; or imbalance in the employee's work-life balance if capacity to learn other environments is not factored realistically into project schedules and capacity planning. In addition, significant investment is needed in the employee who learns multiple environments along with knowledge management practices to retain such knowledge when the employee leaves the organisation.

Another consideration is that it may not only be the BI department and their BI customers who need to shift to S-D Logic for an S-D Logic approach to be effective. Consider where the changes need to be made to performance measures such as BSCs. In an organisation such as Fortune Bank, where BSC performance measures filter from the organisation's strategy down to every level in the organisation, changes to measure value-in-use rather than value-in-exchange within BI may have to filter across many levels, potentially even upwards to strategic level. While this is a consideration that must be borne in mind by those shifting from G-D to S-D Logic for BI, it is beyond the scope of this thesis to explicitly determine whether organisation-wide change is most feasible for such a shift. Other examples of potential implications of shifting from G-D to S-D Logic are now reflected in Table 23, per role player. Role players are based on the two scenarios identi-

fied in the Case Study Introduction (Chapter 4 Part 1).

Table 23: Examples of potential implications of applying S-D Logic to BI

Key:
C/P – BI customer/provider   *Scenario 1 or 2 (as per Case Study Introduction)*
C(V) – BI customer of a BI vendor   *P(V) – BI provider that is a BI vendor*
P(D) –BI department as a BI provider   *C(D) – BI customer of a BI department providing BI*

Implication – example of behaviour change that must take place with the shift from G-D to S-D Logic for BI	**Scenario 1**		**Scenario 2**	
	C(V)	**P(V)**	**C(D)**	**P(D)**
Focus shifts from BI technology: BI vendors' and BI providers' focus shifts to the capability to integrate skills, competence and resources to enable the BI customer to use BI. As the vendor/provider cannot provide a full service flow alone, dependencies are built on relationships with, for example, consulting firms, statisticians, users who already demonstrate capability to use BI and the BI vendor/provider becomes a BI resource integrator rather than an IT solution provider.		X		X
Revenue is earned based on realisation of value proposition and not sale of BI technology: BI vendors' and BI providers' earnings are linked to BI customer's use of the capability, i.e. realisation of the value proposition. Although this may result in increased earning potential for BI vendors/providers, it places a dependency on the BI customer's capability to co-create value. Furthermore, it should be borne in mind that ROI on BI is difficult to measure and may remain intangible, even when ROI is linked to value proposition/organisational competence.		X		X
The BI provider selects/accepts BI customers based on BI customer's potential to co-create value. This may mean that the BI provider turns some customers away until the BI customer has, for example, the business expertise or data knowledge needed in the exchange of skills and competence or identifies value propositions to assist them in creating the necessary resources, skills and competence. This may result in delays on starting BI initiatives, but compensates by avoiding delays and challenges later when necessary resources are available.		X		X
Cannot sell or implement "one size fits all" type of BI solutions: BI providers must investigate the specific BI customer environment and identify a value proposition. This implies an investment in learning the customer environment and an investment in identifying how the operant resource (not just the BI technology application or data solution) can best be created with that specific BI customer.		X		X
The point where BI value is measured changes on BI personnel's BSCs: from measuring value on a BI technology product that is delivered to measuring value-in-use and is present on BI provider *and* BI customer BSCs. This has the potential to become an organisation-			X	X

Implication – example of behaviour change that must take place with the shift from G-D to S-D Logic for BI	Scenario 1		Scenario 2	
	C(V)	P(V)	C(D)	P(D)
wide change.				
BI customer can no longer only accept responsibility during require-ments gathering, UAT and training: An active role throughout the BI service flow is necessary to co-create value. The BI customer must accept responsibility to co-create value.	X		X	
BI customer must provide feedback during/after use: As the BI cus-tomer's experience is subjective, their potential biases or hidden agendas will influence feedback and must be kept in mind.	X		X	
Investment in learning others' environments: All role players involved in the service flow must learn each other's environments and under-stand the BI process and BI service flow. Potential implications arise as discussed above in this section, e.g. longer learning curve, long-term relationship, etc.	X	X	X	X

Based on the significant focus on BI technology and BI technology processes that is identified in BI's dominant BI worldview (Chapter 4 Part 3), the most significant paradigm shift is expected to be the shift from focusing on BI technology, processes and tangible technology outputs, to focus-ing on the BI service flow, wherein BI technology, people, processes and various other resources such as data, information, knowledge, etc. are integrated resulting in the co-creation of operant resources. Therefore, the current perceptions that are identified that BI is a technology, process, capability or product are not identified as incorrect but rather as incomplete. The shift to S-D Logic shifts the current perspective to understand that BI as a technology, process, capability or product is but one service entity, resource or component of the BI service flow.

7.4 The implication of the potential co-destruction of value

As discussed in guiding principle 5 (Section 5.3.5 above), it cannot be assumed that co-creation of value will always take place. Entities involved in the service flow may engage in co-destruction of value (Plé and Cáceres (2009:431-434), purposefully to serve themselves or for ill-intent or negli-gently. Measures suggested in guiding principle 5 aim to circumvent this implication for BI.

In addition, guiding principle 2 (Section 5.3.2) draws attention to BI customers' and BI providers' responsibility to consider the full service flow and the potential co-destruction that may take place should this be neglected. An example from the case study where consideration of the full service flow offers an opportunity is of Fortune Bank's organisational strategy (the Business Banking stra-tegic measures) that reflects G-D Logic characteristics. Participants in the BI service flow may positively influence the organisation by using BI to change the organisation's G-D Logic outlook. This reflects the profound implication and potential for improvement that an S-D Logic approach to

BI presents, not just for BI exchanges but also for the full service flow across the organisation. Instead of targeting customers and treating the employee as a means of production, the organisation may apply S-D Logic to differentiate itself and present a new and compelling value proposition to its customers – thereby potentially achieving value for the ultimate customer and the organisation.

Other examples of co-destruction have already been raised and discussed in Chapter 3 Part 3 on G-D and S-D Logic's epistemology.

8. Conclusion

This chapter presents the culmination of this thesis' research, identifying how shifting BI's dominant worldview from G-D to S-D Logic can contribute to overcome BI's prevailing challenges. It starts by examining BI's dominant worldview through S-D and G-D Logic lenses. A pattern of G-D Logic is thereby identified, answering the research question "can a pattern be detected in BI's worldview characteristics revealing that BI's worldview is grounded in G-D Logic?". BI's challenges are then examined in terms of their relationship with BI's worldview and the G-D Logic characteristics that are evident in BI's worldview. This confirms that there is a relationship between BI's dominant worldview, its prevailing challenges and G-D Logic, answering the final research question of this thesis.

A conceptual shift from G-D to S-D Logic is then proposed through five key shifts that are described. BI's challenges are examined once again, this time in terms of how the proposed shifts can assist those practising and studying BI and what advantages or benefits it can result in for BI.

Rather than end at this point, conceptual approaches to apply S-D Logic to BI are suggested and described with the purpose of providing a foundation for future research. In terms of this, two theoretical concepts – the BI value coin and the BI FPs – are suggested as a base upon which pragmatic guiding principles can be applied. The BI value coin advocates that equal time and effort are spent on discovery and use activities and the BI FPs reflect core premises for BI, based on the ten foundational FPs of S-D Logic. BI's challenges are evaluated in terms of these conceptual approaches, confirming that the conceptual approaches and shifts to S-D Logic do offer new avenues and opportunities to overcome BI's prevailing challenges. Not to overlook realistic implications and possible arguments against the proposed shift from G-D to S-D Logic for BI, implications and potential arguments against such a shift are then examined.