

# Realizing the Value of Business Intelligence

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**Abstract:** Business Intelligence (BI) remains one of the top priority issues for CIOs and investment in BI technologies continues to grow. This research attempted to understand how an organization can realize the business value derived from their investment in BI.

A single, in-depth case study was undertaken in a major South African financial services organization. An extended IT business value process model, derived from the research literature, was used as a framework.

The study found that the realization of business value from BI is highly dependent on activities that occur in all 5 stages of the process model – from the alignment of the BI strategy with that of the organization, through to the way in which the business benefits of BI are measured, but that the actual measurement of these remains challenging due to the delayed, indirect and intangible nature of many of the benefits.

*Keywords: benefits realization, business intelligence, BI, business value*

## 1. Introduction

Whilst BI remains one of the top technology issues for CIOs, little research has been done regarding the actual business value realized as a result of BI investment (Bitterer, Rayner, Hostmann, Gassman, Schlegel, Beyer, Burton, Herschel, Friedman, Newman, Logan, Andrews, Sarner, White, & Radcliffe, 2006; Negash, 2004).

Measuring the business value attributable to investment in IT has been a challenge facing organizations for some time. Findings from past research into IT value have proposed a variety of solutions from calculations based solely on financial indicators to process models and scorecard-based models. However, many benefits associated with IT investment are often elusive.

In particular, it is difficult to determine actual value returned by investment in BI technologies as the business benefits can be indirect, intangible and difficult to measure and realize in different parts of the organization (Gartz, 2004).

This research aims to gain insights into how an organization realizes and measures the business value derived from investments in BI.

## 2. Measuring the Value of IT Investment

BI can be defined as a “collection of integrated operational as well as decision support applications and databases that provide the business community with easy access to business data” (Moss & Atre, 2003, p.4).

BI has no value of its own – value is created by acting on the information delivered to the organization (Brown, 2005; Lonngvist & Pirttimaki, 2006). According to Pirttimaki, Lonngvist & Karjaluo (2006), there is insufficient research on BI value measurement.

Several authors conclude that finding an accurate and reliable method to measure business value achieved as a result of IT investment remains elusive (Gibson & Arnott, 2005; Marshall, McKay, Prananto, 2004). Whilst studies have found that up to 86% of CFOs claim to use traditional, financial indicators such as Return on Investment (ROI) to evaluate IT investments, only 18% of CIOs reported using ROI as they acknowledged the need to consider factors such as reduced costs and improved productivity (Silvius, 2006). Criticism has been leveled at inflexible, financially-based evaluation models as this focus is deemed not wide enough (Gibson & Arnott, 2005). Intangible benefits often make a significant contribution to performance but even if they are measured (using instruments such as questionnaires), establishing the link between the benefit and organization performance is

complex (Remenyi, 1999). Measuring the value of IT remains a complex task due to a lack of understanding of the processes responsible for realizing benefits (Jain, 2006).

A number of studies identified by Silvius (2006) conclude that a process model is appropriate for studying how IT adds business value. Many are based on the process model proposed by Soh and Markus (1995). This model, shown in Figure 1, identifies the relationship between IT investments and business value focusing on how, when and why IT creates value.

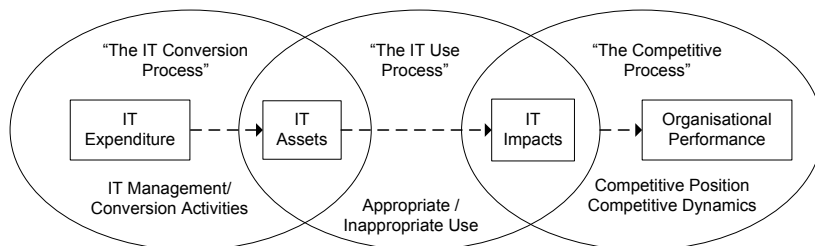


Figure 1 - How IT creates business value – a process model. Source: Soh & Markus (1995)

The IT Conversion Process addresses the acquisition of IT products and services and deployment of IT capability. Investment is necessary but not sufficient to ensure the conversion of expenditure into a usable asset (Soh & Markus, 1995). The outcome relies on the management of the IT Use Process and includes activities such as developing an IT strategy, ensuring the necessary organizational structures are available to support the strategy, focusing on the correct initiatives and the effective management of those IT projects.

The IT Use Process represents the activities that are necessary to ensure that IT assets are used appropriately in the organization. These activities result in new products, improved business processes and improved decision-making. Users need to have the necessary skills to use these IT assets appropriately for the benefits to be realized (Soh & Markus, 1995).

The IT Competitive Process examines the outcomes of the impacts achieved through investment in IT including improved products, services and business processes (Soh & Markus, 1995).

Marshall et al (2004) suggested a modified model which links the IT investments back to the business strategy. They proposed a fourth process (shown as the IT Alignment Process in figure 2) which recognizes a strategic focus for IT investment which aligns with business strategy and organizational performance.

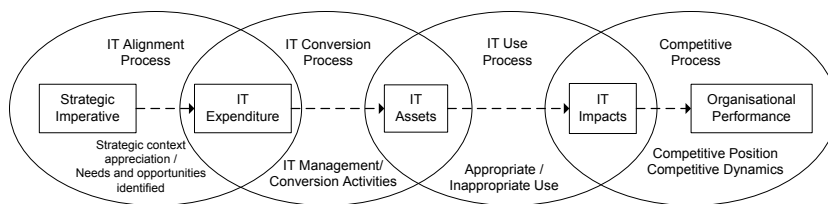


Figure 2 - Modified process model for the realization of business value from IT. Source: Marshall et al. (2004)

The IT alignment process includes tasks such as the identification of opportunities (both business and technical) and the development of a clear IT strategy which aligns with that of the organization (Marshall et al, 2004). This modified model was used by Marshall et al. (2004) to analyze how executives in Australian organizations ensured that IT investment resulted in increased organizational efficiency, effectiveness or competitiveness. They found that IT was seen to contribute to increased profitability and to business value. They identified the IT Alignment Process as the most critical process to realize business value from IT investments.

### 3. The Value of Business Intelligence

Many of the benefits realized as a result of BI initiatives are non-financial and often intangible, such as timely delivery of information and improved product or service quality, and whilst they should lead to financial, measurable benefits, a time lag may make measurement difficult (Lonnqvist & Pirrtimaki, 2006). These intangible benefits are difficult to identify and this makes the process of evaluating BI systems complex (Gibson & Arnott, 2005).

Many BI projects fail to deliver the expected benefits (Gartz, 2004). A user of BI tools and process will perceive value related to the ease of use of the tools, whereas at an organizational level, value would be based on benefits realized as a result of the intelligence available (Pirrtimaki et al., 2006). The benefits related to enhanced knowledge availability often take time to translate into returns which makes it difficult to connect the return to the information used to deliver it (Rouble-Flores & Kulkarni, 2005). It is therefore appropriate to use a process model which evaluates intermediate-level, business process performance measures (such as efficiency and effectiveness) to connect individual performance to that of the organization.

The modified Process Model together with the concept of benefits realization management provided an Extended Process Model as shown in Figure 3.

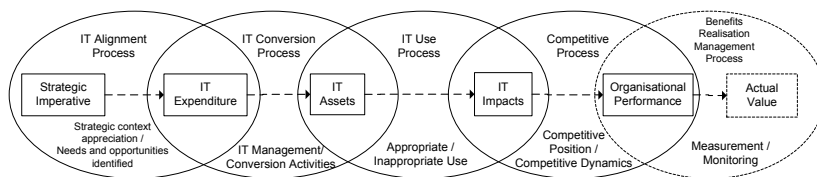


Figure 3 - Extended Process Model. Adapted from Soh & Markus (1995), Marshall et al.(2004)

The Benefits Realization Management process includes activities such as the up-front estimation of expected benefits as well as ongoing monitoring to determine the actual benefit realized.

#### 4. Research Methodology

The research approach was exploratory and deductive using an established model as a framework. A single case study approach was followed. Case studies are appropriate where there is limited amount of existing knowledge and when a phenomenon is broad and complex (Dube and Pare, 2003). A single case study facilitates an in-depth investigation.

The following research question was addressed:

*What are the actions taken, challenges faced and measurement methodologies adopted by an organization in realizing and measuring the business value of BI investments?*

Based on the extended process model, thirty-one open-ended questions were derived and qualitative data was collected using these questions in semi-structured interviews.

A sample of twelve senior IT and user managers responsible for BI were approached for interview. The instrument was pre-tested using a pilot interview with a BI executive.

The interview transcripts were analysed relative to the activities in each of the five processes in the model.

#### 5. Information Analysis and Findings

##### 5.1 IT Alignment Process

The bank's move from a product-centric strategy to a customer-centric approach is dependent on the bank being able to obtain a single view of data that is currently stored in a number of disparate systems. BI is often used to gain a customer-centric view of data as it makes it possible to build a single view based on data from multiple 'silo' source systems. There have been significant changes

within the bank's IT architecture to align IT with the strategic goals – particularly the introduction of an ERP solution to provide a single view of a customer.

Whilst ZAFBank's business strategy is clear and the interviewees were aware of the organization's strategic goals, there was less clarity regarding BI strategy. The interviewees had quite different perceptions regarding the BI strategy depending on their roles and involvement in the BI process. The lack of clarity and understanding around BI strategy has led to disparate and duplicated data and effort.

ZAFBank has acknowledged the need for a more centralized, structured approach and three of the interviewees have recently moved into roles that have been created with a view to strengthening BI's contribution to towards the achievement of strategic goals. Without a clear BI strategy it is difficult to achieve alignment between BI and the overall business strategy and to ensure that all BI initiatives are driven by business goals (Venter & Tustin, 2006).

The need for change in budget ownership has been identified. The lack of clarity regarding the investment in BI and control of the BI budget can be attributed to the fact that the person currently responsible for the BI budget was not interviewed as budget ownership was unclear due to realignment of roles. The change to a charge-back system based on data usage rather than data volumes would be more in line with the BI process measurement indicators suggested by Howson (2006) and Pirttimaki et al. (2006).

## ***5.2 IT Conversion Process***

The Conversion Process in the model is used to address the acquisition of BI products and services and deployment of BI capability.

All participants shared the view that BI should be owned by the business and a business sponsor for BI projects is important. However, lack of a clear BI strategy and lack of business ownership has led to IT playing a driving role in the delivery of BI at times, resulting in solutions that often do not meet the business requirements.

A clearly defined BI strategy would also address the lack of consistency regarding BI architecture and limit the number of tactical solutions being created by business teams, a consequence predicted by Raab (2000). The concerns expressed regarding the need for a 'back-to-basics' approach to BI architecture indicate that the current design and platform may need to be reviewed. It will not be possible to put existing BI requirements on hold whilst a new BI environment is designed and implemented, however, the problems need to be addressed as the volumes of BI data stored

outside of the EIW (such as the warehouse developed to meet Basel II requirements) may soon exceed the volumes in the EIW and the lack of governance around those solutions poses a risk to the business.

The importance of data quality and its impact on the overall success of BI initiatives is acknowledged, but whilst ZAFBank is consciously addressing data quality issues on its ERP platform, the BI environment does not yet have robust data governance processes and policies in place. Changes to the BI architecture to provide a “*single version of the truth*” would eliminate many of the data quality issues as all reports would be based on the same set of data. The recognition of the need for a person to take responsibility for information management indicates that there is commitment to addressing the data quality issues.

### ***5.3 IT Use Process***

The Use Process in the model represents the activities that are necessary to ensure that BI assets are used appropriately in the organization. The impacts of activities in this process may result in organizational impacts such as new products, improved business processes, improved decision making and the flexibility to take advantage of new opportunities. Users need to have the necessary skills to use the BI assets appropriately if the benefits are to be realized.

Various interviewees from the business area (BI teams and BI consumers) commented on the differences between data, information, intelligence and knowledge and share Williams and Williams (2007) view of their organization being data-rich but information-poor.

Involvement of business users in the entire BI process was viewed as critical as they need to play an increasingly significant role whereby they become owners and drivers of a BI strategy with IT playing a support role. Griffin (2007) identifies successful BI delivery to be dependent on a strong partnership between IT and business.

Interviewees involved in defining the strategic direction of BI within ZAFBank understand the concept of a Business Intelligence competency Centre (BICC). However, there are indications that a true BICC structure would not be possible within the organizational structures at ZAFBank as the EIW is owned by IT. A more centralized business BI team had been recently been established and was fulfilling some of the goals of a BICC.

#### ***5.4 IT Competitive Process***

The IT Competitive process focuses on the benefit the organization achieves through improved products, services and business processes. The interviewees appreciated the importance of business involvement in BI which should be the formal ownership of BI in the business. The positive views of all interviewees regarding the success of their BI initiatives should encourage increased use of BI to support business goals.

The interviewees view the current data quality levels and the BI architecture as weak. This implies that these basic issues need addressing to realize the full benefit of its investment in BI.

The BI activities of competitors are not currently of concern to ZAFBank. If the level of awareness of BI value is raised within the organization, more attention might be paid to competitors as BI could be seen as a means of achieving competitive advantage (O'Brien & Kok, 2006). ZAFBank already has competitive intelligence programs but the data resides outside of the formal BI environment. This information would add additional value if it was more easily accessible to BI users.

#### ***5.6 Benefits Realization Management Process***

The concept of benefits realization management is understood in ZAFBank and ongoing measuring and monitoring is taking place in certain cases. Although the study undertaken by Lin and Pervan (2003) focused on benefits realization management linked to IT projects, similar situations appear in the BI environment at ZAFBank – indirect benefits are used to justify BI initiatives and there is confidence that the investment in BI is adding value. However there is little planning for benefits realization management and the measurement of actual value realized is almost non-existent.

The establishment of a formal benefits realization management process could make the prioritization of BI requests simpler and more effective as it would be possible to link priority to expected business benefits. The description of a project that had a strong business case but was later viewed as unnecessary was a good example of what Reiss et al. (2006, p250) refer to as “voodoo figures” being used to justify a BI initiative. Techniques and methods for estimating expected business value for those types of BI requests that are currently difficult to quantify are required (Pirttimaki et al., 2006).

The view that BI is adding value simply because it is being used contradicts the view of Lin & Pervan (2003) which states that unless measurable impacts of the implementation of IT investments can be identified, it is unlikely that any benefit has been realized.



## 6. Conclusion

This study concludes that the realization of business value from BI is highly dependent on activities that occur in all 5 stages of the process model – from the alignment of the BI strategy with that of the organization, through to the way in which the business benefits of BI are measured, but that the actual measurement of these remains challenging due to the delayed, indirect and intangible nature of many of the benefits. As the investment in BI grows, the requirement to realize the benefit will become more important.

In the organization studied, establishing clear ownership and responsibility for the BI budget led to an improvement in benefits estimation as expected benefits and business value became more significant in the project portfolio prioritization process. Clear, overall governance and ownership of a BI function also encourages the creation of a documented BI strategy. It seems unlikely that a single team could become responsible for both the technical and business BI functions within an organization. A strong partnership, established between the business and IT BI teams, is identified as the major reason for success.

Whilst there appears to be a general need for more robust value and benefit measurement processes, the organization studied appeared to be comfortable with the notion that BI adds value even if it cannot always be measured. From the study, it appears that much of the business value is derived from activities linked to the IT Use Process. There is considerable potential to derive even more business value with an increased focus on the activities across the entire process model and in particular on the IT Alignment and Conversion Process.

Although this study focused on one financial services organization, the conclusions relating to BI are supported by previous research findings with a broader IT focus covering a variety of business sectors.

## References

- Bitterer, A., Rayner, N., Hostmann, B., Gassman, B., Schlegel, K., Beyer, M.A., Burton, B., Herschel, G. Friedman, T., Newman, D., Logan, D., Andrews, W., Sarner, A., White, A. & Radcliffe, J. (2006). *Hype Cycle for Business Intelligence and Corporate Performance Management, 2006*. Retrieved 13 April 2007 from <http://www.gartner.com> ID G00140064.
- Brown, A. (2005). IS Evaluation in Practice. *Electronic Journal of Information Systems Evaluation*, 8(3), 169-178. Retrieved 29 April 2007 from <http://www.ejise.com>
- Dubé, L., & Paré, G. (2003). Rigor in Information Systems Positivist Case Research: Current Practices, Trends, and Recommendations, *MIS Quarterly*, 27(4), 597-636
- Gartz, U. (2004). Enterprise Information Management, in Raisinghani, M. (Ed), *Business Intelligence in the Digital Economy: Opportunities, Limitations and Risks*. Hershey: Idea Group Publishing.
- Gibson, M. & Arnott, D. (2005). The Evaluation of Business Intelligence: A Case Study in a Major Financial Institution. *Proceedings of the 16<sup>th</sup> Australasian Conference on Information Systems*, 29 Nov – 2 Dec 2005, Sydney.

- Gonzales, M.L. (2004). Creating a BI Strategy Document. *DM Review*, 14(11), 24-51.
- Griffiths, P. & Remenyi, D. (2003). Information Technology in Financial Services: A Model for Value Creation. *Electronic Journal of Systems Evaluation*, 6(2), 107 –116. Retrieved 29 April 2007 from <http://www.ejise.com>
- Griffin, J. (2007). Putting the Business Back into Business Intelligence Initiatives. *DM Review*, 17(2), 15.
- Howson, C. (2006). The Seven Pillars of BI Success. *Intelligent Enterprise*, 9(9), 33-37.
- Kohli, R. & Sherer, S. A. (2006). Deriving Value from Information Technology: Role of Concordance Investments. *Proceedings of the 12<sup>th</sup> Americas Conference on Information Systems*, 4-6 Aug 2006, Acapulco.
- Lin, C. & Pervan, G. (2003). The Practice of IS/IT Benefits Management in Large Australian Organizations. *Information and Management*, 41(1), 13-24.
- Lonnqvist, A. & Pirttimaki, V (2006). The Measurement of Business Intelligence. *Information Systems Management Journal*, 23(1), 32-40. 1-3 Dec 2004, Hobart, Tasmania
- Marshall, P., McKay, J. & Prananto, A. (2004). A Process Model of Business Value Creation from IT Investments. *Proceedings of the Fifteenth Australasian Conference on Information Systems*, 1-3 Dec 2004, Hobart, Tasmania.
- Moss, L.T. & Atre, S. (2003). *Business Intelligence Roadmap: The Complete Project Lifecycle for Decision Support Applications*. Boston: Addison Wesley.
- Negash, S. (2004). Business Intelligence. *Communications of the Association for Information Systems* 13, 177-195.
- O'Brien, J. & Kok, J.A. (2006). Business Intelligence and the Telecommunications Industry: Can Business Intelligence Lead to Higher Profits? *South African Journal of Information Management*, 8(3). Retrieved 10 March 2007 from <http://www.sajim.co.za>
- Peppard, J., Ward, J. & Daniel, E. (2007). Managing the Realization of Business Benefits from IT Investments. *MIS Quarterly Executive*, 6(1), 1 – 11.
- Pirttimaki, V., Lonnqvist, A. & Karjaluo, A. (2006). Measurement of Business Intelligence in a Finnish Telecommunications Company. *The Electronic Journal of Knowledge Management*, 4(1), 83-90. Retrieved 29 April 2007 from <http://www.ejkm.com>
- Raab, T. (2000). The Need for a Business Intelligence strategy: A Critical Analysis from the Insurance Industry. *DM Review*, 10(6). Retrieved 9 September 2007 from [http://www.dmreview.com/article\\_sub.cfm?articleId=2291](http://www.dmreview.com/article_sub.cfm?articleId=2291)
- Reiss, G., Anthony, M., Chapman, J., Leigh, G., Pyne, A. & Rayner, P. (2006). *Gower Handbook of Programme Management*. Aldershot: Gower Publishing Limited.
- Remenyi, D. (1999). The Elusive Nature of Delivering Benefits from IT Investment. *The Electronic Journal of Systems Evaluation*, 3(1). Retrieved 29 April 2007 from <http://www.ejise.com>
- Robles-Flores, J.A. & Kulkarni, U. (2005). Knowledge Management Systemes: A Business Value Model. *Proceedings of the Ninth Pacific Asia Conference on Information Systems*, 7-10 July 2005, Bangkok.
- Silvius, A.J.G. (2006). Does ROI Matter? Insights into the True Business Value of IT. *The Electronic Journal of Systems Evaluation* 9(2), 93 – 104. Retrieved 13 April 2007 from <http://www.ejise.com>
- Soh, C. & Markus, M. L. (1995). How IT Creates Business Value: A Process Theory Synthesis. *Proceedings of the Sixteenth International Conference on Information Systems*
- Venter, P. & Tustin, D.H. (2006). *Business Intelligence in South Africa*. Pretoria: Bureau of Market research.
- Ward, J. & Daniel, E. (2006). *Benefits Management – Delivering Value from IS and IT Investments*. Chichester: John Wiley & Sons, , Amsterdam, The Netherlands, 1995.
- Williams, S. & Williams, N. (2007). *The Profit Impact of Business Intelligence*. San Francisco: Morgan Kaufmann.