TO BI OR NOT TO BI – THAT IS THE QUESTION
FOR SMALL-TO-MEDIUM ENTERPRISES

BY LEO KOZHUSHNIK

Abstract

The last decade has seen Business Intelligence (BI) go through much growth as a top technology trend largely due to CIOs and IT leaders increasingly recognizing the value of insight when making important business decisions.

Worldwide, billions of dollars are spent annually on BI and analytics enterprise software. Although such high spend greatly resonates with big corporate organisations who generally have large project funding, just about every organisation can benefit from type of informed decision-making the BI systems can provide. So where does small-to-medium enterprises (SMEs) stand in the BI adoption scene compared to their larger counterparts?

BI systems have advanced in terms of diverse technologies, software and licencing costs incl. cheaper licencing, less software complexity and reduced cost of ownership. Larger vendors are changing strategies by playing towards increased BI adoption and offering free software to increase user base.

Several new solutions are targeted and priced for SMEs. With all these factors at play and the SME’s desire for better informed decision making, many smaller companies are trying to move and acquire BI capabilities. This paper focuses on defining BI and identifying the benefits to make recommendations for SMEs, such as Streetkix who are fictitious small business, to adopt BI.

Introduction

With the Business Intelligence cited to have been born in the mid 1950’s, IBM researcher Hans Peter Luhn used the term to describe the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal (Luhn, 1958). Today, the field of Business Intelligence has evolved into an area of expertise that is broadened to include theories, methodologies, architectures, and technologies that transform raw data into meaningful and useful information for business purposes (Rud, 2009).

Demand for Business Intelligence applications continues to grow even at a time when demand for most IT products is soft (Soejarto & Whiting, 2003). Effective and timely business information is recognised as being essential for organisations to not only succeed but even to survive in today’s rapidly changing business environment (Lönnqvist & Pirttimäki, 2006). According to Pisello & Strassmann (2003, p. 13), competitive advantages have shifted from those with expertise in how to implement new technologies, through those who know how to use technology to improve business processes, to those who know how to use technology to share, manage and increase the level of knowledge.

Table 1 outlines top 10 priority rankings with analytics and BI being positioned as a number 1 priority for CIOs. Furthermore, Gartner report Market Share Analysis: Business Intelligence and Analytics Software (2013) identifies that $14.48 billion was spent worldwide on BI and analytics enterprise software in 2013, increasing 8% from $13.38 billion in 2012.

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Table 1: Top 10 CIO Business and Technology Priorities in 2013

Having more recognition and momentum in the BI practice space, major BI software vendors compete furiously for the Leader’s spot in the Gartner BI Magic Quadrant by offering agile analytical BI software, often standalone free of charge installations. To complement this, business users are showing more drive to become more tech savvy as vendors roll out these innovative, easy to use, and scalable product offerings. Fuelled by the appetite and equipped with these tools, business users are changing the BI landscape by circumventing traditional processes and implementing ad-hoc business intelligence initiatives all on their own throughout various sized organisations. Empowered with having the right tools at hand, businesses can aim to identify, interpret and make use of available information to make new opportunities that are strategically aligned and represent long term outlook.

This should be of particular interest to SMEs who are critically important to the Australian economy and play a significant role within socioeconomic systems; providing employment, goods and services and tax revenue within communities (Howe, 2011).
The Australian Bureau of Statistics defines SMEs as those enterprises employing less than 200 people, which can be further broken down to medium business (20-199 employees), small business (5-19 employees) and micro business (1-4 employees). SMEs make up 96 per cent of all private businesses in Australia, making them the largest employers and contribute a third of the country’s GDP (DISR, 2010).

Up to recently, budget constraints, implementation time, reliance on IT and end user skill set requirements, and data quality management complexity have represented major barriers to BI adoption. The purpose of this contribution is to discover and examine the benefits that lead to evaluating and justifying the investment in implementing BI systems for SMEs. To BI or not to BI - that is the question.

Company
Streetkix, a fictitious small businesses who are a multinational retailer specialising in consumer goods. The company employs 15 staff and operates a warehouse which supplies two retail outlets.

The company is using a middle-range small business accounting software that meets Accounts Receivable and Accounts Payable functions, inventory requirements, keeping track of its customers and suppliers, processing purchase & sales orders, and payroll.

The company is looking to increase market share by investing in BI to provide insights into sales trend analysis and cost-of-acquiring new customers.

BI Systems
BI systems go beyond just a set of querying and reporting tools used in an organisation. BI Systems are an integrated set of tools, technologies, and software that are used to source data from disparate data sources, transform, and make it commonly available to the end users (see Figure 1). Typical BI system may include:

- Extract, Transform and Load (ETL) components to source the data from source systems and load into a data warehouse.
- Data warehouse that provide a central repository of data, transformed and aggregated, ready for analysis.
- Online Analytical Processing tools (OLAP) allowing users to perform analysis.
- Querying and Reporting tools that enable users to create reports.
- Data visualisation and Dashboards which provides users with an easy to read, high level, visual interface.
- Mobile BI enabling users’ business insight on the move.

Cost of Ownership
The Total Cost of Ownership (TCO) represents a key factor in deciding on such investments, with a range of other implementation costs should also be taken into account during the evaluation.

The most important categories of costs that should be considered are (Remenyi, Bannister & Money, 2007, pp. 62-69): (1) costs of hardware; (2) costs of other fixed assets; (3) costs of software; (4) costs of data sources; and (5) costs of intellectual capital. The monetary value of these costs vary depending on the project size but normally, the typical implementation costs for BI are made up of Capital and Operational Costs and can range from $100,000 through to $1,500,000, and above. Initial design, build, implementation of services, purchasing hardware and software are part of the Capital one-time expense. While ongoing hardware maintenance cost for ongoing maintenance, enhancements, and support are part of Operation costs.

With IT budgets under increasing scrutiny and business requirements becoming more complex, today’s organizations are under pressure to fully understand and examine BI implementation costs. The costs of successful BI extend beyond the initial acquisition. But there are ways to identify cost reduction methods that could make it more attractive for SMEs to invest in BI.

With more competition in the market place, these costs can be better managed upfront by; (1) lowering the hardware costs based on the intensive use of new technologies including in-memory databases like Hadoop and cloud BI offerings like GoodData; (2) lowering software costs based on the new licensing and delivery models such as Software as a service (SaaS) like GoodData; and (3) lowering costs of due starting small, ease-of-use and self-service applications like Tableau for the business users to embrace consequently reducing the reliance on IT department.
Businesses waste millions annually by relying on poor quality data, which is a critical issue for making decisions and in turn, critical to achieving better business performance. According to Batini & Scannapieco (2006, p. 2), DQ problems affect reliability of data for making decisions and thus, critical to the business, and to make better decisions, businesses need accurate and reliable information at the right time, to provide capability to get an insight into the business, and to make better decisions. These software advances lead to more affordable BI solutions and would make SMEs a perfect candidate for BI adoption remembering that BI does not need to be expensive; think big, start small then build on that capability.

### Benefits defined

Businesses are forever looking for new ways to improve performance, engage better with customers, grow revenue and increase productivity. BI is a major factor in achieving these results due to the wide applicability in both the internal and external business environments, organisations can enjoy many benefits. Thompson (2006, p. 1), lists the following benefits BI brings to companies: (1) faster and more accurate reporting; (2) an improved decision-making process; (3) improved customer satisfaction; (4) increased revenues; (5) savings in IT; and (6) savings in other areas (in addition to IT).

Defining benefits can mean different things in different contexts. Carver & Ritacco (2006, p. 6) divide benefits into four groups: (1) lowering costs; (2) increasing revenue; (3) improving customer satisfaction; and (4) improving communication within the company. One of the most frequently mentioned benefits of BI is support for better decision-making. Comparably, Atre & Moss (2003, p. 39) categorise the benefits of BI as: (1) an increase in revenue; (2) an increase in profit; (3) improved customer satisfaction; (4) a reduction of costs, and (5) increase in market share.

Whatever the benefit may be, BI connects people with the right information at the right time, to provide capability to get an insight into the business, and to make better decision-making, faster.

### Data Quality

With many variations to Data Quality (DQ) definition, DQ is all about reliability of data for making decisions and in turn, critical to BI. Batini & Scannapieco (2006, p. 2) identify that DQ problems cost U.S. businesses more than 600 billion dollars a year. Businesses waste millions annually by relying on poor quality data, causing unnecessary waste and leading to inaccurate decision-making.

Due to the nature of BI systems where the data is usually sourced from a number of disparate systems, ensuring that the data is clean before it is loaded into the data warehouse is imperative. Unfortunately, poor data quality is unavoidable and is one of the main issues exposed by BI. This however, should not be seen as a problem, but as an opportunity to identify poor DQ standards in the source systems, clean the data and load into the data warehouse for aggregation and analysis.

This can be applied as an ongoing program and must be managed to ensure that the source data is clean and DQ problems are not accumulated along the information chain and into the data warehouse. To assist with improving DQ, Data Governance can play an important role in managing good data. Data Governance is not just about managing but is about setting up guidelines, policies and standards that help manage good data properly and ensure that the data can be trusted. Working to establish the processes and holding participatory governance structure through data stewards and data custodians can help to understand the cause and effect of poor data in a business and making people accountable for low data quality. Once these governance policies and procedures are in place and the data is good and reliable, there will be trust in the data and increased adoption and utilisation.

In a typical scenario, Streetkix would be running a marketing campaign creates incorrect or duplicated mailing labels, or weekly sales and marketing newsletter going out to the wrong or inactive customers. All this causes waste and increases operating costs that can accumulate over time. Where the operation budgets are tight, ensuring data quality will lead to reduced waste and cost savings which small business will directly benefit from.

### Self-Service BI

By definition, self-service allows business users to create, analyse and consume information without heavy reliance on IT departments.

Essentially, self-service BI enables business users to be self-sufficient and to help themselves by creating custom/ad-hoc reports, generating queries, analysing the output and disseminating information across business. Vendors are making self-service BI software more intuitive and easy to use, thus empowering business users to extract, identify, interpret and make use of available information faster, more easily and more visually appealing.

Empowering business users to help themselves and opening BI environment to business community increases collaboration and innovation. Users are able to share information faster and provide feedback through interactions. To this extent, self-service BI competency should be built with business end user in mind from the very start, early engagement and training is critical for wider acceptance. The underlying architecture incl. source data, ETL, data warehouse, and presentation layer has to be made simpler for users to self-service on.
Traditionally, IT teams could take weeks to create and distribute reports based on the business requirement(s). With self-serve BI, business users no longer need to rely on the IT team to gain access to data and create meaningful reports. Decision-making process can become that much faster and more efficient. In another example, with Streetkix staff having access to sales data helps understand customer behaviour and can quickly translate to selling them new range of products or targeting customers with appropriate specials offers. Alternatively, profiling existing customers to look for similar trends would lead to selling to new customers in a similar way.

A better insight into the business

In many cases, reports are simply generated without the full understanding: purpose or the measures. What do the business users really know about what they are trying explore? Data that is well formed and transformed into meaningful information can give all the right answers but the challenge for the business remains; are the right questions being asked? From engagement to engagement, same repeated mistakes are transparent, many businesses experience the same obstacle: what do they know about their data and how do they gain a better insight. Rather than saying: “this is how we’ve always done things”, why not ask: “what are we trying to answer or measure?” Taking a step back and understanding the basic question may lead the business on the more appropriate path to getting the suitable answer(s).

At Streetkix, much of financial reporting relies on manual back-end processes that involve heavy Excel spreadsheet manipulation based on standard reports generated from the core accounting software. Compiling vast amount of information on regular basis that is used in monthly financial reporting is a cumbersome task. Even with all the best intentions and time to prepare, legacy reports may not be showing accurate measures to answer most basic business questions. Clearly defining measures and KPI, auditing existing reports, combining or creating new reports to answer specific questions, and automating manual/repetitive processes would lead to cost savings, cost avoidance and better business insight.

Better and faster decision making

Research shows positive effects of BI in assisting with strategic and operational decision making. A Gartner survey ranked the strategic use of BI in the following order (Willen, 2002):

1. Corporate performance management.
2. Optimizing customer relations, monitoring business activity, and traditional decision support.
3. Packaged standalone BI applications for specific operations or strategies.

Users can only make decisions on the facts they know. Presented with the right information at the right time to support the key facts and make a better decision faster, forces support for decision making improvement, so is the actual decision making. Improvements are also made due timeliness, accessibility, quality, and better control of business information.

Furthermore, visualisation allows for complicated problems to be made easier to interpret by the decision makers. Visualization is used to create advanced reports in which large amounts of information are presented on a single screen (Houdeshel & Watson, 1987).

Businesses are quickly realising the value of exist sting information in operational, managerial and strategic decision making. By employing analytical methods including visualisation, the decision support can now be used in a flexible way to assist with decision making processes.

Keeping track of customer data such as history of purchased products, combined with visualization tools to provide the capability to summarize the data and see it with new eyes would aid Streetkix with better decision making. By looking at information represented in simple graphs and pie charts, non-technical counter staff can quickly analyse customer’s purchasing habits and offer alternatives including better quality products or those that are on special. Streetkix would create better engagement with their customers and increase loyalty. Investing in BI will bring long term value to the businesses.

Opportunity to refine and improve business processes

End users are an important element of BI. For BI to be successfully utilised by the business community and to add real value to the organisation, it has to be fully supported, accepted and endorsed by the very end users within that organisation. It is important to include business community on BI implementation journey from the start. When the feedback is poor, end users get frustrated, push back with resistance and eventually give up on using implemented systems.

To improve user acceptance, buy-in from end users is essential. Consulting with and involving end user from the very start of the BI implementation would drive towards positive acceptance. For instance, user engagement at the requirements gathering workshops could provide an opportunity to identify and highlight the business process that is followed and what the users really need from the BI system. With the clear focus on the business process, part of the in-scope deliverable could be to map out each step highlighting inefficiencies that exist within the process and offer improvements.
Asking: “Why we do things the way we do” can lead to discovering and improving internal business processes along the way leading to more positive attitudes: “How can we improve things”. Errors or inefficiencies in business rules can be detected sooner, and with the right change management, rules can be amended as necessary.

At Streetkix, the non-technical counter staff would be engaged in the project to provide feedback on the processes and what they would like to see in those simple graphs, something that is easily meaningful, digestible and actionable. Forcing a solution on staff which they do not understand rarely works out well, and only promotes resistance. Focussing on what works and how to do it better would enable that very same staff to embrace the processes and technology to perform their jobs better.

**Conclusions**

The presented findings identify and highlight the benefits that should encourage small-to-medium enterprises to put BI into their business.

Business Intelligence provides many benefits that are both measurable and tangible. BI systems allow for connecting people with the right information at the right time, provide capability to get a better insight into the business, and provide foundation for faster and improved business decision-making process.

In summary, implementing a BI system can bring the following business benefits:

- Provide the foundation for BI architecture which can then be built upon. Think big, start small – start with improving reporting and analysis capabilities which will delivery consistent and reliable information, then move to grow BI to take the capability to the next level.
- An incremental approach to BI will provide an opportunity to be innovative and embrace continuous improvement to create new future.
- Assit with improving Data Quality and to better managing good data.
- Providing self-service BI capability that enables business users to be self-sufficient and to help themselves to perform independent querying and reporting.
- BI does not have to be expensive: with more competition in the market place, implementation costs are significantly lower and more achievable.

With the fictitious Streetkix, investment in BI is justifiable as it will help:

- Identify poor data quality that will lead to reduced waste and cost savings
- Use self-serve BI to avoid reliance on IT teams to create meaningful reports
- Create new automated reports that clearly show accurate measures meaningful to the business.
- Create better engagement with customers
- Empower staff to embrace the processed and technology

**Biography**

Leo Kozhushnik is a Principal Consultant at Expert Skills IT Professional Services who are a focused Business Intelligence & Data Warehouse Technology Professional Services provider. Leo has over 15 years of IT industry experience spread across various industry sectors with the main focus on relational database management, data warehouse design, development and implementation, development and deployment of BI solutions. Leo holds a Bachelor of Information Management (Business Systems) from Monash University, Post Graduate Certificate of Business Management (Project Management) from Swinburne University, Microsoft Technology Associate (MTA) and a TDWI Melbourne Chapter Member.