Return on Investment in Business Intelligence in Small and Mid-Sized Businesses

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Abstract: - Building an ROI is a key component of ensuring a project is focused on the right areas and the company’s investment is justified. The process should bring both business and IT owners to the table to jointly assess risks, costs, and benefits to form the business case. The framework outlined in the paper highlights four key ROI components to consider when building a BI business case: business value, BI user productivity, IT effectiveness, and total cost of ownership (TCO). An example is presented, illustrating the way ROI can be calculated.

Key-Words: - Business intelligence (BI), return on investment (ROI), total cost of ownership (TCO), business value, user productivity, IT effectiveness

1 Introduction

Successful business intelligence implementations can unlock key information within a company’s data vaults and enable organizations to operate more effectively and profitably. According to a recent AMR profile on Small and Mid-Sized Business (SMB) IT spending, the top business initiative impacting IT decisions was “better utilization/analysis of data throughout the organization” [1].

For many companies, a challenging business event or critical business pain precipitates a conversation about Business Intelligence (BI).

Challenging business events include:
- Period of rapid growth
- Recent or pending merger/acquisition
- Introduction of new products, product lines, and/or services
- Upgrades to the IT environment (e.g. ERP upgrades).

Critical business pain points include:
- Sudden decrease or negative trend in profit margins or revenues
- Unpredictable quarter-end financial results
- Inventories increasing faster than sales
- Customer dissatisfaction due to poor product availability or late deliveries
- User demands for better, more complete information.

These scenarios call for a precise view of the business situation, which usually involves locating, extracting, and organizing data into a repository to support analysis.

2 Value and Benefits of a BI Solution

Many companies rely on a tangled Web of Excel spreadsheets and Access databases to provide information and manage their business. These applications are popular because they often allow business units to design reports to their own specifications without IT resources. Excel experts can create customized reporting templates and perform amazing feats of analytics.

However, there are many significant risks involved if a business becomes reliant on user-generated spreadsheets and one-off databases:
- Compiling the data usually consumes more of an employee’s time than the decisionmaking it supports.
- Spreadsheet manipulation is time-consuming for the business units and is often prone to user errors.
- Spreadsheets created by each functional area propagate multiple versions of the truth.
- Metrics and data about the business should be in the hands of all who need it, not just limited to the expert data analysts.

When faced with a compelling situation, organizations must quickly make strategic and tactical decisions [2]. By implementing a robust BI solution, your company gains:
- One shared view across the company for all associates – from executives to functional teams.
- A single source system for accurate financial and operation information that is readily accessible by all departments.
- Flexibility and scalability to grow and change with your company.
• Insights to understand your business performance and opportunities on a much deeper level.

3  Financial Justification and Evaluation of a BI Project

Building an ROI is a key component of ensuring a project is focused on the right areas and the company’s investment is justified. The process should bring both business and IT owners to the table to jointly assess risks, costs, and benefits to form the business case. Justifying the project actually serves multiple purposes:
  • Helps a company understand the scope of its implementation and prevents “scope creep” in later project stages.
  • Creates a focus on anticipated outcomes and benefits.
  • Creates a framework for sound financial management and value creation.
  • Helps a company monitor their actual results against the expected impact.
  • Provides feedback mechanisms to refine and revise business strategies and technical activities.

Because of this multiplicity of purposes, it is very important for a company to develop an appropriate framework for ROI analysis of BI applications.

4  Developing the Framework for ROI Analysis of BI Applications

Organizations often struggle to create business and financial cases because they do not consider all of the costs and benefits, and often lack a good starting point. We recommend a robust framework to help companies scope, justify, and measure the benefits of a BI project in order to maximize value and return.

The following framework highlights four key ROI components to consider when building a BI business case:
  • business value
  • BI user productivity
  • IT effectiveness
  • total cost of ownership (TCO).

4.1 Business Value

Visibility into business operations can yield previously-unknown insights. Without having an integrated view of the business, functional areas make decisions without having all of the relevant data they need to understand the company-wide impact of their decisions. With one place to go for one version of the truth, business units are aligned on the business’ performance to make more informed and timely decisions.

Business intelligence solutions can deliver extraordinary value by providing the necessary information to make strategic and tactical decisions in three major areas:
  a) revenue, pricing, and profitability
  b) customer satisfaction, retention, and acquisition
  c) operational efficiency and excellence.

4.2 BI User Productivity

By simultaneously providing consolidated business reporting and improving the quality of data, companies can empower employees with the information they need to work more effectively. Users no longer need to chase down data, reconcile different versions, and follow the data trail. Business intelligence provides business users with self-service access to enterprise data in real-time.

4.3 IT Effectiveness

With a jungle of dated, home-grown legacy applications, multiple enterprise and departmental systems, and databases living in every corner of every office, IT organizations often have to spend more time maintaining the systems than developing new solutions for the business. With a robust, self-service BI solution in place, IT departments can reclaim valuable time that can be spent on strategic initiatives versus the never-ending daily data requests. This will, in turn, potentially improve IT effectiveness and contribute to business value achieved.

4.4 Total Cost of Ownership (TCO)

When evaluating different solutions, it is important to consider all the upfront and ongoing fees associated with your Business Intelligence implementation, including consulting, software and licensing, hardware, training, maintenance, upgrades, and support. Often companies focus on the upfront hardware and software costs but neglect to consider the substantial costs of Extract, Transform, and Load (ETL) work, database configuration, enterprise architecture management, and user training when the business grows or changes requirements.

For small- and mid-sized companies, a Software-as-a-Service (SaaS) implementation can yield a lower total cost of ownership and a more compelling return on investment. By choosing SaaS, companies can shift implementation risks to the software vendor and scale more quickly since hardware, software, and data architecture expansions require minimal internal IT resources.
5 Discussion on the Framework for ROI Analysis of BI Applications

Our framework quantifies the value creation of Business Intelligence for the organization’s “shareholders” by detailing opportunities to increase revenue, lower costs, and improve asset utilization. Following, we share some specific value drivers that provide line item benefits (and costs) for the ROI calculation.

Table 1 presents the summary of business value drivers that should be considered when performing the ROI calculations.

<table>
<thead>
<tr>
<th>Business Value</th>
<th>Revenue</th>
<th>Cost</th>
<th>Assets</th>
</tr>
</thead>
</table>
| Revenue, pricing, and profitability                 | ● Identify profitable and unprofitable customers to make necessary changes  
● Identify opportunities to cross-sell products and services  
● Reduce lost sales from out of stocks  
● Optimize pricing across products and product lines | ● Understand customers service costs to adjust pricing or service levels  
● Gain clear, accurate view of different cost centers to understand savings opportunities, including vendor consolidation or low-cost material or service alternatives | ● Understand inventory positions and holding costs for different products or customers to align with target service levels  
● Monitor cash conversion cycle to achieve target levels  
● Understand maintenance and costs for major fixed assets/capital equipment to lower TCO |
| Customer satisfaction, retention, and acquisition   | ● Better selling of products and services to increase lifetime value of customers  
● Meet or improve target service levels to customers in order to become a higher value vendor/partner  
● Provide customers with accurate information quickly, resulting in higher retention and sales | ● Reduce marketing efforts/costs to retain customers  
● Reduce costs related to expediting, error correction, and customer dissatisfaction  
● Reduce penalties for delayed shipments  
● Increase customer acquisition effectiveness | ● Better monitor and align inventory and customer support teams to desired customer service levels |
| Operational efficiency and excellence               | ● Improve order-to-cash process through better visibility | ● Pursue lean process (e.g. manufacturing, engineering) targets through better visibility into process status, bottlenecks, and key issues  
● Optimize direct and indirect procurement  
● Reduce overtime costs with greater visibility to upcoming labor demand  
● Reallocate labor resources | ● Lower inventory holdings  
● Utilize manufacturing lines, warehouses, plants, trucks more effectively |
Table 2 summarizes BI user productivity drivers in small and mid-sized businesses that should be taken into account when trying to calculate ROI of business intelligence systems.

Table 2.

<table>
<thead>
<tr>
<th>Business Value</th>
<th>Revenue</th>
<th>Cost</th>
<th>Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI user productivity drivers</td>
<td>Gain additional time to focus on customers and business growth initiatives</td>
<td>Access required information more quickly</td>
<td>Reduce data marts, Access databases, and servers that are maintained by the business units</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fewer Excel experts needed to manipulate data and manage spreadsheets</td>
<td>Reallocate individuals tasked with managing and manipulating multiple data sources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consolidate reporting – one place to go for information; fewer reports to review</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ability for users to interrogate data and find root cause, reducing business/IT disruptions</td>
<td></td>
</tr>
</tbody>
</table>

The most important IT effectiveness drivers concerning BI solution implementation ROI calculation in small and mid-sized businesses are summarized in Table 3.

Table 3.

<table>
<thead>
<tr>
<th>Business Value</th>
<th>Revenue</th>
<th>Cost</th>
<th>Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT effectiveness</td>
<td>Offer consolidated reporting as a service to vendors/suppliers</td>
<td>Lower staff turnover</td>
<td>Decrease business requests, resulting in less maintenance and better utilization of hardware</td>
</tr>
<tr>
<td></td>
<td>Reallocate IT staff onto higher value, strategic projects that impact company growth</td>
<td>Spend less time retrieving and massaging data for the business</td>
<td></td>
</tr>
</tbody>
</table>

Finally, the drivers of Total Cost of Ownership (TCO) when implementing BI solutions in small and mid-sized businesses, as well as their impacts on those businesses, should be considered.

As it was mentioned earlier in this paper, for small and mid-sized companies, a Software-as-a-Service (SaaS) implementation can yield a lower total cost of ownership and a more compelling return on investment. By choosing SaaS, companies can shift implementation risks to the software vendor and scale more quickly since hardware, software, and data architecture expansions require minimal internal IT resources.

A summary of Total Cost of Ownership drivers and their impacts is shown in Table 4.
Table 4.

Total cost of ownership

<table>
<thead>
<tr>
<th>Business Value</th>
<th>Revenue</th>
<th>Cost</th>
<th>Assets</th>
</tr>
</thead>
</table>
| IT effectiveness     | • Offer consolidated reporting as a service to vendors/suppliers  
|                      | • Reallocate IT staff onto higher value, strategic projects that impact company growth | • Lower staff turnover  
|                      |                                               | • Spend less time retrieving and massaging data for the business | • Decrease business requests, resulting in less maintenance and better utilization of hardware |

6 Example of BI ROI Calculation

Although TCO is one of the most difficult metrics to benchmark [3], it can and is to be calculated. Instead of thinking solely about how to calculate and reduce TCO, companies should think about how to best manage TCO from a business perspective. Putting TCO into the business context – understanding and optimizing the relationship between IT investments and business outcomes (revenues of profits) – has enormous potential to help companies make superior, results-oriented decisions about IT solutions.

Just as important, the ultimate TCO is determined during the conceptual level of a technology initiative. As a result, a proactive, business-benefits approach to application design and ownership produces a significantly lower TCO than simply expecting support operations to reduce costs [4].

The example shown is a hypothetical one. But, in principle, the way ROI is calculated is always the same, regardless whether it reflects a real situation or not. Sample TCO Calculation for a Software as a Service (SaaS) vs. Traditional BI Implementation is presented in Table 5.

Table 5.

Sample TCO Calculation for a Software as a Service (SaaS) vs. Traditional BI Implementation  
(in irrelevant money units)

<table>
<thead>
<tr>
<th>Total Cost of Ownership</th>
<th>Traditional BI</th>
<th>SaaS BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Intelligence/Project Management Application License</td>
<td>250,000</td>
<td>250,000</td>
</tr>
<tr>
<td>Data Integration License (ETL)</td>
<td>200,000</td>
<td>-</td>
</tr>
<tr>
<td>System Integration Costs</td>
<td>750,000</td>
<td>-</td>
</tr>
<tr>
<td>Database License</td>
<td>100,000</td>
<td>-</td>
</tr>
<tr>
<td>Infrastructure/Hardware</td>
<td>100,000</td>
<td>-</td>
</tr>
<tr>
<td>Internal IT Personnel</td>
<td>300,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Training</td>
<td>100,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Support/Subscription Fees</td>
<td>11,000</td>
<td>60,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td><strong>1,910,000</strong></td>
<td><strong>360,000</strong></td>
</tr>
</tbody>
</table>

This calculation predicts ROI in the first year, taking into account the implementation costs, as well. This information is, of course, valuable but is not all that is needed to get the holistic view of BI projects ROI. Thus, the prediction for all subsequent years, when implementation costs do not occur and can be omitted from calculation, should also be calculated, as shown in Table 6.
Table 6.

TCO Calculation for a Software as a Service (SaaS) vs. Traditional BI Implementation for years after the year 1 (in irrelevant money units)

<table>
<thead>
<tr>
<th>Total Cost of Ownership</th>
<th>Traditional BI</th>
<th>SaaS BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Intelligence/Project Management Application License (Maint.)</td>
<td>45,000</td>
<td>-</td>
</tr>
<tr>
<td>Data Integration License (ETL)</td>
<td>36,000</td>
<td>-</td>
</tr>
<tr>
<td>System Integration Costs (Maint.)</td>
<td>50,000</td>
<td>-</td>
</tr>
<tr>
<td>Database License (Maint.)</td>
<td>18,000</td>
<td>-</td>
</tr>
<tr>
<td>Infrastructure/Hardware</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Internal IT Personnel</td>
<td>100,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Training</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Support/Subscription Fees</td>
<td>-</td>
<td>60,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>274,000</td>
<td>110,000</td>
</tr>
</tbody>
</table>

Finally, cost-savings over 5-year horizon for a SaaS vs. Traditional BI Implementation should be calculated. The way to do it in any specific case is principally shown in Table 7.

Table 7.

Cost-savings over 5-year horizon for a SaaS vs. Traditional BI Implementation (in irrelevant money units)

<table>
<thead>
<tr>
<th></th>
<th>Traditional BI cost</th>
<th>SaaS cost</th>
<th>Savings of SaaS</th>
<th>% Savings over Traditional BI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation / Year 1</td>
<td>1.910.000</td>
<td>360.000</td>
<td>1.550.000</td>
<td>81%</td>
</tr>
<tr>
<td>Years 2-5</td>
<td>1.096.000</td>
<td>440.000</td>
<td>656.000</td>
<td>60%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.006.000</td>
<td>800.000</td>
<td>2.206.000</td>
<td>73%</td>
</tr>
</tbody>
</table>

7 Conclusion

As an organization builds a business case for BI, these final thoughts should be considered from a holistic point of view:

- The framework that has been outlined is exactly that – a framework. However, it does provide cost and benefits to calculate, questions to ask, and business areas to consider. Each company’s pains and opportunities will be different; let the business context dictate the ROI model.
- Business intelligence is an enabler, not a panacea. However, it does allow an organization to leverage its own data with greater sophistication and precision. Organizations can better understand and manage the business by unearthing root causes and monitoring actions.
- The “soft” benefits should not be underestimated. Many companies later find that the increased accessibility and visibility to business information allows employees to generate insights via increased innovation, learning, and collaboration.

References: