Adopting BI in an Organization Using Proof-of-Concept Techniques

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Abstract
Implementing a proof of concept for your business intelligence (BI) project proposal can drive home the business value of BI to your executives to shore up that all-important executive sponsorship. Without such sponsorship, you will likely find yourself fighting an uphill internal battle that can force cost overruns and deployment delays, and possibly doom your BI project altogether. In this article, we examine how a proof-of-concept technique can help you win the attention and adoption of your BI project from executives and management.

In our conversations with customers regarding implementing business intelligence solutions, we often meet with talented technical professionals from the data warehouse group. We discuss the ways they may have gone about collecting data from numerous, disparate data sources, cleansed the data, and provided single-source models for customer records, among other tasks. These are enormous efforts that take considerable time and specialists from many groups, including database administrators, developers, business analysts, and data warehouse experts.

However, when we ask the business units responsible for driving business performance and lines of business about the value they receive from these data warehouses, we find that in most instances the value is not being realized by the business.

Let's examine one mechanism we have found useful for describing the benefits and value of business intelligence to business units. We utilize a pre-implementation business-value tool that is essentially a pared-down business productivity tool in the form of Excel spreadsheets.

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A pre-implementation phase of such projects can be scoped for gathering sample data from data sources required for a customer segmentation solution. A small-scale data mart and analysis cube can be created based on this data. We often refer to this project phase as a proof of concept or a pilot. This phase leads to an effort (usually taking a couple of weeks) of data gathering, data modeling, and producing the results through an OLAP engine into an Excel spreadsheet. The resulting spreadsheet serves as the catalyst to present the business value to the project sponsors and executives.

Though the technology and software that make business intelligence possible have existed for decades, the enterprisewide adoption (and benefit) of business intelligence has yet to materialize for many IT shops.

In one example, through this simplified BI proof-of-concept technique, we showed that the top 1 percent of a customer’s base subscribers accounted for 43 percent of all revenue. By implementing a segmentation business intelligence solution for their marketing organization, the company could achieve a return on its marketing investment of 110 percent.

The results of this proof of concept were presented in the simplest of BI forms: Excel spreadsheets. We conducted a four-week business-productivity study for this customer; we took their campaign results database (a fairly unstructured Oracle data warehouse) and modeled a star schema data mart from the extracted data. A single OLAP cube was built on that data mart to provide summaries, aggregations, hierarchies, and drill-down capabilities without requiring direct access to the operational transactional systems.

We presented this information to the customer in spreadsheets and in a formal, executive-summary-style presentation. Needless to say, the audience of executives and upper management was amazed by the results. However, at the same time, worried looks came from around the room. The executive members seemed to glance toward their direct reports as if to say, “Why don’t we have this knowledge for our campaigns today?” and “How have we been conducting business without this data in hand?”

Though the technology and software that make business intelligence possible have existed for decades, the enterprisewide adoption (and benefit) of business intelligence has yet to materialize for many IT shops. Indeed, we often see that in a typical organization, only selected users have access to the knowledge mined from business data that BI brings to a business. Meanwhile, the vast majority of knowledge workers must rely on discrete sources of data (commonly spreadsheets stored at local PCs), experience, or gut feeling to make key business decisions.

The problem is compounded when different departments make conflicting financial or marketing decisions that may be confusing to customers. Even though a pilot or proof of concept is an important step when you need to show empirical evidence of business value and ROI for your proposed project, it’s vital to keep in mind the larger perspective of BI for the masses (or pervasive BI) in your deployment strategy. A deeper discussion on the topic of pervasive BI is beyond the scope of this article, but although Excel spreadsheets with data results are useful at this phase, leveraging portals (for instance) is critical to enable workers across your organization to make excellent decisions based on good intelligence.

Once we identified the needed resources and key stakeholders for this customer segmentation project, we spent four weeks gathering and analyzing their campaign data and purchase logs. In addition to finding that the top 1 percent of data customers brought in 43 percent of all
revenue, we found that the company lacked the tools for campaigns to target this “VIP” customer cluster. In addition, the purchasing patterns of these top-line customers were different from regular users: they bought products and services at different times during the day and were influential to the overall product’s success among regular users. We set out to prove that our hypothesis was correct by conducting a live SMS (Short Message Service) campaign, rolling out and advertising new mobile games.

We often find that the distribution curve of customer revenue—when segmented properly—is not a normal one, but rather very skewed toward a few selected segments. These can be referred to as revenue champions because they are instrumental to a service provider’s profitability. Nevertheless, many carriers have no targeted services or benefits to add value to these customers directly. It’s worth mentioning, however, that these customers are often very savvy technology users, so it is unlikely that they will interact directly with the provider (whether via call center or other channels).

These customers will also have a higher propensity to churn (that is, move to another service provider). Therefore, as part of the initial engagement, we recommended a series of initiatives to retain and better serve revenue champions within the organization. These project directives were fleshed out during the proof-of-concept phase to demonstrate the ROI and business value of a customer segmentation BI solution.

Another problem with a skewed distribution curve is that the lifecycle value of the products is misleading unless you compare it to a curve that does not include revenue contribution from high-value customers. For instance, lifecycle value might indicate the total cumulative value of a product, its profitability, and any impact of market timing. Figure 1 is a typical lifecycle of product A. Compare that to the same graph, but without the contribution of high-value customers (Figure 2).

Figures 1 and 2: The impact of segmenting customers is shown in that 1 percent of the customer base here is accounting for a sufficiently large part of the overall revenue to skew the graph; without segmenting the top-line customers from the rest of the customer base, this would never be recognized.
Notice that the second curve is almost completely flat and shows that without the revenue champions, product A would have certainly had a low ROI. Consider the ramifications if you could actually conduct a targeted campaign to the right set of customers at the right time. The impact to an organization’s earnings per share would be significant.

First, we sent the same product offering to two sample groups (one from their previous sample and the other from a targeted set of customers) of 20,000 customers each. For two weeks, we measured their response hour by hour. We then analyzed the initial results and were quite surprised. Due to the smart campaign (the appropriate offering to the right customer at the right time), the marketing ROI (customers who actually bought the products/services) was up over 110 percent.

To further improve these numbers, we ran mathematical models as an instrument of optimization for a future campaign. After setting specific goals for the campaign, we separated the expected contribution from the overall marketing campaign (to whom and for what offerings) and the specific programs (when and how). Using standard data mining techniques, we ran hundreds of Monte Carlo simulations and simulation optimizations and produced a set of actionable marketing activities that would help the service provider target the right customer at the right time through the most effective channel.

To implement this campaign and customer segmentation solution, we utilized the following BI products from the Microsoft BI suite: SQL Server 2005, ProClarity 6.3, PerformancePoint Server 2007, Excel Web Services, and Microsoft Office SharePoint Server 2007. As the data flow diagram in Figure 3 shows, we built a customer-segmentation solution proof of concept rather quickly by connecting to several preexisting data sources, including an Oracle data warehouse that contained marketing campaign and sales results and a database of customer records. The third source was survey results from Excel and other non-structured data source types.

We extracted, cleansed, and loaded the data into a SQL Server 2005 data mart via SQL Server Integration Services (SSIS). Then, several cubes were defined
using SQL Server Analysis Services (SSAS). Finally, we presented the results to the entire organization based upon security settings leveraged through PerformancePoint Server 2007 and SharePoint Server 2007. This enabled a test group from several different departments to provide feedback and feel empowered by the broad use of such segmentation analysis. For the purposes of the pre-implementation proof of concept, we exported the analysis results from the cube directly into Excel from the Microsoft Excel Data Mining add-in, available in Microsoft Office 2007. This allowed us to demonstrate the business value of such an undertaking directly in printouts or presentations to the executive steering committee.

We encountered similar symptoms at a leading global telecommunication company. Because of the company’s strong base subscriber growth, the enterprise did not put a priority on discovering insights into which customer accounts were most profitable, or which accounts were too expensive to maintain based on service plans and handsets used by subscribers. Furthermore, lack of planning (and these customer insights) resulted in lost revenue because some customers had more operating costs than revenue due to factors including roaming and old handsets.

To demonstrate the need to change their business practices, we made an executive presentation to the vice president of marketing. By implementing a customer profitability analysis solution, the company would be able to:

- Better serve their customers and focus attention on revenue champions—a segment that generates significant revenue compared to an average customer segment
- Showcase improvement on marketing ROI of at least 10 percent
- Gain new insights into lifecycle value of products and the opportunity to bundle products
- Improve customer retention rates by moving customers to more appropriate equipment and service plans

We ran a two-month pilot with a small sampling of data extracted from their Teradata data warehouse, representing just 1 percent of their overall subscriber base. Again, we kept the pilot or proof of concept to an easily manageable and small size so we could complete a development cycle in a short time frame. The objective was to get empirical data in front of the executive sponsors in order to receive buy-in for the project.

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In this instance, we utilized the capabilities of the BI presentation software to export the results of the trial directly from SharePoint graphs in ProClarity to PowerPoint presentations. For some executive summaries, presenting the entire business case in PowerPoint may be a necessity (an Excel spreadsheet sometimes obfuscates the objectives in complex workbooks). The ability to export directly to a presentation was very helpful here.

By extracting the data from the existing data warehouse, we were able to cleanse and format the data into a small data mart and single cube which we used for processing aggregations, dimensional hierarchies, and data summaries of customer profitability metrics including average revenue per user (ARPU), average revenue by handset, revenue by geography, profit margin by service plan, and
average margin per user (AMPU). Figure 4 is a high-level look at the system architecture we used for this pilot.

**Conclusion**

These examples demonstrate that proof points are very important in most organizations that require business unit buy-in or sponsorship for a business intelligence project. Although in this case we happened to utilize the Microsoft SQL Server and Office BI stack to implement a customer segmentation solution, this same approach is applicable to any scenario where you are looking to kick off a BI project with a technology vendor stack. The sequence would break down this way:

1. Ask for buy-in to perform a proof of concept around a single scenario that impacts the business users

2. Configure minimal cubes in SQL Server Analysis Services with a dashboard in PerformancePoint Server and make the knowledge available to all users through SharePoint

3. Utilize Microsoft’s ability to export reports to Excel or PowerPoint, or as PDF files

4. Following the proof of concept, bring copies of the spreadsheets of your results to demonstrate tangible business results to the executive sponsors

We have repeatedly found that a quick implementation of a BI solution idea on a small scale—a well-bounded pilot or proof of concept—enabled us to show results in tangible business value that could be easily explained and demonstrated, particularly where Excel spreadsheets or PowerPoint presentations were exported from an OLAP cube and presented to executives for buy-in and approval. This is a very productive way to obtain authorization for your BI project ideas. An additional benefit is that you will now have a substantive baseline system from which you can scale out and build the production version of your BI vision.