Return on Investment for Business Intelligence

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Abstract: - Business Intelligence (BI) is *not* a product that one can buy off the shelf. It is a goal that is achieved when the different information consumers within an organization are able to leverage vast amounts of data that are collected and created to improve business performance. The Return of Investment (ROI) for BI depends on how the Information Value Chain (IVC) is implemented and managed. Author's tenet is that the more efficiently the IVC is implemented, the better are the chances of maximizing the BI ROI.

Key-Words: - Business Intelligence, Return on Investment, Information Value Chain, business strategy, standardization

1 Introduction

Business intelligence (BI) refers to the use of technology to collect and effectively use information to improve business effectiveness. An ideal BI system gives an organization's employees, partners, and suppliers easy access to the information they need to effectively do their jobs, and the ability to analyze and easily share this information with others. With its roots in early databases and "executive information systems," BI has evolved into a powerful set of technologies suitable for different types of user and information analysis needs [1].

BI is *not* a product that one can buy off the shelf. Business Intelligence is a goal that is achieved when the different information consumers within an organization are able to leverage vast amounts of data that are collected and created by the company, to improve business performance.

Whether looking to up-sell and/or cross-sell to company's existing customer base, develop budgets and consolidate forecasts, identify best practices across sales organization, monitor marketing campaign effectiveness, or track call center key performance indicators (KPIs), organization will find the need for a comprehensive BI solution.

BI allows organizations to access, analyze and share information. This helps them to track, understand and manage their business in order to improve enterprise performance.

BI is increasingly becoming part of the standard infrastructure of the organization. Just as employees today receive a desk, electricity, network access, and access to email, they are increasingly being provided with business intelligence access to relevant data sources.

2 The Value of Business Intelligence

BI is fast becoming a strategic differentiator for today's leading organizations. According to Keith Gile, "BI has evolved during the past three years from a niche, departmentally focused solution to a strategic enterprise asset." [2]

In today's tough economy, enterprises need to manage and reduce operational costs. The key benefit of BI is that it gives executives, mid-level or line managers, and employees the information they need to drive operational efficiencies. BI also makes the easy analysis of expenses across multiple information systems possible. For example, with BI, a company can get a global overview of travel costs, or make headcount reduction decisions based not only on overhead salary, but also on related expenses such as office space and communications.

BI helps target expenses while protecting the core business—for example, one U.K. supermarket chain was poised to cut some of its least profitable products from its shelves, only to find that high-profit customers usually purchased the products in question [3]. If the store had cut these "non profitable" items, it would have run the risk of driving its most valuable customer segment into the arms of competitors.

BI is also a key factor in improving top line revenue growth. As competition increases, the ability to understand and target particular customer segments with appropriate and profitable products and services becomes a key differentiator. BI helps the drive towards higher service levels and increased revenues by bringing to light the trends in customer behavior, determining which customer segments are the most profitable, and identifying cross-selling opportunities [4].

3 The Problem Today: Business Intelligence Fragmentation

BI is present in some shape or form in all of today's large organizations. In most cases, BI implementations are ad hoc and take place at a departmental level and without any overall BI strategy. These individual projects have generally shown the types of high return, but so far, BI has not delivered its full potential in most organizations [5].

Generally, BI is implemented on a one-time, or tactical, basis in response to specific user demands and with little attention paid to projects in other areas or to existing software. In many cases, BI has been acquired incidentally through, for example, packaged applications such as enterprise resource planning (ERP) and customer relationship management (CRM) systems.

This can create a patchwork of applications that are difficult to maintain and support, schematically shown in Fig. 1.
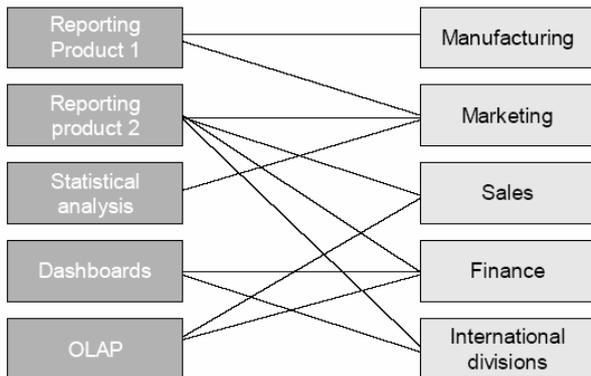

Fig. 1 – A Patchwork of Traditional BI Applications

The complexity of the BI technology market is also a contributing factor. Although consolidation is starting to occur, the BI market has traditionally been a crowded one, with many competing offers coming from a variety of companies, each of which accesses a smaller or wider set of different data sources. As META Group notes, "Proliferating business intelligence tools, with overlapping functionality, are a common problem in large organizations." [6]

Clearly, having multiple, disconnected BI projects leads to inefficiencies – fragmentation firmly places the burden of integration, operation, and recurring support on the IT organization. Procurement costs are higher, training costs are higher, projects take longer to implement, employee cross pollination within the firm is virtually impossible, information inconsistency is rampant, and required technical headcount is higher.

But more importantly, BI fragmentation impedes companies from realizing many of the benefits of business intelligence. And the danger is very real.

According to Gartner Group analysts, "… through to 2004, more than half of Global 200 enterprises have failed to properly use BI, losing market share to those that do (0.8 probability)." [7]

4 Creating Actionable Business Intelligence

Organizations that enjoy the benefits that BI promises recognize that they need more than a product to achieve their goal. They realize that success is still going to depend on how they:

- Implement The Information Value Chain
- Manage The 3 Ps – people, products, and processes

4.1 The Information Value Chain

Like a traditional supply chain, raw data that is available in the organization must be transformed into actionable information in order to be useful to company's knowledge workers. The information must then be made available in a user-friendly context, like a report or an application, and delivered to the consumers by an efficient distribution strategy.

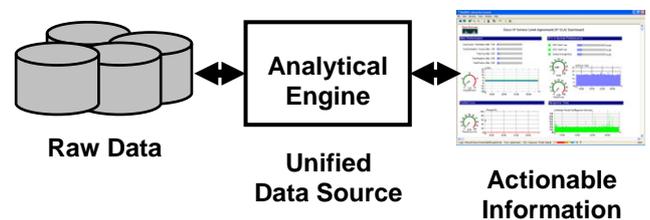The Information Value Chain is schematically shown in Fig. 2.

Fig. 2 – Information Value Chain

Our tenet is that the more efficiently the Information Value Chain is implemented, the better are the chances of maximizing the Business Intelligence ROI.

Namely, as the organization runs its business, its operational systems, like ERP or CRM, generate and capture detailed data as the raw material necessary for BI solutions. However, since these operational systems are capturing transactional information for the specific purpose that they were created, they are not aware that another system may be capturing different data about he same entity.

Data from many disparate data sources, including operational systems, spreadsheets, user databases third party databases, etc., needs to be consolidated and aggregated into a unified database to achieve the single version of the truth [8].

This process, known as Extract-Transform-Load (ETL) is a major step towards the BI goal.

The value added that this step provides is [9]:

- A more complete view of an entity, like a customer or inventory;
- More efficient query performance;
- Relationships between entities are defined, ensuring correct results.

After the data is consolidated into a unified source (through ETL and database), further value is added to the usability of it by creating an intuitive environment where end-users can access the data.

There are many different types of front-end access tools that range from rudimentary data access capabilities to more complex data mining. These tools fall into categories, such as [10]:

- Query and Reporting
- On-Line Analytic Processing (OLAP) tools
- Data Visualization
- Statistical Analysis
- Intelligent Data Mining

These tools have traditionally fallen short for the BI goal because they do not offer enough insight into the data itself, requiring the end-user to do more manual data analysis before identifying any actionable information. Additionally, they tend to be "one-way streets", whereby the user can read the data, but has no ability to update it or modify it.

While data manipulation with today's tools is relatively easy, it still consumes precious time better spent on primary job responsibilities. Therefore, these tools still find themselves in the hands of the power user, whose primary role is to crunch and mine data for useful information nuggets that they can share with their end-users.

The key to more Return on Investment (ROI) and lower Total Cost of Ownership (TCO) is empowering end-users to consume the information more effectively through specifically-purposed BI applications. These are applications that combine the features of Query, Reporting, OLAP, Data Visualization, Statistical Analysis, and Intelligent Data Mining into a single user-friendly interface designed with specific business purpose in mind, such as Budgeting & Forecasting application that facilitates consolidation, or dashboard application that tracks key metrics that align corporate and departmental goals [11].

BI applications provide the user an interface that presents more insightful information and a simple workflow that guides them through the process, to enable faster and easier adoption without the need for specific training [12]. Additionally, applications that enable users to modify the data with write-back capabilities, enables the needed real-time enterprise.

4.2 The 3 Ps

As it has been seen thus far, solutions that enable BI capabilities involve a lot more than simply purchasing and implementing technology. Once an area where a BI solution will fit is identified, the 3 Ps need to be examined and aligned.

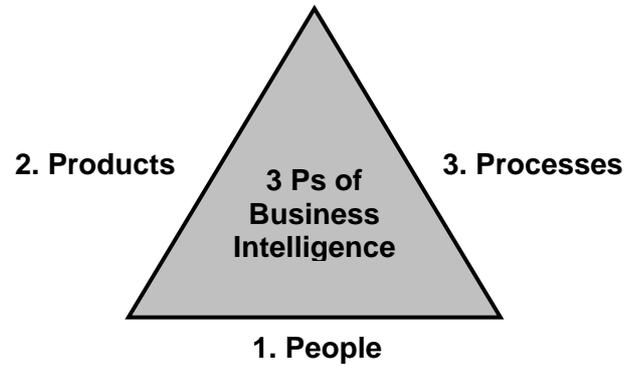The 3 Ps of Business Intelligence are schematically shown in Fig. 3.

Fig. 3 – The 3 Ps of Business Intelligence

Our strong tenet is that the more effectively the 3 Ps are managed, the better the opportunities to maximize ROI are.

The people involved in the BI solution are the first and the foremost critical leg of the BI 'success triangle'. The end-users will have knowledge of the business issues and the type of solution that they expect. The power, advanced users will know the attributes of the data, including where to find it, how to manipulate it, and who actually needs it and when. Additional people may involve consultants or technologists that will automate pieces of the Information Value Chain.

The products involved in the BI solution are the second critical leg of the BI "success triangle". After identifying the data sources, the organization should be engaged in product selections for the technology that drives the framework for the Information Value Chain. Critical product-related pieces include an ETL function, a database platform, and front-end data access technologies to support the BI initiative [13].

The processes involved in the BI solution are the third critical of the BI 2succes triangle". The organization will be identifying the processes in use today, and how they will probably change when the new BI solution is in place.

Examples of processes that are usually reviewed are:

- Business-oriented processes, such as:
  - How up-sell/cross-sell campaigns are done today?
  - What business units are involved?
  - How do they identify target clients?

- Data-oriented processes, such as:
  - What are the transformation/modification rules?
  - How often will the new databases be updated?
  - When are the end-users expected to modify data?
  - How will data be made available to the end-users?

In addition to above processes, a cross-functional project team will be organized to handle the development of the components that make up the Information Value Chain.

The development team will have a different set of processes, based on their favorite System Lifecycle Methodology. This is a methodology used by application developers to bring a system to the exploitation stage. It would involve phases such as Scope, Design, Build, Integrate, Test, and Deploy.

4.3   Recommendations for Mapping the 3 Ps

4.3.1 People

When it comes to managing the first leg of the BI "success triangle" – people – the old adage, "Too many cooks spoil the soup" comes to mind. A small team of no more then four to five people should be sufficient to meet the system objectives, and is nimble enough to get the job done quickly. The team should preferably consist of [14]:

- business user representative(s)
- power user
- technical architect
- expert consultant

The business user representative (one to two) will be the main visionaries for the BI solution.

The power user will be the primary developer of the solution.

The technical architect will know how to deploy software solutions within the enterprise framework.

An expert consultant, familiar with BI technology selected, will help overcome any initial learning curve and provide best-practices ideas, helping the organization get the solution implemented on time and under budget available.

4.3.2 Products

When managing the second leg of the BI "success triangle" – products – is in question, less is better. BI technology providers are strongly pushing the concept of BI tool standardization for the enterprise.

What they most often mean by this is to select their technology as a *de facto* standard, such that all BI solution development will be implemented using their tools. This is the desire of all the traditional ETL, database, and front-end access tool vendors, as it promotes vendor lock-in.

While a *de facto* standard is a paper standard, vendor lock-in will ensure that they can extract maximum license fees from the organization, while the organization has built itself into a long-term commitment to their technology, making it difficult for it to switch.

Additionally, vendors would like the organization to standardize on their integrated tool suites. A tool suite is really a collection of interoperable data access tools that can be configured to work together. However, tool suites are often licensed individually by component, by either a Named User License (NUL) or a CPU-based license model.

On other hand, licensing interoperable components, like ETL, database, and front-end tool suites, from different vendors is often termed the "Best of Breed" approach. This approach, combined with the license model employed by individual vendor, will scale organization's license fees exponentially as it deploys to more users, making it more difficult to measure ROI.

A more reasonable approach is to find a single vendor that offers a toolkit that includes all these core components, with the ability to build and deploy applications with no additional license fees, thereby getting a fix around organization's costs, a necessity for measuring ROI.

4.3.3 Processes

As far as managing the third leg of the "magic triangle" – process – is concerned, rapid, iterative, prototyping is the key. Traditionally, the build-out of the Information Value Chain tends to work from left to right, i.e. first the ETL work is done, then the database work follows, and lastly, the end-user environment is put together.

In this traditional method, there is a significant time gap from the inception of the project until an application is actually made available for the end-users. Often, so much time has passed that the business need has changed, or the development team has hit a deadline and is scrambling to get the data access solution in the hands of the users. The end result, after much time has gone by and much money had been spent, is that the end-user environment is not what was promised, and fails to meet the expectations of the business users. In fact, according to some BI industry analysts 50 to 60 percent of data warehouse projects meet this fate [15].

The organization should seek an easy-to-use, yet powerful toolkit that enables them to rapidly prototype the end-user BI application. By working "from right to left" along the Information Value Chain, the organization can quickly envision the solution that will meet the business requirements. They can quickly

structure the ETL and database components to integrate the data required to enable the application. Modifications to the prototype are done quickly, in an iterative manner, so that the business users can see that their business needs are met as they evolve.

5 Building Business Intelligence Strategy to Achieve Standardization and Return on Investment

The organization's ability to implement a successful BI strategy depends on its "BI maturity." If both IT and business users believe in the benefits of BI, and have previous experience with successful BI projects, then the organization may be ready for BI standardization. However if there is inertia on either side, a cultural change may first need to be driven at an executive level.

To ensure that the full benefits of BI are going to be received, it's essential to implement a long-term strategy with the following steps:

- *Build trust between IT and business users*. BI stands at the intersection of the businesses and the IT organization. Many organizations have a history of mistrust that can prevent the successful implementation of any new BI strategy.
- *Implement a BI Center of Excellence*. A BI Center of Excellence (COE) is responsible for developing and sharing BI best practices throughout an organization. Ideally, a business person should head the center, and it should report to the core business departments in a collaborative environment with IT and the other departments.
- *Align BI initiatives around a framework*. Map available BI functionality to the technical, functional, organizational, and business needs of the organization.
- *Implement a BI methodology*. Implement a formal BI implementation methodology that details the roles of different groups (IT, business users, technical support, etc.), covering both the technical and user-oriented phases of the project lifecycles.
- *Create an acquisition/deployment process*. Ensure that financial incentives are designed to promote the business use of COE.

The biggest threat to a BI standardization project is when an organization doesn't invest enough time in proactively communicating project goals and status [16]. To neutralize this threat, the organization is strongly recommended to:

- *Monitor and communicate the implementation plan*. The organization should constantly evangelize the benefits of BI and of the standardization project.
- *Avoid common BI project challenges*. The organization should anticipate potential problems and use them as growth opportunities.
- *Conduct formal reviews*. The organization should audit the BI COE on a regular basis to ensure that it has been able to maintain the trust of the business organization, and that the processes and methodologies put in place still meet the needs of the end users.

6 The Return on Investment for Business Intelligence Standardization

BI is increasingly becoming part of the standard infrastructure of the organization. Just as employees today receive a desk, electricity, network access, and access to email, they are increasingly being provided with business intelligence access to relevant data sources.

According to META Group, "BI…must be subjected to the same standardization processes used for other technologies widely deployed throughout the organization (e.g., productivity tools, workgroup databases, corporate databases, web servers, browsers) [17].

BI standardization can bring considerable direct and indirect return on investment.

Direct cost benefits are:

- *Reduced project costs*. With a standard approach, new BI projects can be more easily implemented on time and on budget, with less reworking and fewer cost overruns.
- *Reduced technical infrastructure costs*. With a standard BI architecture, multiple projects share technical components, resulting in less duplication, less need to prototype alternative solutions, and lower training costs. In addition, the best and newest products and features can be used on each project.
- *Greater leverage with vendors*. A standard approach means more leverage with suppliers and more coordinated support for the BI solution as a whole.

Indirect benefits include:

- *Higher end-user acceptance*. Having a consistent look and feel across different applications and clear help desk and training policies helps to increase end user acceptance and use of the solution.
- *Greater IT satisfaction*. IT teams have more time to focus on the customer delivery aspects of projects and on high-level architecture issues.
- *Better use of BI*. A standard approach makes it much easier to get the full value of information in

an organization. Gartner estimates that by 2007, business management in more than 75% of large enterprises will identify BI as a strategic initiative, forging an alignment of goals, objectives, and resources to better support the enterprise with insight [18].

7 Conclusion

It is well known that enabling end-users with BI capabilities empowers them to make better managerial and business-related decisions that improve enterprise performance. Therefore, to maximize value and Return on Investment, the organizations should strive to get this capability into the hands of as many of their knowledge workers as possible.

Return on Investment will then be determined by:

- How much value the organization can actually recognize, over time. This represents the benefit to the organization, and can be a combination of top line growth, cost reductions, and cost avoidance.
- How effectively the organization can manage the 3 Ps when implementing the BI strategy and Information Value Chain. This represents the 'costs' that the organization can control.

The organization that successfully minimizes costs, while maximizing value, will obviously maximize the Return on Investment.

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