Information Builders

Worst Practices in Business Intelligence

Why BI Applications Succeed Where BI Tools Fail

A White Paper

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Turning Failure Into Success

Business intelligence (BI) software emerged in response to the need for accurate and timely information to support informed business decisions. With origins in COBOL-based, green-line reports in the 70s and 80s, BI has evolved into a complex market comprised of tools and platforms. Tools exist for report design, ad hoc query, and online analytical processing (OLAP), while BI platforms combine these tools with databases, integration technology, and portals to deliver sophisticated BI applications. Whereas COBOL required IT involvement and months to generate a single report, today's solutions are targeted toward business users and boast real-time reports. Why is it then that the majority of organizations still feel that their information access and reporting needs are unfulfilled?

BI software – tools, platforms, and applications alike – holds great potential for helping organizations readily access the enterprise information needed to make informed business decisions and, ultimately, achieve their business objectives. But, as with any technology, the implementation, roll out, and usage practices play a critical role in the success of BI.

In tracking mediocre results, and even failure[1], in the implementation of BI software over the years, many common threads, or "worst practices," can be found. The top-four worst practices for BI include:

- Assuming the average business user has the know-how or the time to use BI tools
- Allowing Excel to become the default BI "platform"
- Assuming a data warehouse will solve all information access and delivery requirements
- Selecting a BI tool without a specific business need

These worst practices set companies on the auspicious path of BI failure. They have been repeated by some of the best run and smartest companies in the world. Typically, these worst practices are the result of wanting to ride the latest technology wave without balancing the hype with practical knowledge and experience.

Designed to help organizations learn from the mistakes of others, this paper provides insight into the top-four worst practices for BI. It also provides guidance on how to avoid and/or overcome worst practices in order to tap into the true power of BI. By reading this paper, you will have a solid understanding of how to avoid BI failure and achieve success with your BI initiatives.

[1] Failure is defined as a considerable expense with little or no return on investment.

Worst Practice #1: Assuming the Average Business User Has the Know-How or the Time to Use BI Tools

BI tools – report design, ad hoc query, and OLAP tools – provide a valuable service and play a critical role in a company's overall BI strategy. They are not, however, what business users need. Business users need readily available, actionable information that supports educated decision-making. While BI tools offer the ability to uncover information, they are simply too complex for the majority of business users.

Unfortunately, the end-user market is flooded with misguided hype from the vendor community, indicating that, "BI tools are for everyone." Today's BI tools are typically targeted at business users because they no longer require specific programming or database knowledge and primarily use graphical, drag-and-drop interfaces to allow businesspeople to compose questions and retrieve formatted results from databases. Even with these advances, however, they are still too complex for the average end user to adopt as a part of their day-to-day routine.

Furthermore, few business users are involved in the decision process when it comes to BI. Because of this, their need for simplicity is neglected and BI tools are forced on them from the IT developers and business unit power users – a sure recipe for failure.

Overlooking the True End User

Often, the first (not to mention the most damaging) mistake that organizations make when assessing BI solutions is neglecting to include business users on the selection committee. This seems counterintuitive because business users will be the predominant users of the solution, but it happens all the time.

More often than not, it is the participants in the tool selection committee that are at the source of BI failure. If the assumption is that business users need a BI tool, then the committee is typically made up of IT developers and other advanced users who understand how to use them. Individuals of this skill set tend to look for tools with extensive features and advanced functionality with little regard for their overall usability. In other words, the selection committee only represents the needs of a small percentage of the business user population.

When business users are excluded from the solution selection process, their need for simplicity is completely overlooked. The eventual decision of the committee represents the needs of only the advanced users. And of the tools purchased for the entire user population, 90 percent or more often end up as "shelfware."

Additionally, the advanced users who can make sense of the tools often find themselves spending hours creating a single report. Very few people have hours to spend every time they need a piece of information, let alone to handle information requests from their non-technical colleagues.

Too Much for Too Few

BI report design, ad hoc query, and OLAP analysis tools have hundreds, if not thousands, of features. Although the user interface is often simple, complexity is introduced from the data side. Even a simple data warehouse has hundreds of columns of data, and it's not uncommon for more complex systems to have thousands of columns. When an end user is faced with a blank canvas, thousands of columns of data, and hundreds of accessible features, complexity is automatic. "Where do I begin?" is often the first question, shortly followed by "I don't have time for this," or "I give up."

The user skill pyramid is a widely discussed and generally agreed upon description of the end users in most organizations. The simple version of the pyramid shown below demonstrates that 90 percent of the users within most organizations fit into the class of users known as non-technical business users, which means that only 10 percent of users are advanced enough to use a BI tool.

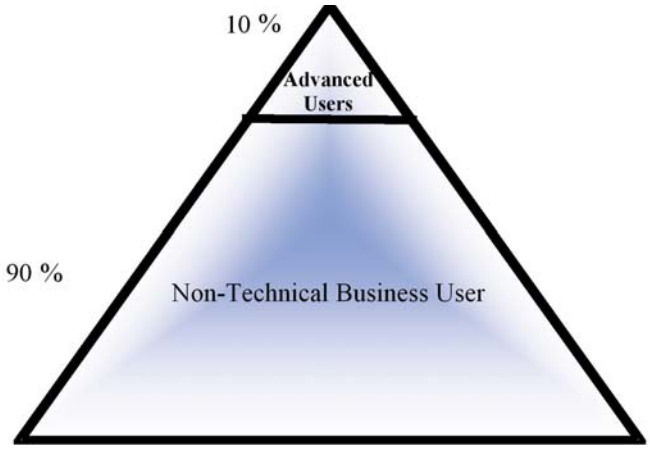


Figure 1: It is generally recognized that 90 percent of the information workers in most organizations can be categorized as non-technical business users.

What may not be obvious from the pyramid is that most executives and managers, often the primary strategic decision-makers, are in the lower portion of the pyramid – that is the non-technical users.

It's a Matter of Time

In some instances executives and managers are technical enough to use a BI tool, but they don't have the time to work with a BI tool and navigate a data warehouse to produce the information they need. Most people need a faster, easier way to get the information they need than that provided by a BI tool.

Usability Trumps Capabilities

How is it that so many companies evaluate, purchase, and deploy BI tools for more than the advanced users at the top of the pyramid? There are several reasons. As mentioned earlier, the true end user is typically excluded from the selection committee and BI tools vendors make overzealous claims of "it is so easy that anyone can use it; and everyone should!" Additionally, IT managers are overburdened with requests for information, which feeds their desire for relief and makes them vulnerable to the BI-tools-for-everyone approach.

In one situation, a project leader stated that her organization was in the process of deploying a BI tool and all information requests would be ad hoc. When asked if they really believe this is what their users need, the answer is typically a resounding, "Yes." Followed by, "that was our interpretation of what they wanted." The challenge in this situation is that the project leader is making a decision based on a desired end result, with little or no consideration of the process required to produce the result or whether or not the users will embrace this process.

Needless to say these projects never get off the ground. The lion's share of the users never use the tools because they are too complex. They continue to ask IT or other more proficient end users for information. Of course the information they need comes to them at a snails pace.

Ralph Kimball, an expert on data warehousing, explains this very clearly in his book, *The Data Warehouse Toolkit; 2nd Edition*. He states, "Ad hoc query tools, as powerful as they are, can be understood and used effectively only by a small percentage of the potential data warehouse business user population."

BI Go-To Guys and Multiple Versions of the Truth

In some cases, moderately successful deployments of BI tools are found in individual departments. Usually that means that each department has identified and relies on a handful of advanced users who become the tool experts, or the "BI go-to guys." These users employ the BI tool on the behalf of others, and create and distribute information for their department. In these cases, another issue is brought to the surface – the inconsistency of the answers generated by more than one advanced user, also known as multiple versions of the truth.

Multiple versions of the truth result when two or more people apply different query methods and functions, and arrive at different conclusions. The challenge is that it's difficult to know which, if any, conclusion is correct.

The tool-based efforts of advanced BI users do not go through the same rigorous quality testing of an IT department. Their work within a tool is typically not auditable. When this occurs, the validity of the information system, the BI tool, and the data warehouse are all brought into question.

Valid or not, many companies have more confidence in operational reports generated, and tested by IT professionals. Many become skeptical of pure ad hoc information created with a BI tool because of the potential for variations and inconsistencies.

The Solution

Organizations need BI solutions that are easy to use for the entire user population, especially those in the bottom portion of the usability pyramid. In addition, they need a solution that mitigates multiple versions of the truth by providing access to a common source of enterprise information and standardized report generation methods. A BI platform is the answer to all of these requirements.

A BI platform leverages BI tools along with other technologies, including databases, data integration, and portals to provide an end-to-end solution for a defined business problem or set of business problems that can be termed a BI application. While BI platforms are implemented by IT professionals, their end result, the BI application, is designed for business users.

Organizations have been led to believe that BI platforms are too complex for their needs. This couldn't be further from the truth. When you consider the data integration, warehousing, and end-user training costs associated with BI tools, a BI application built on a BI platform has about the same time to market as a BI tool. And end users embrace easy-to-use BI applications as part of their day-to-day routine, which is arguably the most critical success factor of any application. This is why BI platforms have far greater success than BI tools.

The fact is that most non-technical business users can and will access information through BI applications, which are much simpler to use than BI tools. BI applications leverage reporting technology, Web browsers, and e-mail to make information more accessible to these business users in a comfortable, easy-to-use environment.

For example, today's parameter-driven BI applications provide users a simple Web interface to navigate to the report they want, much the same way they would find an item on eBay or a book on Amazon. BI applications allow users to easily customize the report by selecting options from pull-down menus the same way they would fill in their address and select their home state or a shipping option from a drop-down list.

Information Builders' WebFOCUS, a business intelligence platform, is specifically designed to allow developers to create exactly these types of applications, as illustrated in Figure 2.

Ralph Kimball also says, "The majority of the user base likely will access the data via pre-built parameter-driven analytic applications. Approximately 90 to 95 percent of the potential users will be served by these canned applications that are essentially finished templates that do not require users to construct relational queries directly."

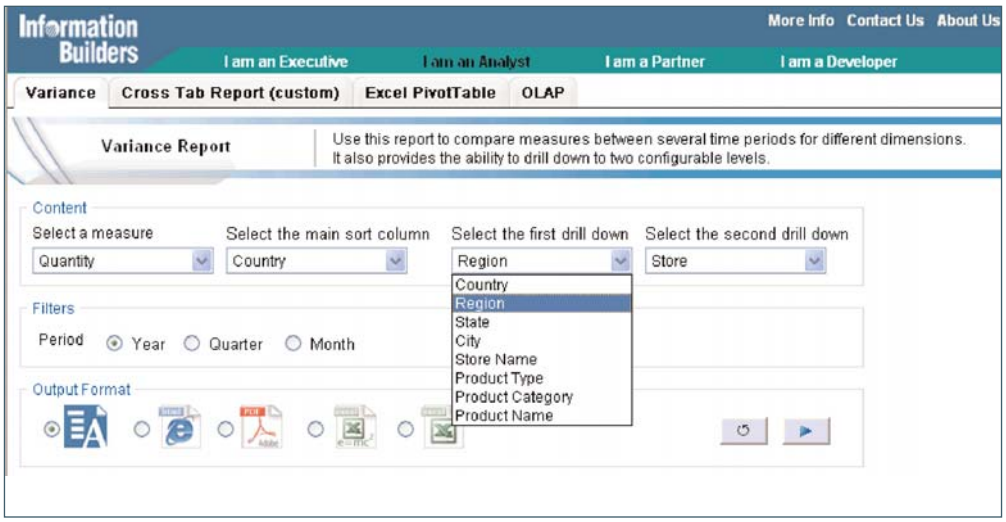


Figure 2: A WebFOCUS BI application.

Information Builders uses a "guided ad hoc" approach as the foundation of our business intelligence applications. This approach combines sophisticated functionality with ease of use to allow users to create their own reports without requiring a tool and without being a technologist. It makes business intelligence consumable by non-technical users by guiding them to the answers they need.

WebFOCUS applications are based on this guided ad hoc navigation. (See figure 2.) WebFOCUS allows developers to create filter and column prompts, and report templates for business users, who can easily customize the templates via the prompts. The result: a single, parameter-driven report that offers thousands of potential outputs without requiring the end user to understand how to use a BI tool.

WebFOCUS also provides the ability for each form to include a subscription/schedule option. Leveraging the Web browser and subscription option, users can request to receive regular updates to the information they create via e-mail. Overall this reduces complexity and the amount of time spent creating and retrieving information, as well as improving the adoption of the application by more non-technical business users.

Based on a combination of parameters, WebFOCUS' flexible reporting environment ensures that developers are never overburdened with new report requests. Additionally, developers can organize reports and prompting forms in a simple navigable portal, so business users receive the simplicity, flexibility, and customization capabilities they need to embrace BI as part of their day-to-day work routine.

Worst Practice #2: Allowing Excel to Become the Default BI Platform

Excel is arguably the most widely used BI tool in the world. While many consider it to be "just a spreadsheet," Excel houses many organizations' financial reports. In fact, Excel thrives in the absence of true BI applications. At best, Excel is a BI tool. In addition to all of the problems associated with BI tools discussed in the previous section, Excel introduces its own unique set of problems.

The beauty of Excel is that it provides an extremely simple interface for commonly needed functions like calculating, presenting, and displaying numerical data. Such functionality is so commonly needed by business users that Excel, as a part of Microsoft Office, is installed on nearly every single desktop and laptop, as well as many mobile devices, around the world. It is a standard utility tool given to practically every information worker the day they start their first job.

Manual, Error-Prone Processes

Even though Excel provides much utility for business users, it wreaks havoc on the quality and consistency of information. This is especially damaging in heavily regulated industries that must adhere to strict compliance legislation. Consider the following, all-too-common scenario:

- Business analysts develop Excel spreadsheets to assist with the day-to-day operational decisions that their jobs demand
- Pleased with the autonomy and sophisticated analysis that Excel supports, they share their innovations with colleagues, who then modify the spreadsheet logic and manually tack on data from their own information silos
- Over time, rogue spreadsheets with data from multiple dubious spreadsheets are propagated throughout the organization, and executives find themselves making decisions based on untraceable, questionable data

In this scenario, the enterprise is at a loss to audit the information and numbers in the spreadsheets (i.e. their "reports") for themselves or for regulatory agencies. Meanwhile, the IT division has complete, auditable, and backed-up operational system data that is untapped by the Excel user community.

The Impact of Data Errors

Excel was never intended to be a BI tool. It is not Excel that is at fault, but rather its use as a BI tool. Much of what is found in Excel spreadsheets is put there through a manual, error-prone, process, which should never be the case with BI. BI applications should only utilize data from reliable, trustworthy sources.

One report said that as much as 7 percent of all data found in Excel spreadsheets is wrong. The impact of this scenario has been brought to light recently in many widely publicized instances where Excel errors have cost companies millions of dollars. In the last year the European

Spreadsheet Risk Interest Group, a group that analyzes and quantifies the cost of spreadsheet errors worldwide, reported various situations, including:

- A public auditor's office in Minneapolis mistakenly reported the percentage change in unreserved fund balances; an analyst set up the formula for the column in the spreadsheet, dividing the difference between 2003 and 2004 balances by the 2004 total, instead of the 2003 figure
- A Housing and Urban Development (HUD) audit revealed that a local housing authority had to pay over $200,000 to cover expenses incurred when the authority overpaid some landlords due to a data-entry error
- In Nevada, a 2006 municipal budget was developed from a copy of the city's 2005 budgeting spreadsheet; in late 2005, a problem was revealed causing a $5 million deficit in the water and sewer fund; while fixing the problem with the water and sewer budget, other errors were uncovered and fixed
- A well-known medical and consumer imaging company had to amend its third-quarter loss by $9 million, announcing that the adjustment was needed because too many zeros were added to an employee's accrued severance on a spreadsheet; the company's CFO characterized the situation as "an internal control deficiency"

The Creation of Spreadmarts

Another unique phenomenon created by Excel is what is called "spreadmarts." When individual users accumulate their own store of relied-upon data in their personal spreadsheets to a point where their information becomes a critical data source, it becomes a spreadmart. A spreadmart is an unregulated, non-secure datamart in the hands of a user who rarely backs up his or her data and may leave his or her job on a moment's notice. This single user isn't a problem so much as the accumulation of hundreds of users with unregulated datamarts.

Excel – or, more aptly put, the spreadmarts created with Excel – is often considered an IT department's worst nightmare. This is because whenever a senior-level executive comes to understand the dangers of spreadmarts, it becomes the IT department's job to come in and make sense of the data and the environment, and to somehow regulate, automate, and maintain the chaos. Hence, in IT departments many have debated whether Excel is a productivity tool or an anti-productivity tool.

The Solution

Stopping business analysts from using Excel is like preventing water from flowing downhill. It's not going to happen. What can be done, however, is minimizing the manual work done in Excel, and preventing the accumulation of critical data in personal spreadsheets.

One way to do this is to turn Excel into a BI viewer, as opposed to a BI tool. If accurate, preformatted, and precalculated data is fed into Excel applications, the user has little or no work to do to get the results he or she needs. If this process is automated, then data can live in a regulated and secure source, such as in the data warehouse or operational system, and only feed into Excel upon request.

Information Builders' WebFOCUS offers two options that help significantly with this problem:

- Automatic generation of reports in Excel format
- Automatic update (or refresh) of Excel spreadsheets and applications with accurate, regulated data from any connected data source

Both of these options limit the amount of manual work performed in Excel, decrease data errors, and reduce the accumulation of personal spreadmarts. Not to mention that these options present the added benefit of improving analyst productivity.

Figures 3 and 4 show how WebFOCUS provides the ability for any report to be generated (upon user request) as an Excel spreadsheet. Figure 3 shows the form through which the user identifies the report parameters and then requests the report to be generated in Excel. Figure 4 shows the Excel report that results from the request.

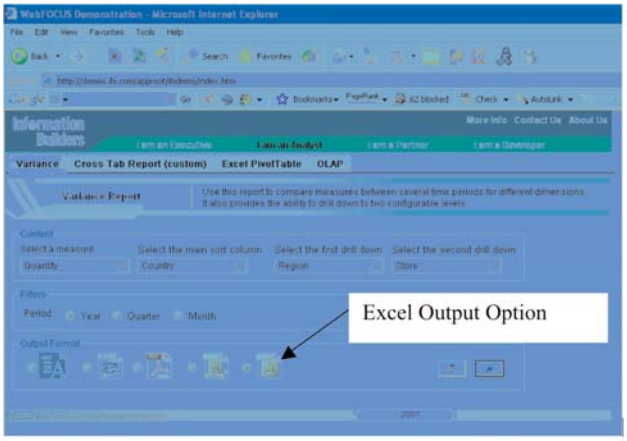
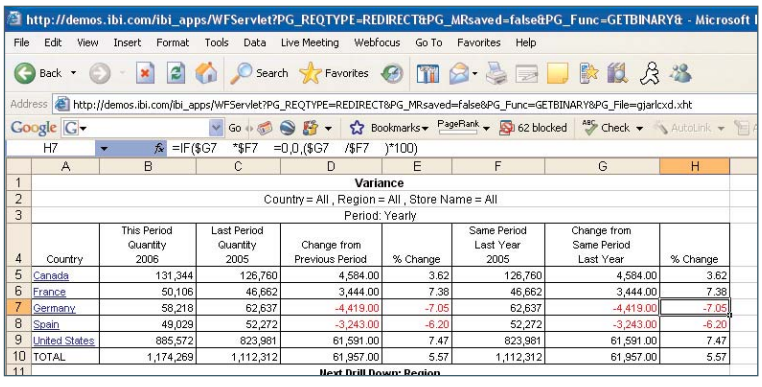


Figure 3: The Excel output option from within a WebFOCUS BI application.



Variance
Country = All , Region = All , Store Name = All
Period: Yearly

Country	This Period Quantity 2006	Last Period Quantity 2005	Change from Previous Period	% Change	Same Period Last Year 2005	Change from Same Period Last Year	% Change
Canada	131,344	126,760	4,584.00	3.62	126,760	4,584.00	3.62
France	50,106	46,662	3,444.00	7.38	46,662	3,444.00	7.38
Germany	58,218	62,637	-4,419.00	-7.05	62,637	-4,419.00	-7.05
Spain	49,029	52,272	-3,243.00	-6.20	52,272	-3,243.00	-6.20
United States	885,572	823,981	61,591.00	7.47	823,981	61,591.00	7.47
TOTAL	1,174,269	1,112,312	61,957.00	5.57	1,112,312	61,957.00	5.57

Figure 4: The Excel output generated by a WebFOCUS BI application.

One key differentiator that may not be obvious in the Figure 2 and 3 screenshots is that WebFOCUS automatically translates calculations and subtotals in the report into Excel calculations and summations. This critical function is absent in most other BI tools. When it is absent from the tool, the user is forced to create calculations and summations manually, which re-introduces the potential for errors. Instead, with WebFOCUS, the user can simply use the spreadsheet as is, reducing time, effort, and errors.

Some have argued that Excel applications are so much more than just reports. They are places where analysts can plan budgets and try out financial scenarios. Information Builders is keenly aware of Excel's value proposition across so many different industries and for so many types of business challenges. With this in mind, we have designed WebFOCUS to work with Excel, not to eliminate its use. The value-add that WebFOCUS brings to the table is the elimination of error-prone data entry processes and silos of individual datamarts, both of which put organizations at risk of violating the 2002 Sarbanes-Oxley Act and other regulations around data accuracy and availability.

WebFOCUS does not eliminate Excel from your business users work life, rather it allows Excel worksheets to be directly updated/or refreshed with up-to-date data directly from the source application or database. Simply put, WebFOCUS makes Excel more secure and less error prone, while still allowing users to work in their preferred environment.

Worst Practice #3: Assuming a Data Warehouse Will Solve All Information Access and Delivery Requirements

This particular worst practice is complex. Data warehouses are a very important part of information technology and, in particular, are a critical component of many analytical systems. So it is not the data warehouse that is the problem. Rather the worst practice arises when a data warehouse is viewed as the solution to all information problems or when it is expected that the availability of the data warehouse will drive business users to information.

The truth is that not all BI applications require a data warehouse. Many BI applications are better served with integration and portal technology that allows data to reside where it currently exists and pulls it on an as-needed basis. Unfortunately, many organizations fail to assess whether or not a data warehouse is the right solution to their challenge before starting down the warehouse path.

Failing to Fully Assess the Need for a Data Warehouse

So often companies begin a data warehouse project before they have a BI solution, or even before an information need has been identified, only to find that they have incurred another expense and have not solved a single problem. When either of these scenarios occurs, companies immediately raise their cost of doing business.

Organizations often rush into the creation of data warehouses for reasons that are not entirely valid, such as:

- My business intelligence solution required it and not because it made sense for the business problem
- I needed to get data from more than one application, so a data warehouse was necessary
- I needed a data warehouse because all information systems require it

Building a data warehouse for these reasons may automatically reduce the timeliness of your data and increase the expense of your overall system. According to leading industry analysts, integration and movement of data (data warehousing) can consume as much as 80 percent of the cost of a BI implementation. Simply put, data warehouses should not be implemented without a clear understanding of the business challenge they will support, and decisions around data warehouses should be well researched.

The Solution

There are many ways to integrate data from your databases and applications that allow you to place important, timely information in a business user's hands at the point of business. Each business challenge and/or process should be analyzed to understand whether a data warehouse or another type of information access tool presents the best solution.

The key thing to remember here is to identify the best information integration and access method for your needs first, and not to assume that a data warehouse is the solution before assessing all options.

Information Builders' WebFOCUS utilizes over seven ways to integrate and access data to solve a specific business problem. The following list reviews four prominent methods that are lower in cost and give business users more timely access to information than a data warehouse.

- Operational data access, which provides reporting directly from operational applications or a copy of operational data
- Trickle-feed or near real-time data warehouses, which take transactional data and place it into a data warehouse at transaction time
- Transactional alerts, which generate information and deliver it directly to a user based on time-sensitive transactional information
- Web services reporting, which combines information available as Web services from internal and external sources to create reports that are delivered directly to business users

Identify the Best Solution for Your Needs

Organizations need to carefully assess their unique challenge and all of the available solutions to identify the best way to resolve their problem. Consider the following examples where a typical, staged data warehouse was not necessary for a business intelligence solution.

Example A: Maintenance issues regarding airline seats on a major airline were going unattended for extended periods of time, preventing the airline from selling those seats on flights and reducing revenue and profitability. The information the airline needed to expedite the repair of the seats was distributed across three different applications, and it was needed in real-time as the plane was on the ground during its maintenance check.

At first glance, it may seem that integrating the data from the three different applications into a staged data warehouse might present a solution. However, a complex, timely, and expensive data warehouse initiative was not necessary. In this particular case, Information Builders identified that a single report was all that was needed to solve the problem. WebFOCUS was used to build a report that combined data from the plane maintenance system, which held information about seat and other problems on the plane; the parts inventory system that held information on where the necessary parts existed to fix the problem (i.e., in which parts warehouse and at which airport); and, finally, the plane routing system, which held information on where all planes were next scheduled to be so that the part could be made available for maintenance at the soonest possible moment. Based on this one report, the airline now has better ability to attend to maintenance problems in a more timely fashion and, thus, has been able to increase seat sales and improve profitability.

Example B: A telecom company had customer information stored in over five separate systems. At any point when a customer interacted with the company, it was possible that that information was sent to and stored in any one of these five systems. The telecom had a staged data warehouse that accumulated data nightly from these five sources. However, it became apparent that the data in the data warehouse was often out of date, which caused major customer service problems. Phone calls needed to be transferred from one customer support representative to another – each having

access and expertise in only one of the five distinct operational systems. This practice delayed call resolutions, negatively affected customer satisfaction, and resulted in higher support costs.

In this case, a data warehouse already existed, but for one reason or another it clearly wasn't serving its intended purpose. To resolve the situation, WebFOCUS integration technology was used to create a trickle-feed data warehouse. In the solution, WebFOCUS monitoring technology listened for transactions going into all five operational systems and then enriched the data and added it to the new real-time data warehouse.

This solution gave a single customer support representative a complete view of the customer in a WebFOCUS reporting application within five minutes of any customer interaction.

Identifying When Data Warehouses Make Sense

Again, it is not the data warehouse that is the problem; rather it is the reason for building it that often presents the challenge. The challenge is to be able to identify when a data warehouse will truly help solve a business challenge.

Many valid reasons exist for building a data warehouse, including:

- When there is a critical need to reduce overhead on a transaction system or production application in order to improve performance of that system and the resulting BI application that will access the data warehouse
- When BI tools require access to data, and you need to reduce the complexity of data to speed the query creation process
- When it is necessary to analyze data across older, historical time periods and that data is no longer accessible in the operational applications

If you are endeavoring to build a BI system for your company, the key point to remember in relation to this BI worst practice is that it's a misjudgment to assume that a warehouse is required. Always start by evaluating the information need and selecting the data integration option that best fulfills your requirements. You may find that a data warehouse suits your needs, but more importantly, you may not.

Worst Practice #4: Selecting a BI Tool Without a Specific Business Need

You might have noticed that the two business examples given in the previous section – the major airline and the telecommunications company – both had finely defined problems and solutions with clear business objectives. Their understanding of their problem helped them identify and implement an effective BI solution. On the other hand, one of the most egregious of the four worst practices in this paper is the purchase of BI software for "general purpose analysis." In fact, the largest expenses and the smallest ROI is a result of purchasing a solution for "general purpose" BI. In other words, a company recognizes the need for business analysis and immediately plans a project to evaluate and purchase a BI solution for their users.

Without a specific purpose, BI rarely has impact on business. The starting point for creating a BI solution should be when you identify a project that will solve a specific problem through access to information in a timely fashion and in the right context. "Solve a problem," means that information will accelerate a slow running process, eliminate a bottleneck, reduce the cost of doing business, or even become a new revenue source.

When information requirements such as these are identified up front and used as the business driver behind the BI implementation, the implementation of the BI system has a much greater likelihood for success.

The Solution

The lesson here is that your motivation for pursuing and purchasing BI software, or building a data warehouse for that matter, should never be general purpose. If you want success, understand the business problem and know beforehand what can be expected if information is injected into the process.

While this lesson's roots are less about technology than the others, Information Builders' solutions allow you to think outside the box when designing a system. WebFOCUS is not just a tool for accessing a data warehouse, but a software platform that allows you to get data from anywhere at any latency and provide it at a specific point of business to solve a problem. That is where you will receive clear and easily quantifiable benefits.

You Have the Antidote

While some of what has been mentioned in this paper may seem like common sense, you can bet that someone in your organization will begin efforts that will put into effect at least one of these worst practices. Who can blame them when industry trade journals, the vendors, and technology consultants promote the latest technology and promise all sorts of benefits? It's easy to get caught up in the hype.

The good news is that you are well armed to identify and combat at least these four worst practices before they take root and grow into a strangling vine. In addition to the solutions presented in this paper, you can also use counterintuition to the worst practices to provide you a clearer path to success. Consider the following.

- Start your next project by identifying how timely information delivered in the right context can accelerate a process, reduce costs, or improve productivity in a particular area. Do not start the project for a general purpose!
- Identify which data integration method will allow you to prepare the data for your application in the most timely and least costly manner. You may find out that a data warehouse is appropriate, or perhaps not. (If you have already chosen a tool it may limit your choices in this area.)
- Build a BI application that leverages Web-based, parameter-driven forms, personal end-user scheduling for regular e-mail delivery, and alternate output options (e.g. HTML, Excel, PDF) to give end users flexibility.
- Include business users on the selection committee to ensure that you implement a solution that will be embraced by all users. For most users, this means an easy-to-use BI application that doesn't require too much of their time. But don't neglect the preferences of your technical users either. BI tools, although complex, are a great way to provide technical business analysts with a way to contribute new insight to an evolving BI application. Evaluate how many technically savvy analysts you really have and build these tools into the final solution. Be sure that their work can easily be shared with other less technical business users so everyone can benefit.

These steps will deliver an end result with a clearly defined ROI. You will have identified your business need upfront. And you will have laid the groundwork for wide user adoption by including the true user in the selection process and implementing an easy-to-use BI application that integrates with preferred desktop applications.

While these four steps can be followed regardless of your choice of BI platform, we strongly believe Information Builders' WebFOCUS will give you the appropriate blend of integration choices (more than seven options), application development capabilities (for parameter-based reporting and scheduling), and the most flexible output options. All of this will allow you to build a simple, flexible BI application that will result in wide user adoption, which will in turn help the organization achieve its business goals.

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