

# The 2011 Focus Experts' Guide to Business Intelligence

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## Section 1: Introduction

During the past 20 years, Business Intelligence (BI) software has gone from an afterthought following order processing and closing the quarter to a driver of competitive advantage for both large enterprises and midsize firms. The reason is that BI is fundamentally about data analysis and experience has shown that those who quickly understand their customers, their prospects and their performance then take actions accordingly have a big ongoing advantage in follow-on revenues, spend efficiency and effectiveness and flexibility over those who don't. The key word today is flexibility; our current economic environment is marked by more dangerous, more frequent, more profound changes than in the past and BI software automates and institutionalizes more rapid corporate responses to these changes.

However, not all BI solutions fit every situation and many BI solutions can be quite pricy – not just in terms of the software, but also in terms of the data mining experts and database administrators that are needed. The aim of this Experts' Guide is to allow you to figure out what stage of BI “maturity” you are in and then what features you need and what vendor choices you have at that stage. Note that maturity is not a matter of crash implementation, or of slow evolution of an initial solution. Rather, it is a recognition that as an organization grows and its experience with BI increases, new types of analysis from a broader range of sources become worth the additional spend.

One more thing: Many who have followed BI for a long time tend to view it as almost equivalent to the company's entire information strategy. In most if not all cases, this is not true. BI will not knit your company's data stores into a seamless whole; it will not solve all data quality problems; and it will not allow most employees to access company data. Still, it should be among the top few applications that help run the business, if you pick the right vendor and solution. And that's precisely what this Experts' Guide is designed to help you to do!

Here's what follows:

### **Section 2: Meet the Experts**

The names and brief bios of all Experts contributing to the Guide and a brief description of the Focus Expert Network.....3

### **Section 3: Essentials**

A brief overview of the BI market and solution types covered in this Guide and the key things to know before you begin your search.....4

### **Section 4: The Market**

A summary of current market conditions and trends and a list of key vendors.....6

### **Section 5: Your Needs**

Knowing your requirements and determining your Buyer Type and to drive solution choices.....9

### **Section 6: How to Buy: Key Solution, Cost and Vendor Considerations**

Including checklists, ROI and total cost of ownership (TCO) considerations and advice on how to compare candidate solutions and suppliers.....16

### **Section 7: The Focus Short List**

The top solutions and vendors for each Buyer Type, as determined by the Focus Experts contributing to this Guide.....24

### **Section 8: Conclusions**

Final recommendations and suggested next steps .....26

## Section 2: Meet the Experts

The analysis and recommendations in this Guide are based upon the opinions and experience of a group of Experts selected from the [Focus Expert Network](#). Thousands of business experts answer questions, lead research and participate in online events at Focus.com. Below are brief biographies of the Focus Experts who contributed to this Guide.

### Lead Expert: [Wayne Kernochan](#)

Wayne Kernochan is the President of Infostructure Associates, an affiliate of Valley View Ventures that aims to identify ways for businesses to “leverage information for innovation and competitive advantage.” Wayne has been an IT industry analyst for 21 years. During that time, he has focused on key information-related technologies, such as databases, development tools and middleware and ways to measure their effectiveness, such as TCO, ROI and agility measures. Wayne has worked for respected firms such as Yankee Group, Aberdeen Group and Illuminata and has helped to identify differentiation and to craft marketing strategies based on competitive intelligence for vendors ranging from Progress Software to IBM. He has also performed extensive studies of the SMB market and produced buying guides for databases, development tools and information integration solutions. Wayne is a columnist and writer for a wide range of publications, with over 200 Google citations and he is a frequent speaker at Webinars.

### Contributing Expert: [David Hill](#)

Through his writing, speaking and research, David Hill has become a recognized thought leader in the field of information infrastructure. Prior to founding Mesabi Group, Hill was an industry analyst at the Aberdeen Group for a number of years, first as an analyst in data warehousing and data mining and later as the Vice President of Storage Research and founder of the Storage & Storage Management practice. In that role, David emphasized how leading enterprises could leverage their enterprise-wide IT investment to derive additional business value that ranges from TCO/ROI advantages to competitive advantage. Before Aberdeen, he spent many years at Data General where, among other activities, he directed Data General's internal IT data centers as well as managed the Quantitative Management Services group that introduced new analytical tools and built decision support systems. Prior to that, he personally developed decision support systems before the term was even coined. He has an advanced degree from the Sloan School at the Massachusetts Institute of Technology and writes a [blog at Network Computing](#).

## Section 3: Essentials

### What Are We Talking About Here?

Today most, if not all, BI deployments include the following:

- A core solution that includes querying/data mining, some degree of OLAP and reporting.
- Optional capabilities for functions such as Enterprise Performance Management (EPM) and CRM.
- In almost all cases, a data warehouse – not part of the core BI solution, but necessary for it to work, typically consisting of database software; extract, transform and load (ETL) functionality and needed hardware that contains the enterprise-wide data store on which the BI solution operates. (Even in large-scale cloud-based BI deployments, most BI data still resides in a physical data warehouse hosted on premise-based hardware.)
- Related software that is often under the control of the data warehouse or BI solution, such as Master Data Management (MDM) software. Enterprise Application Integration (EAI) software that trades data between enterprise applications can often be used to put key operational data in a common format before sending it to the data warehouse.

To gain more insight on BI and a historical perspective, see “Appendix A: A Bit of BI Background” on page 28.

### BI: The Top Reasons Why Businesses Buy

In general, the strongest reasons for buying a BI solution are:

- Competitive advantage via data mining
- To improve business processes for bigger margins via reporting and closing speedup
- To improve business decisions by more rapid provision of greater amounts of more timely, better-quality data
- To improve business agility by faster alerting to changes in the environment

### BI Solution Categories

CATEGORY	TYPICALLY INCLUDES	VENDOR EXAMPLES
Cloud/SaaS BI	Core solution	Birst , Jaspersoft (open source)
Enterprise BI	Core solution, EAI, performance management	Microsoft BI, Microstrategy
Global BI	Core solution, EAI, performance management, data warehouse, related software	IBM Cognos, Oracle, SAP Business Objects
Data Warehousing	Database, ETL, servers and communications	HP, Vertica (columnar database)

## BI: What Type of Buyer Are You?

### The Basic BI Buyer:

- Needs core BI capabilities such as querying and reporting
- Usually is an SMB (up to 500 employees) with little or no existing BI infrastructure

### The Advanced BI Buyer:

- Needs to scale existing BI capabilities
- Needs to add technologies such as OLAP or PM for competitive advantage
- May need to extend the scope of data accessed by BI
- Usually is a midsize to large organization with existing BI infrastructure

## Checklist: 10 Key Things to Know Before You Begin Your Search

1. Size of company: Larger companies can support physical data warehouse infrastructure better.
2. Immediate needs: This will tell whether the focus is on, say, scheduled reporting or ad-hoc data mining.
3. Existing ERP solutions: In-house or packaged, these are almost always the most important sources of data, and the BI solution must be able to handle that input well.
4. Scalability of existing hardware to handle data warehouse: A rule of thumb is that enterprise storage needs will grow by 50 percent per year to handle new demands, especially BI demands.
5. Ultimate user(s) of solution: As with other enterprise apps, corporate buy-in is essential; finance and sales executives are usually especially important.
6. Characteristics of business processes into which the BI solution must fit: Book-to-bill, supply-chain management and closing/planning/budgeting are typical processes for which the user must ensure data is loaded, and reports are sent to the appropriate people at the appropriate points in the process.
7. Points of resistance: for example, major changes in business processes, changes to existing culture/organization.
8. Initial project that would lead to biggest “bang for the buck”: Experience shows that the difference between BI “shelfware” and success is often the bottom-line effect of the first project.
9. Likely budget for implementation/maintenance: As shown in Section 6, initial and ongoing expenses for a BI solution can be surprisingly high, even if the BI application itself is cheap.
10. Company relationships with particular vendors that may affect price or solution choice: Some companies have been known in the past to offer as much as 90 percent markdowns for favorite customers; of course, the cost of acquisition and ongoing maintenance costs can be as high or higher.

## Section 4: The Market

### Market Trends

The BI market is large, growing and not yet mature. Strictly speaking, it consists of a BI application and a BI infrastructure market, but, practically speaking, most sales of BI applications involve sales of BI infrastructure and most sales of data warehousing infrastructure are for BI purposes. As a result, users seeking new BI capabilities buy additional data-warehouse storage at the same time that they buy new BI software. This storage – and the hardware to accompany it – tends to cost more than the BI application software.

There are two major trends in 2010 that are driving the next wave of BI acquisition: the advent of Enterprise Performance Management (EPM) features and the notion of “*agile BI*.” Large enterprises are increasingly using EPM to track business performance on a daily basis via dashboards, giving corporate executives hands-on contact with data-warehouse data for the first time. A fast-changing, unpredictable and cost-constrained global economy is finally having an effect on BI, raising demand for quick ad-hoc queries and “almost real time” updates to data. “Agile BI,” the response, is a set of technologies and processes that promise rapid prototyping and rapid response to changing business environments or situations. Although it is a marketing slogan as of yet, pent-up demand is causing customers to buy even before the technology is ready.

A third important trend, for the future, is the *increasing interest of SMBs in BI*. Although most BI solutions today are designed from the ground up for very-large-scale data warehouses and BI application interfaces still, by and large, have not made using BI easy for any but expert data miners, the increasing importance of data available on the Web has meant that SMBs do not need to create a terabyte-sized data store of internal corporate data in order to benefit from BI. Streaming existing data sources such as local-office reports to the cloud and combining it with Web data on online trends can be almost as effective as doing deep data analysis on time-series data. It is likely that the SMB market, unusually small as of now compared with that of other enterprise applications, over the next three years will grow into a substantial (and often counter-cyclical) component of overall BI sales.

### Challenges to BI

There are no major, fundamental threats to the BI market on the horizon. Rather, the major factor constraining the market is the parochialism of both vendors and IT operators of data warehouses. The tendency of these vendors and operators to assume that all enterprise information management is or should be grouped under the heading of the data warehouse and that their approach to data analysis is right and is very easy to learn, has meant that a large and increasing percentage of useful corporate and environmental data is not made visible to those who could benefit from it and that BI solutions have missed add-on sales that would have resulted from being part of an integrated overall data-management solution. The acquisition of two major BI players by global computing vendors (Cognos by IBM and Business Objects by SAP) has meant that this parochialism is beginning to break down, as BI vendors are exposed to other viewpoints; but it remains a significant limitation.

## Vendor Landscape

Table 2 (an expansion of Table 1) shows a simple classification of vendors in the BI solution market.

CATEGORY	VENDOR EXAMPLES	BEST ENTERPRISE SIZE	TYPICALLY INCLUDES	RELATIVE STRENGTHS
Open Source/Cloud/ SaaS BI	<a href="#">Birst</a> , <a href="#">Jaspersoft</a> and <a href="#">Pentaho</a> (open source),	SMB	Core solution	**Cost **Relative openness to Web data
Enterprise BI	<a href="#">Microsoft BI</a> , <a href="#">Microstrategy</a> , <a href="#">SAS</a>	SMB to very large	Core solution, EAI, performance management	**Scalability **Some avoidance of vendor lock-in
Global BI	<a href="#">IBM Cognos</a> , <a href="#">Oracle</a> , <a href="#">SAP Business Objects</a> ,	Large to very large	Core solution, EAI, performance management, data warehouse, related software	**Ultra-scalability ** Ability to provide enterprise view of its information
Data Warehousing	<a href="#">HP</a> , <a href="#">Vertica</a> (columnar database)	All	Database, ETL, servers and communications	Not applicable

Other BI-related companies include the following.

- [1010Data](#) (querying interface plus highly scalable data warehouse, primarily used in financial services)
- [Actuate](#) (reporting; platform open source)
- [arcplan](#) (BI for SAP, including federated querying across BI systems)
- [Aster Data Systems](#) (columnar database plus SQL-MapReduce BI)
- [Blink Logic](#) (self-service SaaS BI tool)
- [Board International](#) (BI tool supporting rapid “toolkit” creation of custom apps)
- [Greenplum](#) (recently acquired by EMC, it is a leading proponent of Massively Parallel Processing [MPP] for data warehousing and BI)
- [InetSoft Technology](#) (BI emphasizing “data mashups”)
- [Infobright](#) (columnar database)
- [Information Builders](#) (BI platform and performance management solution)
- [IQubz](#) (BI for the hospitality industry)
- [Kognitio](#) (database with focus on in-memory technology, optimized for data warehousing)
- [LogiXML](#) (rapid development of Web-based BI apps)
- [LucidEra](#) (SaaS BI for sales)
- [myDIALS](#) (SaaS BI focusing on dashboards)
- [Neotix](#) (reporting focusing on Oracle Apps)
- [Netezza](#) (IBM is in the process of acquiring this company, which has been a leading provider of analytic appliances)
- [Oco](#) (SaaS BI)
- [Panorama Software](#) (BI that can be integrated into portals; relationship with Google)
- [ParAccel](#) (columnar database with good TPC scalability for data warehousing)
- [PivotLink](#) (cloud/SaaS BI)
- [Predixion Software](#) (focuses on “predictive analytics”)
- [QLIKtECH](#) (BI emphasizing in-memory performance and ease of use)
- [Strategy Companion](#) (BI focused on Microsoft SQL Server data marts and warehouses)
- [Tibco](#) (BI from an old EAI provider that provides good access to enterprise apps)
- [Teradata](#) (full proprietary-hardware data warehousing solution, widely used)

For selected vendor detail, please see Appendix A.



## Section 5: Your Needs

Most large enterprises already have major BI solutions. Most SMBs don't; in fact, most SMBs don't have BI at all. Therefore, the Basic Buyer is likely to be an SMB that does not have BI and the Advanced Buyer is likely to have core BI plus one or more options as well as the physical BI infrastructure – the aim of the Advanced Buyer is to get the next “new new thing” that will take their BI effectiveness to the next level, such as EPM or MDM. For that, the major requirements are straightforward: The add-on gives new capabilities that relate to company's competitive advantage, integrates with existing BI and scales.

The aim of the SMB Basic Buyer should be more modest, because an SMB simply does not have access to the data mining experts and massive amounts of operational data that a large enterprise does. Analysis will be shallower and use historical data less. To counteract this, the SMB must use more “agile” BI and create a tighter link between the data analysis and the high-level decision-maker.

### A. Basic Buying (SMB) Considerations

The actual task of Business Intelligence (BI) is business data analysis. The typical operation is a query on a massive database of business data, usually fed from existing operational systems such as order entry or sales, manufacturing or production and distribution or delivery. For the SMB, this means that existing systems must add extract, transform, load (ETL) links to a central database that is strictly for data analysis. This deployment can take place pretty quickly, but typically, even in the SMB case, it will take a month or more to start using BI effectively.

The key question here is whether you anticipate growing into a large enterprise soon or not. If not, a SaaS solution or one that is prepackaged and easy to query with is the best option. If you do anticipate being a large enterprise (say, more than 500 employees) in the next couple of years, take the extra time and do either open-source (if you have tech-savvy IT) or global BI.

Almost all businesses, SMB or not, have a wish list of things that they would like to find out about their customers, their operations and their suppliers, beyond what their existing reports tell them. The SMB should take this wish list, prioritize it and be ready to hit the ground running when the BI system has enough data in it to be useable. Again, the key is to be flexible: The initial answers you get may not be what you expect, and you will need to formulate follow-on questions quickly. Once beyond the initial shock, however, BI becomes quite routine.

One final point: as with other products, there must be high-level business buy-in. Unlike other products, that means not only that you deliver routine reports but also that you deliver periodic warnings and unexpected findings and that the high-level business executive pays attention to them.

### **SMB-Buyer Bottom Line**

The key word today is flexibility. The current economic environment is marked by more dangerous, more frequent, more profound changes than in the past, and BI software automates and institutionalizes more rapid corporate responses to these changes. As a result, BI can help not only large enterprises that appreciate the ability to respond better yet are necessarily slow to change, but also SMBs that are easy to change but are now more likely to be blindsided by a catastrophe.

Unfortunately, SMB BI is too immature to give the kind of you-can-count-on-it value-add that a vendor like Progress Software brought to databases. However, in a couple of years, the authors of this Guide

anticipate that SMB BI vendors will give you better simplicity and more options that will make acquiring BI a slam-dunk. Alas, SMBs shouldn't wait, and should opt for hands-on use of any product before buying and then do the best you can with SLAs and take the risk. All that you lose is the investment; what you may gain is differentiation.

## B. Matching Your Need to General Vendor Categories

More broadly, buyers should consider the “fit” of vendor BI offerings with their needs. What that boils down to, in this case, is classifying vendor offerings in such a way that you can easily determine if a particular “type” does or doesn't fit your organization and its needs.

Two types of classification are particularly useful now:

1. Enterprise vs. Open Source vs. SaaS BI solutions
2. Agile vs. “Traditional” BI solutions

A third “classification,” analytics vs. BI, often confuses people. It turns out that this is not useful as a way to determine an offering's “fit” for your needs. Analytics has become a popular word associated with BI in the past five years, probably because of books such as *Competing On Analytics* by Davenport and Harris.

Analytics is not just a part of BI, nor is it completely distinct. Compared to a BI tool, an analytics tool is focused on analysis rather than on results reporting or supporting a business process, and it tends to have more “forward-looking” and ad-hoc features than a BI tool. BI, by definition, aims at assessing the data at a business level; analytics tools are being applied to levels below that of the business – for example, to detect patterns in IT workloads or costs that are missed by cruder systems management and accounting tools. Thus, some BI is not analytics, and some analytics is not BI (*business analytics* is a subset of BI).

That said, the BI software buyer should anticipate that some vendors may use the terms *BI* and *analytics* interchangeably. Because most full-scale BI vendors provide business analytics, the buyer typically need not worry because one vendor says it has analytics and another does not; it's pretty much the same set of capabilities.

## Enterprise vs. Open Source vs. SaaS BI

There is a temptation to assume that BI solutions are the same as other applications, and that there will be the same cost considerations, the same functionality, the same tradeoffs. As it turns out, BI is not your average CRM, ERP or SCM application. For example, SaaS BI simply is not appropriate to handle all of a large enterprise's BI needs, not because it isn't functional enough (the differentiator in some other apps), but because in large-enterprise BI, customization and moving data to one large data store continually are more difficult to accomplish in a SaaS solution. Likewise, using open-source programming for solution development and customization to the needs of the enterprise can be quite effective with other applications; with BI, the database and data-mining expertise needed is relatively lacking in the open-source community.

Nevertheless, we can make some tentative statements about the pros, cons and best fits for each type of BI. What follows are some brief, broad-brush generalizations about enterprise-app vs. open source vs. SaaS comprehensive BI solutions. Let's consider the architecture, TCO and best usage of each solution type in turn.

## Enterprise BI

An enterprise (or global) BI solution such as IBM Cognos sets up data feeders from operational databases such as order entry into a common central data store, known as a data warehouse (or multiple data marts). Data comes into the data store in hourly, daily or weekly bursts and the periods of time not spent on “mass loads” are spent on running queries against the data store using “BI software.” Today, such a store may be terabytes or more, and it is typically composed of numeric or text data records with relatively small sizes.

BI solutions are pricy, but a large part of the cost goes to database administration. The reason is that the data warehouse has to maximize query performance, day after day, year after year, as the data-store size increases by 50 percent per year. Only a fine-tuned, powerful database can handle the job, and every customer believes that his or her fine-tuning is not “one size fits all” – it’s very hard to outsource the tuning that the administrator performs on the database.

However, the same is not true for SMBs. Up to a certain point (in the authors’ opinion, somewhere around 500 to 1,000 employees), these companies need raw power rather than customization. Moreover, it’s possible to find a cheap enterprise database that will handle all the load that an SMB can throw at it and deliver “near-lights-out administration” as well. The result is that, according to the authors’ studies, an SMB can save more than 50 percent in three-year TCO by using one of these instead of Oracle.

## Open Source BI

An open source BI solution such as Jaspersoft or Pentaho replaces the license cost of a full BI solution with an open-source “free” distribution of software, plus either a fee for services or an “enterprise edition” at moderate cost. The architecture of the open-source solution is pretty much the same as that of an enterprise BI solution, although the prevalence of open source communities on the Web has led to a significant presence of open-source BI software in public clouds.

The main attraction of open-source BI is the reduction in license costs. Note, however, that the open-source BI solution either uses an enterprise database, in which case overall costs are not reduced by much, or its own open-source database (typically MySQL), in which case the open-source solution won’t scale as well and may be more appropriate for an SMB.

The main possible problem with open-source BI is not the possible security vulnerability of company data (since users can always take advantage of sophisticated Web security schemes and keep the physical architecture in the company itself), but rather the relative inexperience of today’s open-source community with scaling databases. It is only very recently that open-source databases such as MySQL have implemented some of the basic mechanisms of enterprise databases to ensure data integrity and consistency and Java programmers frequently demonstrate a poor understanding of database schemas.

Finally, for some SMBs, databases that offer “administration for dummies” are vital, because good database-administration personnel are just not out there to be hired, even in today’s economy. All in all, open-source BI right now occupies a “middle tier” in the BI market – good for medium-to-large-scale implementations where Web knowledge is plentiful.

## SaaS BI

Birst is a good example of the new breed of SaaS BI provider. The architecture is hosted and multi-tenant (multiple users can share one BI “veneer” and physical data store). Instead of flowing operational data to an in-house data store, Birst redirects the data to a Birst data center “in the cloud.” To implement Birst, one simply inserts new generic ETL software that feeds the hosted hardware, and the Birst solution auto-discovers the structure of the existing data. Thus, deployment is quick and administration is cross-customer, cutting the costs (included in the price) of database administration. Moreover, the solution itself is necessarily quite agile, being able to adapt more readily to, or be customized more quickly for, new data types and new kinds of transaction streams (with cost-saving load balancing).

However, many large-enterprise implementations do not just store new data in the data warehouse; they also store historical data. Moving massive amounts of new data to a geographically far-flung SaaS data center is much slower than moving multiple smaller streams of that data to a local data center or one with dedicated communications. Things are even worse when historical data is involved, because it can increase the amount being loaded by one or two orders of magnitude. The proof of this is in the new cloud concept of “data locality”: although theory says that applications can be moved quickly between geographies in a public cloud, in fact implementers keep the data where it is and “pretend” that the data has been moved along with the code -- because moving large amounts of data dynamically croaks performance.

The result is that SaaS BI is especially good for one of two situations: handling a new SMB's BI, or serving as a complement to a larger organization's BI to do quick ad-hoc deeper data mining for particular, smaller data marts or tables.

### BI Buyer “Enterprise/Open Source/SaaS Bottom Line”

Users should try to pierce the veil of vendor claims and counter-claims about open-source and SaaS/cloud BI by focusing on the ability of the solution – the whole solution, not just the BI software – to scale and cut database-administration costs. There is much that is attractive about open-source and SaaS BI solutions right now – fast deployment and data-store modification for SaaS, fast custom-program modification for open-source – but that doesn't mean they are suitable for all of an enterprise's needs. On the other hand, enterprise information management no longer requires one solution for all needs; the days when Oracle could credibly recommend a one-stop data shop are pretty much over. The new BI solutions don't typically provide almost all of the answers; but, separately or in combination with enterprise/global BI solutions, they cover more user needs than ever before.

## Agile vs. "Traditional" BI

Agile BI is indeed a step forward in overall business agility - a very small step. It is quite possible for a smart organization to take what's out there, combine it in new ways and make some significant gains in business agility. However, it's not easy and companies won't get much help from a single vendor.

The authors of this Guide define agility as the ability of an organization to handle events or implement strategies that change the functioning of key organizational processes. It can be further categorized as:

- proactive and reactive;
- anticipated and unanticipated;
- internally or externally caused;
- new-product-, operational- and disaster-centric

That is, improved agility enhances one or all of these areas.

Initial data suggest that improvements in new-product development (proactive, unanticipated, externally caused) have the greatest impact, since they have spillover effects on the other categories (anticipated, internally caused, operational and disaster). However, improvements in operational and disaster agility can also deliver significant bottom-line long-term benefits. Improved agility can be measured and detected from its effects on organizational speed, effectiveness and "follow-on" metrics (TCO, ROI, customer satisfaction, business risk).

The implications for Agile BI are:

- Unless improved BI agility helps new-product development, its business impact is small.
- Increased speed (faster reporting of results) without increased effectiveness (i.e., a more agile business decision-making process) has minimal impact on overall agility.
- Improvements to "reactive" decision making deliver good immediate results, but fewer long-term impacts than improvements to "proactive" decision making, which anticipates rather than reacts to key environmental changes.

In summary, when agile BI is part of an overall agile decision-making and new-product-strategy-driving business process and emphasizes proactive search for extra-organizational data sources, it should produce much better long-term bottom-line results than reactive BI that depends on relatively static and intra-organizational data sources.

## The Fundamental Limit to Today's Agile Decision-Making via BI

Let's consider some questions about BI with answers based on Aberdeen Group's data usefulness study, (used by permission of Aberdeen Group):

1. **Question:** Where do the greatest threats to the success of the organization lie, in its internal business processes or in external changes to its environment and markets?  
Answer: In most cases, external.
2. **Question:** Which does better at allowing the business person to react fast to and even anticipate, external changes – internally gathered data alone, or internal data plus external data that appears ahead of or gives context to internal data? Answer: Typically, external.

3. **Question:** What percentage of BI data is external data imported immediately, directly to the data store? Answer: Usually, less than 0.1 percent.
4. **Question:** What is the average time for the average organization from when a significant new data source shows up on the Web to when it begins to be imported into internal databases, much less BI? Answer: more than half a year.

The fundamental limit to the agility and effectiveness of BI therefore lies not in any inability to speed up analysis, but in the fact that today's BI and the business processes associated with it are designed to focus on internal data. Increasingly, your customers are moving to the Web; your regulatory environment is moving to the Web; mobile devices are streaming data across the Web; new communications media like Facebook and Twitter are popping up; and businesses are capturing a very small fraction of this data, primarily from sources (longtime customers) that are changing the least.

As a result, the time lost from deducing a shift in customer behavior from weekly or monthly per-store buying instead of social-network movement from one fad to another dwarfs the time saved when BI detects the per-store shift in a day instead of a weekend; and a correct reaction to the shift is far less likely without external contextual data.

This is an area where agile new product development is far ahead of BI. Where is the BI equivalent of reaching out to external open-source and collaborative communities? Of holding "idea jams" across organizations? Of features/information as a Web collaboration between external users and code/query creators? Of "spiraling in on" a solution? Of measuring effect by "time to customer value" instead of "time to complete" or "time to decide"?

A simple but major improvement in handling external data in BI is pretty much doable today. It might involve integrating RSS feeds as pop-ups and Google searches as complements to existing BI querying. But if any major BI vendor currently features this capability on the front page of its Web site, the authors of this Guide have yet to find it.

### BI Buyer "Agile BI Bottom Line"

In the long run, therefore, users should expect that *really* agile BI, which delivers major bottom-line results, will probably involve:

- Much greater use of external data to achieve more proactive decision-making.
- Major changes to business processes involving BI to make them more agile.
- Constant fine-tuning of the querying that BI offers, customized to the needs of the business, rather than feature addition and decision-process change gated by the next BI vendor release.
- Integration with New Product Development, so that customer insights based on historical context can supplement agile development's right-now interaction with its Web communities.

Here are a few suggestions:

1. Look at a product such as the joint Composite Software/Kapow Technologies Composite Application Data Services for Web Content to semi-automatically inhale new Web-based external data.
2. Look for major BI vendors that “walk the walk” in agile development, such as IBM with its in-house-used Jazz development environment, as a good indicator that the vendor’s BI services arm is up to the job of helping improving the agility of BI-related business processes; but be sure to check that the BI solution is also being developed that way.
3. Look for BI vendor support for ad-hoc querying, as this will likely make it easier to constantly fine-tune querying.
4. Look for a BI vendor that can offer, in its own product line or via a third party, agile NPD (new product development) software that includes collaborative tools to pass data between BI and the NPD project. **Note:** In most if not all cases you will still need to implement the actual BI-to-NPD link for your organization, and if your organization does not do agile NPD you won’t get the full benefit of this. Also note that agile plus lean NPD, where the emphasis is on lean, does not qualify. (Finally, note that the authors of this Guide are in disagreement with other commentators on this matter. We believe that lean cost-focused just-in-time processes work against agility as much as they work for it, because if product specs change there is less resource “slack” to accommodate the change).
5. Above all, change your metrics for agile BI success from “increased speed” to “time to value.”

## Section 6: How To Buy: Solution, Vendor and Cost Considerations

Because most BI solutions are comprehensive (and where they are not, third parties exist to fill the gaps), users should focus their vendor checklists on cost of ownership, prepackaged customization for their industries and immediate needs and speed of custom-app development. SMBs should also stress hand-holding in data mining and custom-app development.

### Questions for BI Vendors

For all except SaaS BI deployments, to get at TCO and ROI, buyers should ask:

1. What database will I be using? (This will determine administrative costs and scalability.)
2. What storage vendor will I be using? (If applicable; storage vendors can vary widely in TCO, as shown below.)

Database administration and storage total cost of acquisition are typically the largest components of overall TCO.

To get at customization, buyers should ask:

3. What libraries, templates, or features for specific industries or [insert unusual company BI need] are available?

To get at speed of custom-app development, buyers should ask:

4. What mashup support, ad-hoc-query-creating development toolkits above the level of Java/C++ and agile-development-process support is available?

To get at services related to data mining and custom-app development, SMB buyers should ask:

5. What system-integration, outsourcing and/or hand-holding services do you provide for gaining internal expertise in data mining?
6. What outsourcing services do you offer for custom applications?
7. What strategic consulting do you offer for identifying the best targets for BI-app development?

### Cost Considerations

These deserve a separate section, because in BI solutions, as elsewhere, the primary sources of costs are not well understood and, in the case of SMBs, can make the difference between a BI investment that pays off and one that does not.

To really get at TCO and ROI, the BI solution buyer should consider all parts of the BI solution: the BI app itself, infrastructure software and hardware. Despite seeming pricy, BI apps at whatever price level are very often less expensive than other parts of the solution (quoted BI-software license prices typically range from \$10,000 to \$100,000), especially database administration expenses and storage price. Moreover, in the case of database administration, choice of the right database can sometimes save far more money than buying a cheaper BI app.



To see how this works, take a look at the real-world SMB infrastructure-software and storage TCO findings noted below (these are publicly published by some of the vendors studied).

In calculating the TCO and ROI of infrastructure software that was used for a distributed enterprise SMB application but could also be used in a data mart, Infostructure Associates (one of the author's firms) included the following:

- *Development solution license:* This includes the overall development toolset likely to be used to create mission-critical SMB BI custom applications and the framework that complements that toolset. The three toolsets/frameworks considered here are Progress OpenEdge Business Platform (especially Progress 4GL and OpenEdge platform), Microsoft Visual Studio 2005 (especially Visual C#) and .NET Framework and Oracle JDeveloper and the Oracle framework. Ten development solution copies are assumed.
- *Database and application server (or framework) license:* IA considered three database products: Progress OpenEdge Enterprise 10.0B, Microsoft SQL Server 2005 and Oracle 10g, all running on an Intel/Windows XP Server-based server platform. IA considered three application server products: Progress OpenEdge Application Server 10.0B, Microsoft Application Server (included in Windows XP) and Oracle Application Server (included in Oracle 10g). IA chose these versions because sufficient data was available at the time of the study. In Tables 3 and 4, figures are presented for 25-, 50- and 50x20-user (i.e., 20 sites, 50 users at each site, or 1,000 users) implementations.
- *Storage software and hardware acquisition costs:* IA considered EMC, NetApp and LSI (through a third party) solutions for a data warehouse with 50 terabytes of storage mirrored in a disaster recovery center, upgraded by 25 TB after two years.
- *Development and upgrade costs:* To create a full suite of new custom mission-critical BI applications, Infostructure Associates posited 10 developers at \$80,000 each per year (often done by third parties).
- *Deployment:* Infostructure Associates considered both the fees charged by the independent software vendor (ISV) to deploy the embedded infrastructure and application and the likely cost for savvy customers to perform deployment. Because application servers permit more rapid deployment across the Web, the research sometimes shows clear differences in customer deployment costs between development solutions.
- *DBA and application-server administration costs:* To determine costs of using internal staff to deploy and maintain the system, Infostructure Associates calculated that administration of an application required some amount of dedicated time from internal systems professionals, including systems, application and database administrators, each of which costs an average of \$400 per day, or \$80,000 per year. Research suggests that much of this administrative effort comes from database administrators.
- *Development solution and framework training costs:* This figure is the cost of training developers and administrators in how to use the development solution and update and maintain the database and application server. For example, training costs may include the cost of Web services programming training and administrator training in troubleshooting.
- *Platform upgrades:* This includes the supplier charges for two upgrades of the version of the database and, typically, of the application server. Typically, upgrades are purchased separately or included with maintenance contracts.

- *Application upgrades*: This figure is the cost of two code upgrades, each of which adds 5 percent to existing code and changes 5 percent of existing code. Research shows that in the case of these two solutions, upgrades typically do not require recoding most of the application.
- *Support/license maintenance costs*: This figure represents the supplier or ISV fee to provide telephone-based, Web-based and field service support in order to maintain the application.

## Costs Not Included

The focus of the research was on determining the typical *additional* costs and benefits of creating a new application to the user. Thus, several potential expenses were not included:

- *Server, desktop and operating system acquisition and support costs*: Infostructure Associates estimated that users would spend about \$7,000 for an application-supporting dual-processor PC server with a Windows XP Server license bundled and will use one additional machine for development. If users do not have these servers available, IT buyers should add these costs to the TCO. Because desktop and server support is almost invariably already part of the budget, it is not included in the cost of ownership, nor is the cost for the client hardware.
- *Networking infrastructure*: Most organizations already have local area networks (LANs) in place. Therefore, IA did not include networking equipment expenses such as wiring a building.
- *“Soft costs”*: This number includes the costs derived because a development toolset, database or application server does not have a particular feature and also includes costs associated with redesigning business processes to take advantage of the application. Soft costs vary widely depending on the type of application and the environment in which it is deployed. Opportunity costs do capture some soft costs where one solution has a feature and others do not.
- *Virtualization software costs*: For example, the cost for VMware. This typically a relatively small part of overall TCO.
- *Training productivity loss*: This number is an estimate of lost productivity due to training developers and administrators in use and maintenance of the application itself. Productivity loss should be determined on a case-by-case basis, depending on the skills of the administrators or developers. Therefore IA did not include it in this study. Interviews indicate that this cost is insignificant for typical users studied.

Table 3 is a total cost of ownership (TCO) analysis for three BI software products.

**Table 3: Microsoft, Oracle and Progress Platform Three-Year TCO**

	25 CLIENTS	50 CLIENTS	50 X 20
<b>DATABASE LICENSE (FRAMEWORK)</b>			
Progress OpenEdge Enterprise RDBMS	\$14,625	\$29,250	\$585,000
Generic solution – assume Microsoft SQL Server	\$13,969	\$28,506	\$586,350
Microsoft SQL Server 2005	\$13,969	\$28,506	\$586,350
Oracle Database Standard Edition 10g	\$20,000	\$38,000	\$800,000
<b>APPLICATION SERVER LICENSE (FRAMEWORK)</b>			
Progress OpenEdge Application Server Enterprise Ed.	\$2,750	\$5,500	\$110,000
Generic solution – assume Microsoft Application Server	\$0	\$0	\$0
Microsoft Application Server	\$0	\$0	\$0
Oracle Internet Application Server Standard Edition	\$5,000	\$10,000	\$200,000
<b>DEVELOPMENT ENVIRONMENT (10 COPIES)</b>			
Progress OpenEdge Studio	\$36,000	\$36,000	\$36,000
Generic solution – assume same as Progress	\$60,000	\$60,000	\$60,000
Microsoft Visual Studio 2005 Team System	\$109,390	\$109,390	\$109,390
Oracle Internet Developer Suite (Java)	\$50,000	\$50,000	\$50,000
<b>DEVELOPMENT COST (10 PROGRAMMERS)</b>			
Progress OpenEdge Studio	\$600,000	\$600,000	\$600,000
Generic solution	\$700,000	\$700,000	\$700,000
Microsoft Visual Studio 2005 Team System	\$900,000	\$900,000	\$900,000
Oracle Internet Developer Suite (Java)	\$1,035,000	\$1,035,000	\$1,035,000
<b>TWO APPLICATION UPGRADES (NEW RELEASES)</b>			
Progress OpenEdge Studio	\$120,000	\$120,000	\$120,000
Generic solution	\$140,000	\$140,000	\$140,000
Microsoft Visual Studio 200 Team System	\$180,000	\$180,000	\$180,000
Oracle Internet Developer Suite (Java)	\$207,000	\$207,000	\$207,000
<b>DEPLOYMENT COST</b>			
Progress OpenEdge	\$11,300	\$16,000	\$21,000
Generic solution - assume use Microsoft deployment tool	\$6,500	\$12,000	\$17,500
Microsoft – with \$1,000 application server deployment	\$6,500	\$12,000	\$17,500
Oracle – with \$4,000 application server deployment	\$47,499	\$98,999	\$193,998

<b>DBA COST</b>			
Progress OpenEdge Enterprise RDBMS	\$7,000	\$11,000	\$24,000
Generic solution – assume Microsoft SQL Server 2000	\$17,000	\$33,000	\$240,000
Microsoft SQL Server 2005	\$17,000	\$33,000	\$240,000
Oracle Database Standard Edition 10g	\$150,000	\$150,000	\$7,500,000
<b>APPLICATION SERVER/WEB SERVER ADMINISTRATION COST</b>			
Progress OpenEdge Application Server Enterprise Ed.	\$12,000	\$12,000	\$12,000
Generic solution – assume Microsoft Application Server	\$15,000	\$15,000	\$15,000
Microsoft Application Server	\$15,000	\$15,000	\$15,000
Oracle Internet Application Server	\$50,000	\$50,000	\$50,000
<b>DEVELOPMENT TOOLSET TRAINING</b>			
Progress OpenEdge Studio	\$16,000	\$16,000	\$16,000
Generic solution – assume like Progress	\$16,000	\$16,000	\$16,000
Microsoft Visual Studio 2005 Team System	\$64,000	\$64,000	\$64,000
Oracle Internet Developer Suite (Java)	\$32,000	\$32,000	\$32,000
<b>PLATFORM TRAINING</b>			
Progress OpenEdge platform	\$2,000	\$2,000	\$2,000
Generic solution – assumes Microsoft training	\$7,280	\$7,280	\$7,280
Microsoft .NET Framework	\$7,280	\$7,280	\$7,280
Oracle Application Development Framework	\$10,000	\$10,000	\$130,000
<b>TWO PLATFORM UPGRADES OVER THREE YEARS</b>			
Progress – included with support	\$0	\$0	\$0
Generic solution – assumed like Microsoft	\$5,549	\$5,549	\$5,549
Microsoft SQL Server 2005	\$5,549	\$5,549	\$5,549
Oracle – included with support	\$0	\$0	\$0
<b>SUPPORT/MAINTENANCE</b>			
Progress	\$9,608	\$12,735	\$131,580
Generic solution – assume like Microsoft	\$6,000	\$12,000	\$300,000
Microsoft	\$6,000	\$12,000	\$300,000
Oracle	\$14,850	\$18,700	\$693,000
<b>TOTAL COST OF PLATFORM OWNERSHIP</b>			
<b>PROGRESS OPENEDGE STUDIO/OPENEDGE</b>	<b>\$831,283</b>	<b>\$860,485</b>	<b>\$1,657,580</b>
<b>GENERIC HIGHER-LEVEL SOLUTION</b>	<b>\$987,258</b>	<b>\$1,029,335</b>	<b>\$2,087,679</b>
<b>MICROSOFT VISUAL STUDIO 2005/.NET FRAMEWORK</b>	<b>\$1,324,688</b>	<b>\$1,362,125</b>	<b>\$2,421,069</b>
<b>ORACLE INTERNET DEVELOPER SUITE/APP. FRAMEWORK</b>	<b>\$1,621,349</b>	<b>\$1,699,699</b>	<b>\$11,178,998</b>

Source: Infostructure Associates, May 2006

Table 4 examines ROI rather than TCO, with a focus on relative rather than actual ROI, but it does give some feel for actual ROI for a generic enterprise application in the real world. Also, it does make one key point: In computing ROI of less expensive (in TCO terms) solutions, buyers typically underestimate the actual return, because they don't consider the additional "opportunity cost savings" profits from investing the money they have saved by choosing a cheaper solution.

**Table 4: Microsoft, Oracle and Progress Platform Three-Year ROI**

	25 CLIENTS	50 CLIENTS	50 X 20
<b>TCO</b>			
Progress OpenEdge Studio/OpenEdge	-\$831,283	-\$860,285	-\$1,657,508
Generic higher-level development solution	-\$987,258	-\$1,029,335	-\$2,087,679
Microsoft Visual Studio 2005/.NET Framework	-\$1,324,688	-\$1,362,125	-\$2,421,069
Oracle Internet Developer Suite/App. Framework	-\$1,621,349	-\$1,699,699	-\$11,178,998
<b>OPPORTUNITY COST SAVINGS</b>			
Progress OpenEdge Studio/OpenEdge	\$148,022	\$150,552	\$229,068
Generic higher-level development solution	\$101,229	\$99,837	\$100,017
Microsoft Visual Studio 2005/.NET Framework	\$0	\$0	\$0
Oracle Internet Developer Suite/App. Framework	-\$88,998	-\$101,223	-\$2,625,979
<b>BUSINESS BENEFITS</b>			
Progress OpenEdge Studio	\$8,000,000	\$16,000,000	\$400,000,000
Generic higher-level development solution	\$7,333,000	\$14,666,000	\$366,000,000
Microsoft Visual Studio 2005/.NET Framework	\$6,000,000	\$12,000,000	\$300,000,000
Oracle Internet Developer Suite/App. Framework	\$4,700,000	\$9,400,000	\$235,000,000
<b>RETURN ON SOLUTION INVESTMENT</b>			
<b>PROGRESS OPENEDGE STUDIO/OPENEDGE</b>	<b>\$7,316,739</b>	<b>\$15,290,267</b>	<b>\$398,571,560</b>
<b>GENERIC HIGHER-LEVEL SOLUTION</b>	<b>\$6,446,971</b>	<b>\$13,736,502</b>	<b>\$364,012,338</b>
<b>MICROSOFT VISUAL STUDIO 2005/.NET FRAMEWORK</b>	<b>\$4,675,312</b>	<b>\$10,637,875</b>	<b>\$297,578,931</b>
<b>ORACLE INTERNETDEVELOPER SUITE/APP. FRAMEWORK</b>	<b>\$2,989,553</b>	<b>\$7,631,958</b>	<b>\$220,545,023</b>

Source: Infostructure Associates, May 2006

Tables 5 and 6 are the total cost of acquisition (TCA) and total cost of ownership (TCO) for hardware needed to run and store BI data.

**Table 5: SGI, EMC and NetApp Storage Solution TCA**

<b>STORAGE HARDWARE COSTS (INCLUDING WARRANTIES)</b>	
SGI IS4600-SP	\$382,100
NetApp FAS3160	\$1,007,460,468
EMC CLARiiON CX4 Model 480	\$975,620
<b>STORAGE SOFTWARE COSTS (INCLUDING WARRANTIES)</b>	
SGI IS4600-SP	\$79,200
NetApp FAS3160	\$461,376
EMC CLARiiON CX4 Model 480	\$443,080
<b>DEPLOYMENT COSTS</b>	
SGI IS4600-SP	\$2,000
NetApp FAS3160	\$2,000
EMC CLARiiON CX4 Model 480	\$3,000
<b>TRAINING COSTS</b>	
SGI IS4600-SP	\$4,295
NetApp FAS3160	\$8,500
EMC CLARiiON CX4 Model 480	\$7,730
<b>TOTAL COST OF STORAGE SOLUTION ACQUISITION</b>	
<b>SGI IS4600-SP</b>	<b>\$467,595</b>
<b>NETAPP FAS3160</b>	<b>\$1,479,276</b>
<b>EMC CLARIION CX4 MODEL 480</b>	<b>\$1,429,230</b>

Source: Infostructure Associates, March 2010

**Table 6: SGI, EMC and NetApp Storage Solution  
Three-Year TCO (Partial)**

<b>TCA COSTS</b>	
SGI IS4600-SP	\$467,595
NetApp FAS3160	\$1,479,276
EMC CLARiiON CX4 Model 480	\$1,429,230
<b>UPGRADE COSTS</b>	
SGI IS4600-SP	\$181,498
NetApp FAS3160	\$503,730
EMC CLARiiON CX4 Model 480	\$487,810
<b>ADMINISTRATION COSTS (NOT VERIFIABLE)</b>	
SGI IS4600-SP	\$30,000
NetApp FAS3160	\$30,000
EMC CLARiiON CX4 Model 480	\$45,000
<b>SUPPORT/MAINTENANCE COSTS</b>	
SGI IS4600-SP	\$20,600
NetApp FAS3160	\$50,000
EMC CLARiiON CX4 Model 480	\$60,335
<b>TOTAL COST OF STORAGE SOLUTION</b>	
<b>SGI IS4600-SP</b>	<b>\$699,693</b>
<b>NETAPP FAS3160</b>	<b>\$2,063,006</b>
<b>EMC CLARIION CX4 MODEL 480</b>	<b>\$2,022,575</b>

Source: Infostructure Associates, March 2010

Tables 7 and 8 summarize the results of the previous Tables.

Table 7: Bottom Line Summary of Three-Year Software TCO/ROI

MICROSOFT, ORACLE AND PROGRESS PLATFORM THREE-YEAR TCO	25 CLIENTS	50 CLIENTS	50 X 20
PROGRESS OPENEDGE STUDIO/OPENEDGE	\$831,283	\$860,485	\$1,657,580
GENERIC HIGHER-LEVEL SOLUTION	\$987,258	\$1,029,335	\$2,087,679
MICROSOFT VISUAL STUDIO 2005/.NET FRAMEWORK	\$1,324,688	\$1,362,125	\$2,421,069
ORACLE INTERNET DEVELOPER SUITE/APP. FRAMEWORK	\$1,621,349	\$1,699,699	\$11,178,998
MICROSOFT, ORACLE AND PROGRESS PLATFORM THREE-YEAR ROI			
PROGRESS OPENEDGE STUDIO/OPENEDGE	\$7,316,739	\$15,290,267	\$398,571,560
GENERIC HIGHER-LEVEL SOLUTION	\$6,446,971	\$13,736,502	\$364,012,338
MICROSOFT VISUAL STUDIO 2005/.NET FRAMEWORK	\$4,675,312	\$10,637,875	\$297,578,931
ORACLE INTERNET DEVELOPER SUITE/APP. FRAMEWORK	\$2,989,553	\$7,631,958	\$220,545,023

Table 8: Bottom Line Summary of Hardware TCA/TCO

TOTAL COST OF STORAGE SOLUTION ACQUISITION	
SGI IS4600-SP	\$467,595
NETAPP FAS3160	\$1,479,276
EMC CLARIION CX4 MODEL 480	\$1,429,230
TOTAL COST OF STORAGE SOLUTION	
SGI IS4600-SP	\$699,693
NETAPP FAS3160	\$2,063,006
EMC CLARIION CX4 MODEL 480	\$2,022,575



## Section 7: The Focus Short List

Both Basic and Advanced buyers should consider all types of BI solutions, although global BI is likely to be pricy for an SMB and, as far as a large enterprise is concerned, solutions other than global BI solutions are likely to be add-ons rather than the core solution.

For global BI, short lists should include:

- IBM
- Microsoft
- Oracle
- SAP

For enterprise BI, short lists should include:

- Microsoft
- Microstrategy
- SAS

For open source BI, short lists should include:

- Jaspersoft
- Pentaho

For SaaS BI, short lists should include:

- Birst
- Oco
- PivotLink

For large-enterprise Advanced Buyers looking for full hardware/software data-warehouse one-stop-shop solutions as BI infrastructure, short lists should include:

- IBM
- Oracle
- Teradata

For large-enterprise Advanced Buyers looking for the best scalability, short lists should include:

- IBM (Smart Analytics Optimizer)
- Oracle (Exadata)
- SAP (Sybase IQ)
- Vertica

## Section 8: Conclusions

Business Intelligence (BI) software has indeed become a driver of competitive advantage for both large enterprises and SMBs — but don't hang all your hopes on BI, trusting it to be a panacea or the basis of your company's entire information strategy. Determine what stage of BI "maturity" you are in, and then what features you need and what vendor choices you have at that stage. Following are some specific recommendations from the Focus Experts who wrote this Guide:

### Five Things to Do Before You Begin Your Solution Search:

1. Determine if you are a Basic or Advanced BI buyer.
2. Ascertain your company's immediate need, be it scheduled reporting or ad-hoc data mining.
3. Understand your existing ERP solutions, as they are the most important sources of data.
4. Determine the ultimate user(s) of the solution, as corporate buy-in is essential.
5. Understand the current trends in BI, and how they may (or may not) align with your needs.

### BI Solutions: Five Things to Investigate

1. Characteristics of your business processes into which the BI solution must fit
2. Anticipated company growth for the coming 24 months (especially important for SMBs)
3. The estimated budget for implementation/maintenance
4. Targets of opportunity for first BI use that offer a low payback period and big ROI
5. Existing infrastructure software and hardware that you can leverage in implementing the BI solution.

### BI Solutions: Five Critical Vendor Considerations

1. Consider the overall "fit" of vendor offerings with your needs.
2. Determine what database you will be using.
3. Ask what storage vendor you will be using.
4. Understand whether an enterprise-app, open-source or SaaS BI vendor is more likely to offer the solution you need.
5. For agile development, look for major BI vendors that "walk the walk."

## BI Solutions: Five Dos and Five Don'ts

### Do:

1. Choose an initial project that would lead to biggest “bang for the buck,” to avoid having your BI solution become shelfware.
2. Remember that flexibility is the key.
3. Prepare for points of resistance, including major changes in business processes and possible changes to existing culture/organization.
4. Investigate company relationships with particular vendors that may affect price or solution choice.
5. Focus on the whole solution, not just the BI software.

### Don't:

1. Underestimate the costs of database administration.
2. Assume that BI solutions have the same cost considerations, functionality and tradeoffs as other applications.
3. Expect that a so-called “agile BI” tool will deliver business agility out of the box.
4. Assume that everyone in the company can use the tool without any training.
5. Forget to investigate the ability of the solution to handle unstructured and Web data.

## Appendix A: A Bit of BI Background

The best way to understand BI solutions is historically. At the start, in the late 1980s, most businesses did run-the-business order entry, manufacturing resource planning (MRP) and accounting via in-house solutions that ran 9-to-5 or in “batch mode” at the end of the day and on weekends. The first BI solutions (from companies such as Cognos and Business Objects) aimed to do queries on that data in order to dig deeper into the data, faster, than end-of-week reports that rarely changed.

As the data in existing systems and the demand for such “decision support” grew, two problems became apparent:

1. A “query from hell” could crowd out all other processing on existing run-the-business systems and therefore prevent customer service at crucial times.
2. Queries generated far more “result data” than in-house reports – what was called then “drinking from a fire hose” – and therefore the result data needed further massaging and filtering before it was presented to users.

The solution to the first problem, in the early 1990s, was to copy production data ceaselessly to a data warehouse or set of data marts that only handled queries. The solution to the second problem was to improve the analytical capabilities of BI solutions, so that they could handle not only simple queries but also complex queries and online analytical processing (OLAP) that more effectively zeroed in on just the results needed in particular cases. This, in turn, created a special class of user called the data miner – pretty much the only one who could understand how to turn business information needs into instructions to the BI solution.

By the late 1990s, two new developments triggered further evolution of BI solutions:

1. In-house run-the-business solutions were increasingly being complemented by commercial enterprise resource planning (ERP) software that handled accounting, order entry and MRP in one package. This also multiplied the number of “data sources” for the data warehouse.
2. The advent of the Web meant new customer interfaces and required that customer-facing solutions operate 24/7, 52 weeks per year. Also, the new flood of customer data from these solutions encouraged sales force automation (SFA) and customer relationship management (CRM) via SFA and CRM applications.

The answer to the first development was ETL (Extract, Transform, Load) software attached to the data warehouse, with a specialized version called EAI (Enterprise Application Integration) to handle communication between ERP packages and data transmission from the ERP data stores to the data warehouse. One follow-on effect on BI solutions was to add a new set of data sources that ramped up the amount of data in the data warehouse enormously, so that it became critically important that BI solutions be “smart” enough to minimize query time and scale flexibly. In other words, OLAP and regular querying became more and more integrated. Another follow-on effect was that it no longer made sense to have each run-the-business application doing its own reporting. In many cases, by a simple extension of the BI solution’s querying ability, BI took over reporting – or shared it with the key ERP app.

An answer to the second development was to begin to shrink the “delay time” between entry of new data and its use by the BI solution. As the size of some data warehouses began to reach the terabyte range, the only effective long-run way to do this was to “fudge” the BI solution: to allow the underlying data warehouse to handle some updates at the same time as queries and to allow the BI solution to reach outside the data warehouse, very carefully, to access key “fresh” data.

Thus, for a strictly limited set of “business-critical” data, data mining and reporting have moved steadily from a maximum of a week later to as little as a few minutes after the data arrives. That in turn has led to the latest BI capability: performance management (PM), or the ability to support accounting/budgeting and provide dashboards showing corporate business executives the results from the business as of a few hours ago, or even alerts about data arriving minutes ago.

Another answer to development two was to incorporate integration with CRM solutions into the BI solution. While CRM and SFA solutions themselves today are typically either separate (Salesforce.com) or now folded into ERP solutions (Oracle Apps), some analysis of CRM data is now handled by the BI solution.

## Appendix B: Select Vendor Details

[Birst](#), [Jaspersoft](#), [Pentaho](#) – Grouping these is perhaps unfair, but their markets do tend to overlap. They offer BI capabilities lower into the SMB market than other BI-software vendors, and they use the Web much more extensively. With Jaspersoft and Pentaho, the selling point is the cost advantages of open source; with Birst, it is the flexibility and cost savings of the cloud. With all three, security is the most obvious concern, but it appears that all three have adequate answers in most cases. Therefore, the key question for all three is: How will you help me evolve my BI strategy?

In the case of Jaspersoft and Pentaho, this may involve reassurance that open-source BI will keep pace with the capabilities of enterprise and global BI providers. In the case of Birst, this should be a matter of establishing how Birst can provide advice to customers about new data sources and new projects and how users can monitor existing BI usage in order to fine-tune their strategies. Of course, service-level agreements are necessary to ensure adequate Birst (or other SaaS BI vendor) robustness and performance.

[HP](#) – While HP has had a long tradition of staying strictly away from software development (with the exception of systems management software), when it was under Mark Hurd it began a rapid expansion into, among other things, data warehousing, and software revenues actually began to approach 2 percent of total revenues. However, Mark Hurd's departure casts all of these apparent moves into BI into doubt. While it remains unclear whether HP will continue to move into data warehousing or put the whole strategy on hold (in which case, HP will become a marginal player in BI), HP is probably not worth the BI buyer's time. If, however, HP clearly recommits to expanding its software arm in general and data warehousing in particular, buyers should remember the enormous HP installed base that can fuel strong data-warehousing services. One key question for HP: What are your plans?

[IBM](#) – Until recently, IBM had stayed strictly away from the enterprise application space, in order to appear as a partner to firms such as SAP, PeopleSoft and Baan. As PeopleSoft and others were swallowed up by Oracle and SAP moved down the application stack with NetWeaver, IBM has shifted to a “coopetition” stance in the enterprise application market, of which the biggest sign was its acquisition of longtime BI firm Cognos. Since then, much of IBM's data-warehousing push has been re-centered around the Cognos brand, including the new Smart Analytics Optimizer appliance; and if the Netezza acquisition goes through as anticipated, IBM will have added another strong analytics arrow to its BI quiver. As a result, IBM is as close to a one-stop BI shop as any. Moreover, IBM has a significant SMB focus (although the SMB arm rarely mentions BI). And its services arm is generally recognized as second to none.

In most cases, the only drawback of choosing IBM (as is the case with the other large vendors) is that it will rarely be first in the market with a major new capability. However, the prevalence of large IBM-solution-dominated data centers means that the smaller vendors who do lead in the new technology will work well with IBM infrastructure. One key question to ask: Does such a vendor work well with Cognos itself?

**Microsoft** – Microsoft is in many ways a surprising entrant into BI, because its SQL Server database's core market was traditionally among SMBs and departments/divisions of large companies. However, a decade-long trend of positioning itself as fully scalable in data warehousing but cheaper, with more room for customer build-it-yourself, has allowed Microsoft to be in shouting distance of IBM and Oracle in BI scalability and with significant presence at the large-enterprise level. Still, it remains somewhat less functional in the BI software itself – which is counteracted by availability of a wide array of third-party add-ons from the enormous Microsoft developer market.

Microsoft has two key strengths: being built from the ground up to require less administration for the same amount of scaling and being part of a wide array of Microsoft and third-party applications that use interfaces like Excel with unmatched acceptance by end users. In other words, while the analysis may not be as deep and the new features slower to arrive, Microsoft BI is often usable by a larger portion of any enterprise. One key question to ask Microsoft: How does it support delivering Web extra-organizational data to BI via its cloud strategy?

**Microstrategy** – This is a slightly more recent entry into the BI software space than Business Objects and Cognos, but that has allowed Microstrategy's product to do an excellent job of folding in highly scalable OLAP capabilities and of simplifying use of the solution. Like SAS, Microstrategy works with all data warehouses without favoring one; unlike SAS, Microstrategy's strengths are in complex querying rather than statistics. In fact, Microstrategy may well do as well as anyone in exploratory or iterative data analysis (that is, in analysis where the answers to questions lead immediately to analysis of unexpected further questions). This is important to those companies seeking to unlock the potential of real-time decision-making and may be a good complement to event processing solutions.

As a smaller firm, Microstrategy may provide less in the way of services and it is definitely not a one-stop shop. However, having used the product, the authors can attest that it needs less in the way of services; it is, indeed, relatively easy to learn and use. For the immediate future, Microstrategy is an excellent complement to large-vendor BI solutions that are not themselves technological leaders in these areas and may be a good starting point for some technically savvy SMBs. One key question to ask Microstrategy: What is the best way to use your product in combination with Cognos or Business Objects?

**Oracle** – Until recently, Oracle likewise had not entered the BI market. However, its acquisition of major CRM and ERP vendors means that it is strong in ETL, or effective feeding of operational system data into the data warehouse. Moreover, Oracle is always at or near the top in extreme database-size scalability, with solutions such as the Exadata appliance and dominates the non-mainframe data-warehouse database market with Oracle Database 11g. Previous BI attempts have been less successful, as a technologically strong Oracle OLAP Option product was hindered by what some customers perceived as too high a price.

As with IBM, Oracle will not necessarily be a technology leader in BI. One plus compared with IBM is that Oracle (apps, database) is often a corporate standard. One minus is that Oracle has in the past been seen as insistent on encouraging users to “buy Oracle” for everything rather than making integration with existing apps easy. Also, in the past, ultra-scalability plus per-processor pricing of software has tended to make Oracle higher-priced for infrastructure solutions. It appears that Oracle is tackling both price and cost of ownership concerns. One key question to ask: What, specifically, is Oracle doing to make its BI agile?

[SAP \(Business Objects\)](#) – Like Cognos, Business Objects was a longtime major BI vendor before its recent acquisition by SAP. The fit between SAP and Business Objects is different, however. SAP's database capabilities are minor, although NetWeaver provides good infrastructure software otherwise and, unlike IBM, SAP presently doesn't offer hardware. What SAP does bring to the table is a dominant ERP application that “runs the company” for many large enterprises. The ERP application is therefore an exceptionally rich source of data for analysis. The recent acquisition of Sybase is an interesting twist, since Sybase brings to BI a columnar database that in many cases delivers an order of magnitude performance improvement over IBM and Oracle enterprise data-warehouse databases. Moreover, this database has been around for more than 10 years, so it isn't risky and it requires less administration if anything than IBM and Oracle – its main limitation is that it hasn't proven ultra-ultra-scalability to the 10s of terabytes.

SAP is already a leader in the EPM side of BI, with its SAP Business Objects Planning and Consolidation solution. However, it is less of a one-stop shop than IBM and may be less of a market leader in CRM data that can be fed to the data warehouse than Oracle. In the past, these have not been the major factors in buyer decisions. A more serious concern is whether SAP can keep pace technologically in infrastructure software with Oracle and IBM. However, even if it did not, the installed base for Business Objects ensures a strong base of experience with core BI that translates into strong implementations and services for the average customer. One key question to ask SAP if you are an SMB: What is your solution if SAP's ERP is overkill for my business?

[SAS](#) – SAS is an anomaly in BI: a longtime private company whose BI product arose from a still-thriving business in statistical research. If the average BI product is for an expert data miner, SAS' product is for an “expert of experts.” But if that's what you're looking for, SAS is for you. Its statistical packages are regarded in many areas of university research as the best or close to it in both of power and ease of use – bearing in mind that ease of use to a statistician is not ease of use to the rest of us.

SAS has always positioned itself as BI software that works with any data warehouse. It may not be as fine-tuned for a particular set of infrastructure software and hardware as IBM, Oracle and Microsoft, but it does provide comparable features and performance where the organization has data marts from multiple vendors. Perhaps the best way of positioning SAS is as the choice where “exceptionally deep analysis” is more important than “exceptionally large/broad amount to analyze.” One key question for SAS: What is its BI differentiation from IBM now that IBM has acquired SPSS, a rival statistics firm? By the way, deeper statistical capabilities may well be a valid answer to this question, as questions have been raised recently about SPSS' ability to match SAS' statistical features.

[Vertica](#) – This is the most visible of the new columnar-database suppliers aimed at the data-warehouse market. While it has not yet proved itself superior to enterprise databases in all BI cases, its technological case for scaling better at least to very large scale (a terabyte) is quite strong. Because of its recent founding, it has not yet proved its chops in SMB BI, and there remain some uncertainties about its future because of cost pressures in IT that have prevented major new database acquisitions.

Keep in mind, however, that columnar databases may also prove better than enterprise relational ones in many areas involving updates, such as enterprise-application databases, or Web-application databases and that their performance advantages may actually increase over the long term. Finally, remember that Vertica was founded by Michael Stonebraker, who has an unparalleled reputation for creating database companies that don't fold (they are typically acquired, so existing customers are well taken care of) and that provide technical advances that are of significant value to customers. One key question for Vertica: How many 500GB installations with a year or more of operation do you have?



## About Focus Research

Each year U.S. businesses spend more than \$75 trillion\* on goods and services. And yet there has not been a definitive source of trustworthy and easily accessible information to support business buyers and decisions makers — especially those in small and midsize businesses. Filling this gap is the mission of Focus Research.

Through its Research Guides, Focus Research empowers buyers to make considered purchases and decisions. Focus does this by providing freely available, actionable advice based on the expertise of other buyers, recognized experts and Focus analysts.

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Our goal is not only to provide independent and high-quality research but also to deliver a new research model that serves all businesses.

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We believe information must be set free. The data, advice and research on Focus are widely distributed and available to everyone.

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We believe in the power of many. Thousands of buyers and experts contribute their expertise to Focus every day. Our job is to take their insights and integrate them into our research.

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We believe in addressing everyday issues facing businesses. Focus Research does not pontificate on high-level trends or promote broad-based research agendas. Rather, Focus Research endeavors to provide specific, actionable recommendations that help businesses make the right decision every time.

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We believe there is no “one-size-fits-all” answer to a business purchasing decision. Focus Research is, therefore, designed to address specific concerns of multiple Buyer Types across multiple industries. As such, users are encouraged to combine our different research deliverables into tailor-made packages that effectively address their unique needs and goals.

\* Source: Visa, Inc. Commercial Consumption Expenditure Index fact sheet.