The Critical Shift to Flexible Business Intelligence

What Every Marketer Wants – And Needs – From Technology

An Intelligent Solutions White Paper by Claudia Imhoff and Raymond Pettit

Synopsis

Business Intelligence, or BI for short, evolved and matured considerably in the last 20 years. Today, for-profit, non-profit, and government enterprises can easily and affordably leverage proven BI architectures and state of the art BI hardware and software solutions. Like never before, enterprises are technologically empowered to reach their goals of integrating, analyzing, and making decisions based on their data.

It's useful to divide the spectrum of BI analysis types into 3 categories: operational, tactical, and strategic. As we survey the spectrum from operational through tactical to strategic, we notice two trends. First, the analysis becomes increasingly complex and ad hoc. That is, it's less repetitive, less predictable, and it requires varying amounts and types of data. Second, both the risks and rewards of the analysis increase. That is, the often time consuming, more strategic queries produce value less frequently but, when they do, the value can be extraordinary.

Given the first trend, it's not surprising that operational BI enjoys the best hardware and software selection, availability, maturity, automation, and support. After all, repetitive, predictable analysis against fixed, homogeneous data is the "low hanging fruit" for computerized automation.

The converse is also true: strategic BI solutions are relatively scarce. But not for long.

Given BI's maturity, the plethora of operational BI solutions, and fierce competition for the operational and tactical BI solution marketplace, innovative vendors are shifting their focus to solutions for the more challenging/rewarding analysis of strategic BI.

I. The need for an architected approach

The task of organizing business intelligence to maximize the benefits for the enterprise *as a whole* is complex and challenging. For a number of reasons, e.g., budgeting, it's easy for BI to fracture along division or department lines, fragment into stove-pipe subsystems, and fail to adequately support strategic BI. It's simply the path of least resistance. The more operational in nature the BI need, the more likely it is to be developed without regard to the other strategic needs of the enterprise.

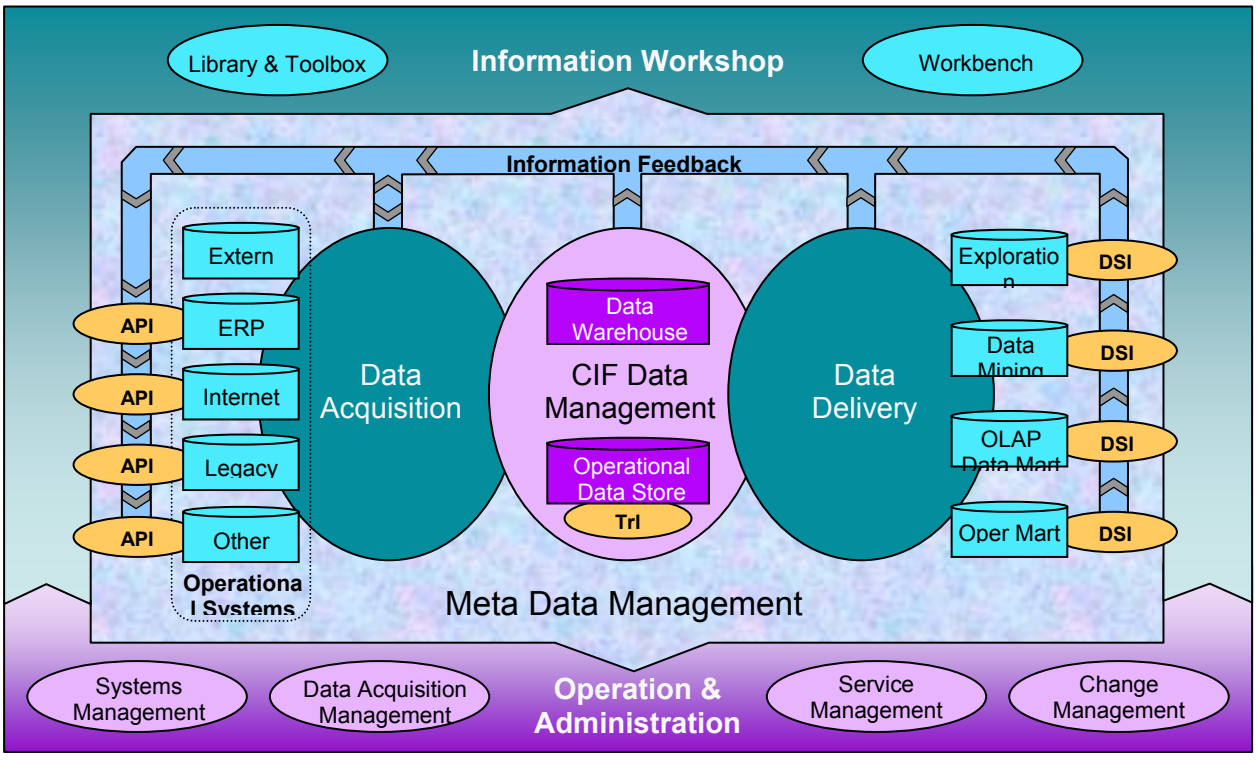
So, the primary fundamental assumption for successful business intelligence at the strategic or enterprise level is that everyone in the enterprise adopts and shares the same architected approach to BI. In short, an architected approach facilitates the quality control and movement of BI data throughout the enterprise. Once management articulates and enforces this requirement, resistance is futile.

Dr. Imhoff, one of the authors, has pioneered and championed one such architecture, the Corporate Information Factory (CIF) for over a decade, so the CIF architecture is used as the architectural context below. That said, both authors acknowledge that the CIF is not the only architected approach.

II. BI user communities of the CIF

The CIF (Figure 1) is an ideal decision support environment for both tactical and strategic analyses. However, it is important to realize that different types of analyses and different types of users need their own milieu. We classify these different users as Farmers, Tourists, Explorers, Miners, and Operators – Each an arbitrary category of Business Community end users. By grouping users with similar characteristics, we can gain a valuable head start in understanding, anticipating, and satisfying their needs.

Figure 1: The Corporate Information Factory



This section describes these five communities that use the CIF starting with the Farmers but having a particular emphasis on Miners and Explorers. These last two are usually fairly small communities in your overall organization but, in many

ways, the most insightful. And they generally have the greatest impact on business direction and strategy. They are also the least understood by IT and have the least amount of technological support for their particular types of analyses.

1. Farmers

   Corporate farmers usually come from the management or business planning groups. Typical farmers in your corporation may be the financial analysts responsible for reporting on revenues and costs. They may be sales and product analysts determining how well a product is selling in some part of the world. They maybe the people who track campaigns or promotions from week to week or they may be the analysts who monitor the budget vs. actual reports.

   Wherever they are in your organization, you can bet that they have a very good handle on the types of reports and analyses that they need. They are a reasonably predictable and therefore are easy to satisfy for data warehouse implementers. When you are building an environment for farmers, you will find they have well-defined and consistent requirements; their queries are clear and concise and are generally short in duration using small amounts of data.

   They look to the Corporate Information Factory (CIF) to supply automation (of reports), consistency (of data), reliability (of the technology), standardization (of calculations and algorithms), and reproducibility (of information). The farmer sees the world in terms of both dimensions such as product, market segment, campaign, sales channel and metrics such as revenue, cost, counts, transactions, etc. Therefore, the farmer's DSS environment consists of multidimensional data marts found within the CIF and their data is usually aggregated or summarized to a fairly high degree. They may need to drill down one or two layers of detail within the data mart they are using but rarely will they need to drill down to the lowest level of detail found in the warehouse.

2. Tourists

   The tourist community generally comes from the executives of our corporations or from very technical, Internet-savvy resources. Executives are among the most critical users of the Corporate Information Factory not just because of their need to get information directly from the CIF – they can get information through other means. They are critical because their satisfaction – or dissatisfaction – can significantly impact the future viability of the Factory.

   Although sometimes difficult to determine, tourists' characteristics can be found within three areas. First they have a broad business perspective

through which they assess the overall health of the company. Many tourists have an intuitive feel for the direction and health of the company. It is the need to prove this intuitive feeling that often makes the tourist so hard to please and so difficult to predict or plan for. Second, they need a consistent interface, one that does not require a lot of typing and yet provides him or her with the ability to search large banks of data. Finally they need a way to help them quickly identify items of interest. They require an interface such as a digital dashboard so they can select topics and areas of interest and then have alerts or alarms sent to them that an event requiring their attention has happened.

The tourist needs the ability to locate and execute a query that satisfies the information need without loading the query tool itself. The meta data architecture needs to provide this capability. The data itself is likely to reside in a multidimensional data mart, and the pertinent data mart needs to be accessible to the Tourist based on the search selection criteria.

3. Operators

Operators are the most common set of users of the Corporate Information Factory. Sometimes operators make special requests for information, but most of the time they need current detailed information on a scheduled basis, so they rely heavily on standardized queries. As information storage has increased via computers, more and more operators have adopted the view that all the information they need is in the system somewhere. If only they could get someone to give them access to it – and now! As a result, many of today's operators must continually struggle to consolidate and evaluate current information from disparate sources. The good news is that an alternative exists for effectively satisfying operators' needs for current, detailed, enterprise-wide, consolidated tactical information – the Operational Data Store.

Operators usually come from the administrative or clerical staff in your organization. Therefore their focus is much more tactical than the previously discussed users. Their requirements are for fast access to current, tactical, and fully integrated data. Operators are easily identified by their administrative, tactical focus on today's problems. They may be individuals functioning in the role of first or second level managers, line or shift supervisors, or even customer service representatives who need current information from the Corporate Information Factory.

Operators rarely require significant amounts of historical data since they address the current state of the business. The time aspect of their analyses is usually limited to today, yesterday, this week or perhaps this month. While they may not need a large amount of historical data, they do need a broad range or scope of data. Tools that facilitate unstructured access, such as those in the OLAP family, are generally not necessary for

operators because the operators have interface or presentation requirements that are relatively simple. Many need only on-line access to the few lines on the “green bar” reports of interest to them each day. Given the predictable pattern of usage demonstrated by most operators, interfaces that facilitate structured access and invoke a series of standard queries using only a few keystrokes are very effective.

4. Explorers

Perhaps the most misunderstood member of the Corporate Information Factory community is the person that is known as the "Explorer". The Explorer is the original corporate "out of the box" thinker. The Explorer is an individual who does not look at the life and commerce of the corporation in the standard ways. Instead the Explorer looks at corporate business differently than any one else. In some cases these insights are very valuable; in other cases these insights are merely a mirage.

Business Requirements

Due to unusual nature of Explorers, their business requirements are quite different and therefore many times are difficult to understand and satisfy.

a. Random Queries

The queries and the analysis submitted by the explorer are of a very random nature. One minute he wants to look at this - the next minute he wants to look at that. The explorer operates on intuition and observation. He tries to find relationships between obscure pieces of data and events. The explorer is often wrong in the conclusions that he or she draws. But on occasion the explorer is correct. And on those occasions that he or she is right, the rewards of being correct can have tremendous payback for the corporation, easily paying for the many misses made.

Additionally, the explorer often finds nothing as a result of the analysis done. Occasionally huge nuggets overlooked by everyone preceding the explorer are uncovered.

b. Unconventional Procedures

The procedures for analysis and exploration used by the explorer are not standard for the corporation. The explorer operates in a free form, unstructured world. He will go six days or weeks with no queries, then will submit six queries in a day, when the fancy strikes him. The explorer operates in a truly heuristic manner.

Explorer queries tend to be oversized. There are a variety of reasons why she submits large queries. The explorer operates on

detail. To find the subtle patterns desired often requires that the explorer look at minute pieces of data. The second reason for the girth of the queries submitted by these CIF users is that they require significant history. The patterns sought are of the variety that they occur infrequently. Therefore, the Explorer needs robust amounts of historical information. And finally a third reason for the size of the explorer queries is that he needs to look at the data being analyzed in a manner unknown to other users. The data used by the explorer needs to be twisted around to suit his mood. In short the queries submitted by the explorer are huge because the characteristics of the query are - history x detail x ten way joins.

c. Pattern and Relationship Determination

Explorers look for patterns and relationships. They care about the conditions that cause the occurrence of a notable event. Once the conditions surrounding a notable event are established, the explorer can seek predictability. Once predictability is determined, it is relatively easy to then create an environment where there is business advantage.

Activities

Explorers create hypotheses out of their analyses. They then pass these hypotheses to the data miner for proof or disproof and an analysis of the strength of the hypothesis. Often the explorer will create a repeating query of his or her findings and then pass that query on to the farmer for routine creation.

The explorer uses many different types of technology in trying to find an environment that works for them. These technologies include specialized exploration databases, OLAP, data mining and visualization tools.

Architectural Requirements

The explorer often needs a world of his own in which to submit his varying queries. Today, there are highly useful and advanced technologies available to support the explorer. We can now create an exploration warehouse just for their usage. The exploration warehouse takes advantage of specialized technologies to create an environment that permits any and all queries and yet still yields a response time that is reasonable for such large queries. The explorer can change his or her mind as often as needed and not be penalized.

The exploration warehouse is a type of specialized data mart found in the Corporate Information Factory. It consists of data drawn from the data warehouse and placed into an environment that supports the unique data requirements of the explorer. Then the explorer uses a variety of tools that

access these technologies to launch their queries, receive their results, study their results, and then launch yet another query.

The technology that appears to be most suitable for these unique and invaluable community members is the data warehouse appliance such as that offered by Netezza. Because their queries are “ad hoc” in nature, use large amounts of data, and are very unpredictable, data warehouse appliance technology offers the best options for this fluid kind of analyses. Rarely will explorers use a pre-defined database design.

Examples

The explorer is becoming a significant user of the Corporate Information Factory. Their queries tend to be long, random, and may result in nothing of interest. However, occasionally, the explorer obtains results that are of incredible value to the corporation. Most corporations have only a few true explorers but their value to the company is immeasurable. Examples of these “out of the box” thinkers are marketing analysts, actuaries and strategic analysts

5. Miners

The implementation of the Corporate Information Factory has unleashed a "gold rush" of sorts. A new group of CIF users, data miners, are frantically equipping themselves with tools to find rare and valuable nuggets of information from mountains and mountains of data found in data warehouses and data mining data marts. Once settled with appropriate tools, miners are patient in their search, determined to find the few insights that can make their organizations rich. They survey those mountains, analyzing the data to make sure they get meaningful correlations. Miners are thorough. If the data looks odd for some reason, they check it out, since data outliers might indeed be just what they're looking for (finding an instance of fraud, for example).

Business Requirements

Data miners have fairly straightforward requirements and are usually quite capable of expressing their needs. These include the following:

a. Large amounts of detailed, historical data

Data miners scan large amounts of detailed data looking for the confirmation of a hypothesis or for suspected patterns of activities (e.g., buying habits of valued customers, fraudulent claims). These massive amounts of data must be of high quality and/or consistent. The data must be stored in technologies that can handle these large data sets while yielding reasonable response times.

Generally, the data is preconditioned to aid in a particular study. For example, they may select a statistical subset of data to study, or they may choose a particular population of customers, or a particular market segment, etc. The data will most likely be stored in an environment that is not a multidimensional format.

b. Specialized data mining tools

The advent of tools with "intelligent agents" has been a great boon to the data miners. These tools have greatly increased the miner's productivity and ability to sift through the tons of data available. They offer the miner a variety of analytical devices such as decision trees, neural networks, memory-based reasoning, cluster detection, genetic algorithms, statistical analyses, etc.

c. Known queries

Data miners often have a very good idea of what they expect before they execute a query. They set up queries based on this preconceived notion. For example, they may set up a query to determine the frequency of submission of claims with the likelihood of fraudulent claims. They may set up a query to determine the likelihood of two products being purchased together (market basket analysis) or one to determine the pattern of equipment failures (mean time to failure) and so on.

d. Have a predictable pattern of usage

The best news for the CIF architect developing an environment for data miners is that they generally have a very predictable pattern of usage. Indeed, they may know more about how they use the data than any other member of the CIF Community. They may simply tell the CIF administrator to simply supply them with an extract and they will load it into their specialized data mart for their usage.

Activities

Data miners approach decision-making with basically six different activities in mind.[1] They are:

i. Classification – the assignment of records to one of a predefined set of classes

ii. Estimation – determine values for an unknown continuous variable

[1] From *Data Mining Techniques* by Michael Berry and Gordon Linoff, John Wiley & Sons, 1997 and *Mastering Data Mining* by Michael Berry and Gordon Linoff, John Wiley & Sons, 2002.

iii. Prediction – classify records according to some predicted future behavior or estimated future value

iv. Affinity grouping – determination of which things go together

v. Clustering – segmentation of a heterogeneous population of records into a number of more homogeneous subgroups

vi. Description – portrayal of a complex database to increase understanding of the underlying data

Data miners use very specialized technologies and functionalities such as statistical languages, core data mining, querying, and data visualization capabilities.

Architectural Requirements

Data miners are heavy users of the data warehouse or of a specialized data mining data mart. In addition, they can be users of an exploration warehouse, if one exists. The database design scheme that best serves the needs of miners is a denormalized relational one in the data warehouse or the data mining data mart. Aggregated or summarized data usually does the miner no good, since he or she is after detailed data to support trends or patterns. The data mining data mart, usually a fairly flat format containing preconditioned data for analysis, is designed specifically for use by miners.

Data miners require massive amounts of historical data. Therefore the CIF architect would be wise to look to data warehouse appliance technology and possibly near-line storage mechanisms to help reduce the costs of maintaining these massive sets of data while still making them available when the Miner needs it.

Examples

Mining is not easy. There are pitfalls in determining what activities need to be done, and which techniques and tools need to be utilized. And lots of false starts, dead end paths, and erroneous or meaningless findings can be encountered. Data miners need to have great resilience and patience. They also have very specialized skills and mathematical or statistical backgrounds. Data miners include statisticians, logistics specialists, marketers, and actuaries

III. Blurring the lines

By recognizing and understanding the various communities using the Corporate Information Factory, you can implement better architectures and applications to meet their specific needs. Each community has distinct characteristics and

requirements for their technical environment. The Corporate Information Factory presents a flexible environment capable of supporting all five sets of users.

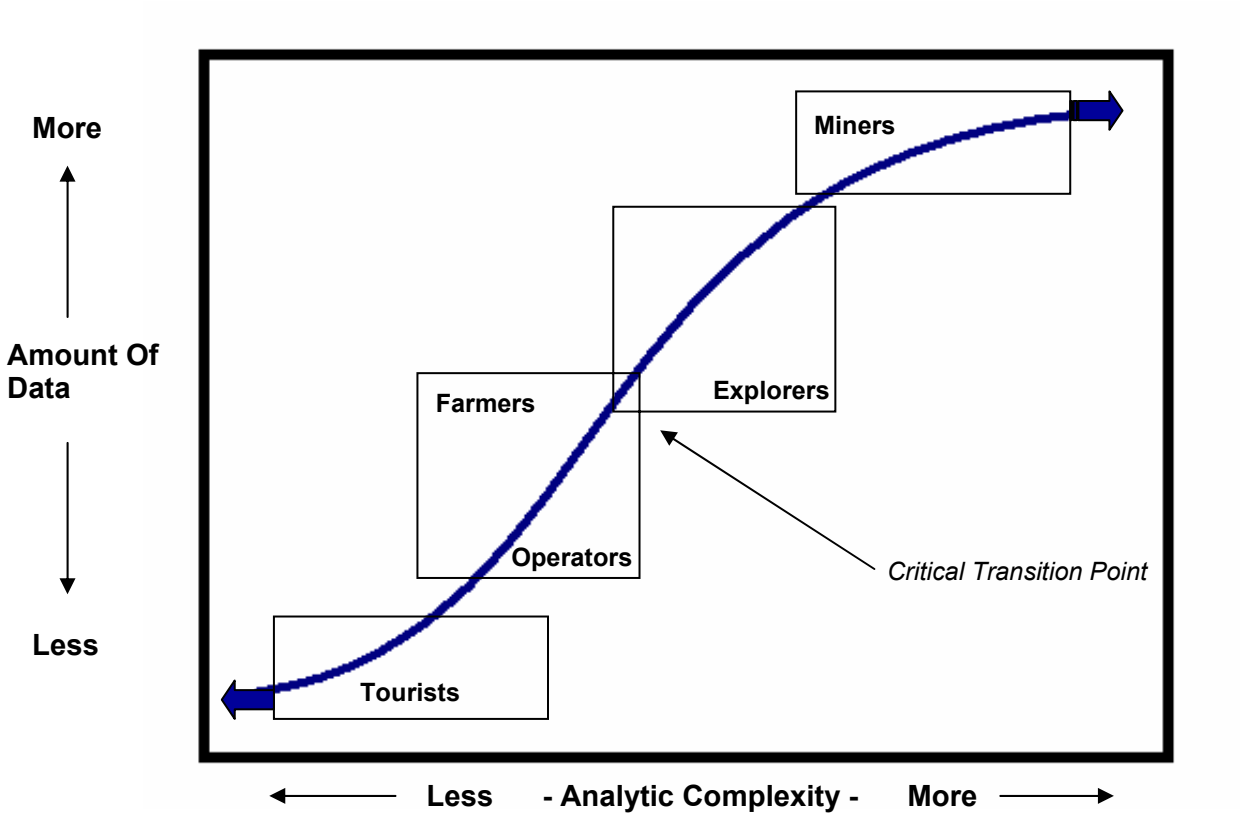
It is important to note that our business users may change their personalities, jobs, and analytical prowess and, therefore may demonstrate characteristics of more than one community member. For example, a marketer may be a farmer in the morning, a miner or explorer after lunch and a tourist at the end of the day. That means he or she needs multiple tools and environments in which to work.

We need to be acutely aware of all of these communities so that we can set up a flexible and appropriate environment for these distinct users. We must also understand the varying degrees of usefulness each community type brings to the enterprise. In the past we have focused heavily on the farmers and operators because they were easy to satisfy, the technology was readily available to support them, and their environments were simple to build and understand. Since those early days, the BI communities have expanded to include a broader and more complex audience – the explorers and miners. These relative new comers are far more sophisticated in their requirements. Their insights and value to the enterprise has been recognized and appreciated, and we now have superior technology to support their forms of analyses. This improvement in technology has yielded not only more difficult and complex analyses but has given the explorer and miner much more freedom in their thinking and diagnostic abilities.

As we better understand the needs, objectives, and idiosyncrasies of the analytic user community, a critical shift manifests itself in ***flexible BI community membership.*** As data gathering, collection, and access become more fluid and amenable to analysis, community members may move seamlessly in and out of their community. New requirements - or optimized, efficient, and effective ways to address old problems - will increasingly be part of integrated business processes and technology support tools (e.g., the ability to quickly move and integrate data – and make it accessible). Figure 2 depicts the BI user curve that we see in forward thinking enterprises today.

If we consider two factors, amount of data and analytic complexity, we can see a general movement up the ladder of BI use – that is, people wanting to do more exploring (looking for intelligence and insight generation – the next big idea, etc.) versus the ever increasing amounts of data needed to provide this insight. With data warehouse appliances, such as Netezza, the ability to move up is technologically solved. As we can see, for competitive and business reasons, it is essential to get the right type and amount of data together quickly for explorer and miner analyses, so that improved insight and reporting can result.

Figure 2 The BI user curve



For marketing and advertising, in particular, we see an emerging mini-community of users mostly focused on exploration and discovery. That's why current BI tools make little or no sense to them. However, with an appliance solution and access to a steady stream of the data marketers' needs (see list below), access to appropriate data is achieved, datasets are quickly built, and analytical applications easily created using statistical tools. The results can then be fed back into the mix for tourists, operators, or miners. Thus, the interactive and flexible qualities that marketers require are not only possible but much enhanced. And data mining, exploration, and statistical software will become the preferred BI tools of marketers.

IV. A closer look at BI for marketing

Achieving a strategic alignment of marketing processes and IT systems continues to elude many companies, particularly around the issues of gaining competitive advantage, generating greater return-on-investment (ROI), and improving success rates of marketing activities.[2] Given the extraordinary importance of customer research and marketing measurement in binding

[2] Computer Sciences Corporation & Financial Executives International (2004). Technology Issues for Financial Executives. Financial Executives International: Florham Park, NJ.

together and guiding a strategic and competitive business alignment, it is odd that this 'analytic' perspective is so little discussed and so neglected by many organizations. Yet, it is clear that using data for competitive advantage is a key objective companies would like to pursue. Where has the breakdown occurred?

Technology-Marketing Misalignment

The development of CRM software systems, with their innovative focus on the customer, clearly was a step in the right direction. Who wouldn't want to make better use of an increasing flow of customer data to drive improved marketing actions and increased revenue? The reality of the situation, however, unfolded rather quickly:

- CRM software was seen as a 'silver bullet' solution that would change the way companies were organized and run to focus on the customer.

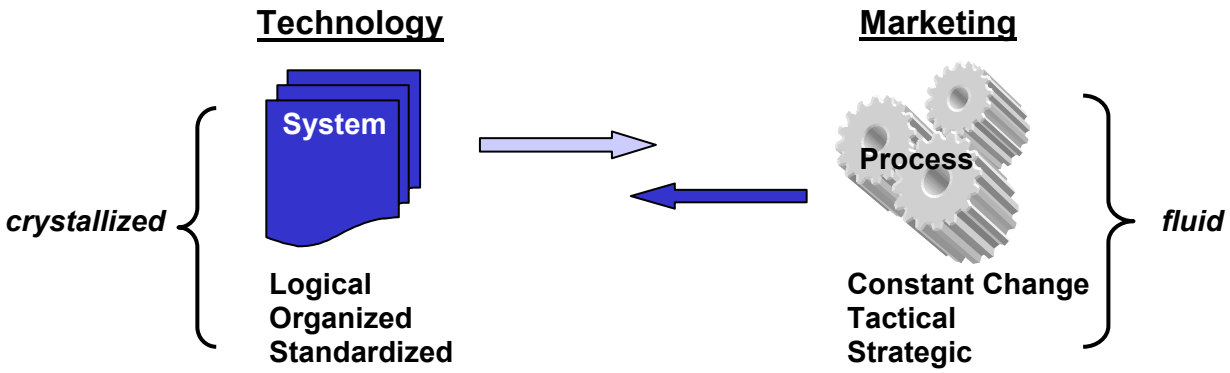
- CRM software systems, when deployed, instead resulted in massive data overload that companies were not prepared to handle. In the worst cases, no attention was paid to helping business users take advantage of the systems, and the software was simply put on the shelf.

- The vaunted 'closed loop' promise really became a closed loop breakdown in software-only CRM implementations.

One would suspect that such massive failures would draw executive and strategic scrutiny. Yet, according to a 2004 CSC/FEI study, fully 60% of companies surveyed reported no strategic (business-aligned) IT plan.[3] Technology-Marketing misalignment is real – and it saps vital potential that companies desperately need to exploit to be successful. This is not some sort of mystery, but grows from a fundamental difference in perspective (see **Figure 3**).

[3] Computer Sciences Corporation & Financial Executives International (2004). Technology Issues for Financial Executives. Financial Executives International: Florham Park, NJ.

Figure 3: Technology – Marketing Misalignment



The technology perspective is a **systems** perspective. It is logical, organizing, and seeks to standardize. It is characterized as a 'crystallized system'. The questions the IT professional tends to ask are:

- What storage, management, and access systems are most efficient and effective?
- What tools, programming, and protocols need to be in place to keep the system running (nearly) all the time?
- What analytic or viewing tools allow the best 'cut' at the data in my system without disrupting everything or slowing the system to a halt?
- Marketing professionals (and sales and client service, for that matter) have a very different view of the world. Marketers see their job as a **process**. From their perspective, marketing is constantly changing and evolving – driven by strategies and tactics to best capture the attention, loyalty, and dollars of the customer. Marketing can be characterized as a 'fluid process'. The questions marketers want to answer are:
- What is the right balance of marketing spending?
- What mix of tactics and communication channels deliver the highest return?
- Why does my customer choose my competitor's product over mine?

Unfortunately, IT's attempts to assist marketers, through the introduction of business intelligence tools, has resulted in some serious problems. First, business user requirements have not translated well (or at all) for many IT departments. Because of the system/process dichotomy, it has been difficult for the parties to understand each other. Second, business intelligence tools are essentially online analytical processing (OLAP) modules that work very well from a technology perspective, but do not allow

access to the questions marketers want to answer. For example, OLAP cannot help marketers distinguish or understand the 'who, what, and why' of their customers beyond simple dimensional representations of historical data. Finally, there is an essential disconnection between data and information that is easy to store and manipulate in a database or warehouse system and data and information that is necessary to support a strategic marketing process that addresses marketer's continually changing requirement to understand and meet customers' needs.

On top of all this, the issues of competitive advantage and improved business success rates just won't go away: CEOs are under intense scrutiny; CMOs are being held to new levels of accountability; CTOs have had to drastically reign in spending; and CFO's are looking for better ROI rates. Increasingly, executive leaders and managers in nearly all industries are being advised that 'customer-centric' is the way to run a successful business. The question is: how do we do that?

A Broader View of BI Needed for Marketing

The development of BI has been predominantly introduced from an IT perspective. Many of the users on the marketing side, however, are divorced from the use of technology. Instead they are involved in fairly traditional processes (that have evolved over time) to develop advertising and marketing campaigns, address customer research questions (usually through the use of an outside research agency), and measure or track customer attitude to such things as brand, advertising, and promotions. Their use of what we might classify as BI 'tools' is not limited to the use of technology supported software, is widely dispersed, and usually is not integrated into the corporate IT infrastructure. Thus we might characterize a marketing BI community (of Farmers, Explorers, Miners, Tourists, and Operators) as a 'mini'- community operating in relative isolation to the rest of the organization – yet, highly focused on the customer.

While it might seem chaotic on the surface, the marketing function uses analysis extensively and, as such, aligns very well within the Corporate Information Factory's BI Community framework:

- Farmers: a sizeable group that is focused mostly on monitoring and keeping track of the dynamic activities of marketing. This includes: tracking (campaigns, advertising, brand and customer loyalty,) and receiving in-person (or more frequently web-based) reports from 'explorers', who can range from internal researchers to outside market research agencies.

- Explorers: in marketing, due to the nature of its filtering and creative processes, exploration and discovery is a major part of BI. And the community is extended from internal practitioners to outside consultants, agencies, and specialists. Many of the explorer's roles have evolved over the years into specific, traditional, non-technology based activities, such as: focus group testing of new product introductions, surveys of customer attitudes, and conjoint (preference) testing.

- Miners: as marketing databases have grown, and the introduction of ecommerce has taken hold, miners perform a particularly specialized role in marketing. Their link in the process is to be back office number crunchers: segmenting, classifying, and using predictive modeling to assist marketer's efforts. They are perhaps the closest to the BI stream, often having programming skills. They are also, however, the most out of touch with marketer's daily concerns. Two primary functions they carry are to answer or address marketing explorer's questions and to provide support to direct marketer's targeting and/or personalization efforts.

- Operators: these are the brand and marketing managers, who attempt to track marketing allocations, pay back on campaigns, and success rates of advertising. Their analysis is very current, and if they have a fault it is in not using technology successfully to track, trend, and evaluate short, medium, and long-term results. This aspect of marketing is one of the least developed from a technology and BI perspective.

- Tourists: are rare in marketing, as most analysis filters down to the marketing farmers, who then condense reports to the chief executive of marketing (paper and web). A very slow evolution of marketing intelligence dashboards to the chief executive's desk is occurring. But, again, as with most of marketing, this is analysis and information divorced from the technology infrastructure, created and generating within the marketing function and then used to populate a web-based portal interface or more likely to generate a paper-based report for the executive desktop (or filing cabinet).

Since marketing is such a dynamic process, there is continual interaction between the marketing BI community members and outside support specialists. What is occurring on a daily, weekly, monthly, and yearly basis is a combination of long-term strategic planning and short-term tactical activities. Where marketing automation has taken hold has been in the relatively small direct marketing function, where customer databases are 'scored' using the skills of miners (statisticians) and campaigns are tracked and evaluated rigorously. But, most of marketing activity is still a complex, human network of specialized interactions, both internal and external to the company, where highly valuable data 'of the moment' resides in innumerable pockets around the organization, often disconnected and sometimes lost in the rush to a new campaign.

Can we expect a critical shift in *marketing* BI? Given that marketing, in particular, has been most divorced from and resistant to technology innovations, it is still evident that they are operating within a very flexible and interactive BI community. The problem is that it is quite inefficient. Legacy systems, and inadequate technology infrastructures, are not addressing a basic requirement for marketing: **flexible and efficient access to large amounts of disperse data and information**. It is conceivable that, given the opportunity to rapidly and efficiently access and manipulate diverse relevant data, the marketing function could become measurably more efficient and effective in what they do.

V. Supporting a Critical Shift in Marketing BI

Two elements are required to be in place for an effective critical shift in BI to occur: (1). Marketers need to build an integrated, strategic analytic blueprint, and (2). New technologies must be aligned with this blueprint to afford rapid access, manipulation, and delivery of data, analysis, and reports both inside and outside the company. Once again, the Corporate Information Factory is indispensable by providing the 'ecosystem' for marketing and advertising to flourish.

A strategic **analytic** blueprint, or roadmap, overlaid on the CIF architecture, is essential to make sense of the myriad of marketing activities that occur on a regular basis in the organization. This includes not just processes, but the identification of the interactions and analytic touch points that emerge in marketing activities. A well-fashioned blueprint will provide guidance to the proper renovation of marketing, as well as direct the focus for necessary training, cross-community planning, and key relationships that need to be addressed.

With this framework in place, the technology side of the house can then begin to see what marketers want and what tools they need to get their job done. The blueprint becomes a strategic planning document that bridges the gap between technology and marketing, allowing them to finally come together on a common playing field. The time will be well spent, as this will break the cycle of both sides being assaulted with (and buying) 'silver bullet' solutions that have no connection to each other. Thus, IT won't be force-fitting inappropriate BI tools that don't address marketer's needs and marketing will refrain from continuing the practice of proliferating marketing data from numerous sources that is unconnected to anything else.

To better understand the potential and opportunity that is just over the horizon, imagine that marketers could have at their fingertips a stream of relevant data at all times. This data would include the primary analytic building blocks of marketing:

- Transactional and customer records data
- Market research and competitive intelligence data
- Customer feedback data (from customer service, and as a result of inquiries done directly by the organization to the customer at all contact points)
- Sales data
- Consumer purchase data, such as Nielsen scanning data

- Libraries of past campaign evaluations
- Continuous tracking of brand, loyalty, and satisfaction
- Financial background data, such as Experian or TransUnion
- Web-site behavior traces (clickstream data)
- Data from all customer contact channels – cross media

Marketers see that horizon. New initiatives by the Advertising Research Foundation[7] have identified three primary issues that marketing is facing:

- Accountability: return on marketing investment (ROMI) - what are the bottom line results we get from advertising and marketing efforts?
- Cross media: Integrated marketing optimization (IMO) - how can we best align strategy, tactics, delivery, and measurement to optimize the marketing effort?
- Optimization: Marketing Investment Management (MIM) - how can we effectively guide, measure, predict, track, and evaluate all advertising and marketing efforts?

What this will require from marketers is a new way of doing business. A disruptive technology solution that can jumpstart the challenge of efficient data and information integration and access will raise the bar on what marketers can do. Imagine that marketers could access all the primary analytic building blocks they need to improve accountability, address integration, and achieve optimization. How would this change the way they do things?

- The marketing function would be facile and quick in its ability to rapidly adjust advertising and marketing campaigns. Adjustments could be done in hours and days, instead of weeks or months.
- Finely honed analytic tools for segmenting and classifying customers according to their lifetime value to the company would be routinely deployed. Personalization at the micro segmentation level would be achievable. Software with broad statistical capabilities, such as SPSS, would become the BI tool of choice.
- Permission based marketing would allow marketers to meet customers at precisely the contact points they desire. Adjustments and changes could be made on the fly.
- Advertisers would be able to achieve a rapid, holistic picture of customers to better design creative and advertisements that resonate with them, as well as adjust and change designs via rapidly deployed field testing and analysis of feedback

[7] The ARF's GROW Initiative, Cross Media Platform Studies, and Emotion in Advertising studies are currently focused on these current industry concerns and issues.

- Data mining would improve as more complete and high quality collections of data could be accessed quickly for analysis and fed back to the data stream for explorers, operators, and tourists to use

- Reporting of key marketing metrics, such as brand experience points, gross rating points, and customer satisfaction scores would be accessible and available at a moment's notice. Executive marketing dashboards would now be populated by relevant metrics in a timely fashion

- The BI community in marketing would interact more efficiently by using the common data stream flowing through the organization. Marketers would be able to 'dip into' the data stream at any point in the marketing process to derive insight and intelligence that is needed to maintain momentum.

The better marketing and technology can work together, the better the various marketing BI communities can align for more efficient and effective results. What is clear is that legacy systems and current approaches are not working. A disruptive technology, in the context of the CIF, that could bring many forms of data together quickly would both streamline and enhance the many activities of the marketing process.

VI. Summary

It is obvious that corporations can generate huge benefits from their BI environments but to do so, these environments have to be expanded. They must include advanced technologies to support the critical and unpredictable behaviors of two important community members – the explorers and miners. The good news is that the technology exists today. It not only supports these members completely but also integrates into and enhances the overall BI architecture. Data warehouse appliance technologies such as Netezza's enable IT to finally deliver on the promises of a fully encompassing BI environment that generates enormous benefits to the enterprise.

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