Blending Reporting and Analytics:
Putting the Decision Maker First

An Industry White Paper

Introduction

If business intelligence (BI) is about enabling corporate decision makers to navigate the waters of today's complex business environments, the focus of BI solutions should be more about the user and less about the technology.

The BI industry has spent decades perfecting the process of data collection, storage, cleansing and distribution – with good reason considering the mounds of data amassed in corporate data stores today. Taking BI to the next level means not only transforming data into information, but also getting it into the right hands, at the right time and in the correct format to be used for timely decision- making. BI is not about exclusivity, it's about every player in the corporate network having the information they need and the tools necessary to turn that information into sound decision-making.

The BI industry has come to a crossroads, and it is time to re-engage with the business community to better understand each user and their role in the enterprise.

> *The selection of BI tools and applications must be based on a segmentation of the BI user community. Different user segments will require different modes of delivery of BI, ranging from basic static reporting to sophisticated analytic applications. Deploying the proper mix of tools and applications is critical to achieving optimal benefits from BI.*
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> ***The Cornerstones of Business Intelligence Excellence; Gartner April 2004***

The Water Under the BI Bridge

Dating back to the days of mainframes, minicomputers and COBOL reporting, business decision makers relied heavily on the information technology (IT) staff to help them understand day to day business workings via the creation and delivery of standard and custom reports. As technology evolved, more data became available in transactional systems and in turn the need to access and understand this information grew. This

Figure 1
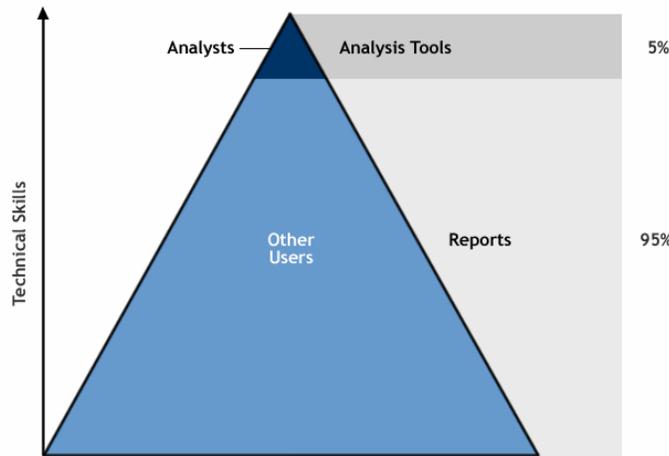
marked the beginning of the never ending reporting backlog; the IT team created standard, pre-defined reports by pulling data from the transactional systems, but the standard reports rarely provided the necessary information. Business users constantly demanded more data and additional one-off custom reports. The resulting backlog meant business users often had to wait days or even weeks for reports. Often these custom reports did not provide the appropriate information but would prompt another series of requests for additional custom reports – starting a vicious cycle, placing IT in a difficult position, to say the least. With the advent of the PC and a myriad of BI tools designed to give business users the technology to create their own reports, IT's reporting burden was not alleviated.

Under this information delivery model (see Figure 1), the vast majority of business users were getting information from standard reports generated via a reporting tool. Only about 5-10% of the very technically skilled users ever worked with an analysis tool - the vast majority simply had to rely on predefined reports.

As personal computer technology became more widely available to the business community, information usage patterns changed triggering a transformation in BI thinking. Executives, managers and business users throughout the organization faced a need to make decisions more quickly to survive. Thus, individual users, and even whole departments, started to take control of their own data requirements by using spreadsheets as a central repository for information. This caused the BI model to evolve (see Figure 2) in a manner to incorporate reports, spreadsheets and analysis tools to understand the new situation. Casual users at the bottom, 65%, really only needed to

see information in a report, while the business users in the middle (30% of total users), had a bit more technical skill and needed their information in a form that could be easily manipulated – spreadsheets. Still, only about 5% of users possessed the highly technical competency to fully utilize this information format, thus pointing to the need for an analysis tool.

Figure 2
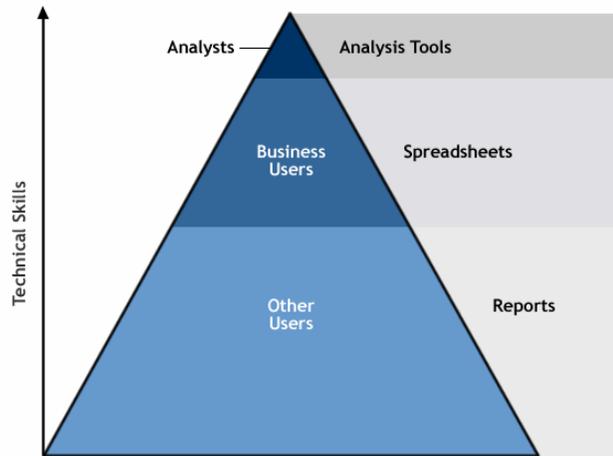
Even today, as our massive amount of information continues to grow, most data is still being analyzed in spreadsheets.

The majority of business users today are still unhappy with the information they receive to support their decision-making. Most reports are a good starting point for business users' understanding, but when it comes to comprehending what the data actually means – the trends, the root causes, etc., decision makers continue to be frustrated with the information and tools they have available. As a result, business users continue to ask for one-off reports aggravating the original problem of IT's reporting backlog

This ineffective cycle of information delivery and consumption forces us to rethink the BI model in order to better understand users' underlying frustrations and needs. The current model (see Figure 2) is aligned by technical skill, not by where the decision makers live in the organization, what they need to get their job done, or how to make them successful.

It's About the User

There is a disconnect in the current BI delivery model between decision support tools and the decision-making process. On the IT side, we continue to make incredible progress on data storage, integration, access and delivery. However, line of business users - the business decision maker, isn't interested in the success in this area; their primary concern is answering such questions as:
— Which customers are the most profitable? Why is that? How do we raise the profitability of those customers who fall short?

— Where are manufacturing and inventory bottlenecks? How can efficiencies be created in these areas?
— What is driving support costs? How can these costs be decreased?
— Which sales channels perform the best with new products? Which are more profitable? What is it about their product mix or discounts that make them so?
— And so on...

Before providing a business user with an effective decision support tool, it's necessary to step away from the data management zone and enter the world of the corporate decision maker:

— who are they
— what do they do
— why do they do it
— how are they measured
— how do they make decisions

Whether it's the CEO, a regional sales director, a promotional manager or a manufacturing line manager, business people are making decisions regardless of what tools they do or do not have and whether the information they receive is useful or not.

A general manager of a large manufacturing company said:

"Today I have twelve production facilities. At the end of the month I am going to close two of them resulting in layoffs. Which two facilities will close I am not sure of right now, but I will make a decision in a week – regardless of what data I have at the time".

In the process of getting better acquainted with the business user it's imperative to understand the fundamentals of the decision-making process; the standard types of decisions made and how analysis happens in different areas within the organization.

Tactical vs. Strategic Decision Making

Depending on the size of the organization, hundreds or even thousands of tactical decisions are made daily regarding the operations of the business. These decisions are made by both management and individual contributors. Tactical decisions occur frequently and are typically in a specific departmental area, while the data needed to support these decisions is usually specific to that department.
Examples of Tactical Decisions:

— Is there enough inventory on hand to fulfill this order? If so, what downstream impact should we be prepared for with other orders?
— What product or service offerings will best drive our revenue goals this quarter?
— What is the right offer in terms of product mix, cost and pricing to preserve our gross margin requirements while we grow?
— Where should we be focusing our sales people at this time? Do I need to split territories?

Strategic decisions, on the other hand, are most often made at the executive and upper management levels within the organization. Because strategic decisions can impact many divisions and functional areas within the business, they occur less frequently than day to day tactical decisions. Strategic decision support usually means providing consolidated and cross functional data. The analysis of data necessary for strategic decision-making often leads to additional questions, which ultimately means additional requests for data.

Examples of Strategic Decisions:

— Should we enter the market with this new product line?
— What distribution channels should we pursue in global markets?
— Do we put market share or profit margin at the top of the priority list for the next two years?
— Does that mean additional marketing budget allocations or investing in manufacturing efficiencies or new product development?

Knowing whether the user at hand typically makes tactical decisions, strategic decisions or both, will help frame the decision support solution you deliver.

Data Usage and Analysis

In any given organization there are many different decision makers using a variety of different methods to review and analyze data. It's critical to understand exactly how the target user(s) interact with the information prior to determining a delivery mechanism. Below are samples of data usage and analysis ranging from simple to more complex.

Simple forms of data usage include:

— **Reading** – simply looking at a pre-defined report for specific information and basic facts pertaining to the subject. Reporting servers are designed to facilitate this need. Example: The inventory report is retrieved and the user quickly scans through certain products looking for quantity on hand.

— **Monitoring** – "reading" but in a monitoring manner – meaning information is looked at everyday or every 5 minutes, etc. Real-time reporting and alerts are great technology for this need. Example: The executive opens his daily business dashboard to understand the numbers and how the quarter is progressing.

As analysis grows more complex, simply delivering the information in a predefined report grows inadequate:

— **Trend Analysis** – putting new information in context with historical data to understand growth or change in a time series. This is needed to better understand where the numbers are going and to determine if this is a trend or an exception. Example: A product manager sees a significant increase in Q4 sales. The manager now wants to see a multi-year trend line to better understand if this is a trend, a seasonal variation or an exception. The manager can then decide if further action is required.

— **Root Cause Analysis** – ad hoc analysis to determine what factors are driving a specific number. Decision making responsibility means deciding when things need to be changed and specifically what to change. This requires knowledge of more than just the high level issues; understanding of the underlying driving factors is critical. Example: a product line manager sees a decreasing gross margin on his product line. Is the decrease being driven by a channel mix change, an increase in material costs, higher scrap rates or price pressure from competition?

— **Statistical Analysis** – correlation, regression, affinity, data mining, etc. These analysis techniques are used to more deeply understand information and uncover hidden insights in historical data. Performing this type of analysis

requires skilled training and thus, the tools are not widely used. However, the insights revealed can be extremely valuable to decision-makers. Examples include: affinity or market basket analysis to better understand consumer behavior.

— **Predictive Analysis** – extrapolation, risk analysis, decision modeling, what-if scenarios, etc. This complex analysis is performed in order to drive desired outcomes in the future. Examples include: price modeling, derivative risk exposure, forecasting and sales pipeline analysis.

Taking the time to understand what decisions will be made and how your users will interact with and analyze the information will help you determine the most appropriate delivery method.

The BI Audience

In today's complex economic environment, issues such as increasing efficiencies, decreasing costs and retaining customers all drive the importance of making more decisions, more often. Ever growing business complexity is compounded by the mountains of data being produced. This means more users in every level of the organization are responsible for analyzing more data than ever before, and the value of business intelligence is applicable from upper level management to the front line employee. However, executives, managers/knowledge workers and production/clerical staff all have very unique metrics and information needs.

Executives
Increasingly more users at the executive level need not only to receive summary information, but more importantly they need to understand the factors behind the data. Because of this need, the speed at which these systems can reveal insights must accelerate. Executive decision-makers are almost always on the leading edge of strategic decisions that have far reaching impact on the rest of the organization, and depending on the nature of the organization, the executive may also be involved to some degree in tactical decisions. Their work style is less about focus and more about monitoring a wide variety of factors that require constantly shifting gears to deal with the next problem or opportunity. Executive data usage and analysis needs are relatively simple and at the high-level end of the spectrum; data monitoring with the occasional need to quickly look deeper using tools like time series analysis or guided root cause analysis. Executives need a BI solution that is easy to use, non-intrusive and customized to give them an "at a glance" overview of the top level business key performance indicators (KPIs). When more detailed analysis is necessary, a structured guide to help them research is highly useful. They do not have the time or the patience to learn to work with complex technology or to dig through mounds of data.

Sample Scenario

A marketing executive monitors a specific set of KPIs on a daily and weekly basis. This allows them to keep tabs on quarterly ship projections, market share by product and the other metrics their functional area is responsible for driving. If a metric is off plan, the executive wants to be able to quickly look at contributing factors to better understand where in the organization they need to follow up further.

Managers and Knowledge Workers

Users in these roles have responsibility for meeting certain business objectives within a specific timeframe. In general, it is the managers and knowledge workers who invest the most time in decision-making as they typically make much more of the daily tactical decisions for the organization. Business managers must make decisions about what course to take, what is working and what is not, and where to shift the focus of their team. Knowledge workers analyze data for their own purposes, often to drive focus and trade-off decisions regarding spending allocations, projects with outside contractors/agencies, etc. These two groups are most often responsible for tactical decisions and are held accountable for the successful execution of the corporate strategy. Their data usage and analysis modes cover the gamut from simple to complex, and from reading and monitoring to advanced analysis. These users not only need to see critical information in an easy-to-digest format, but they also must have the ability to interrogate information and change the data requests in order to adapt to dynamic business situations and get answers to questions as conditions evolve. This group of tactical decision-makers rarely has the luxury of high level analyst support that is common to executives. Subsequently, although they have more focused needs, managers and knowledge workers typically have very little support in helping to digest the information and extract key insights on a timely basis.

Sample Scenario

A category manager in a retail chain is responsible for the sales, profit and inventory costs of his product. He is under constant pressure to fight for the right shelf/aisle space and to maximize the return on that floor space or he'll soon loose it to more profitable items. He must understand the positioning, pricing, bundling and promotional effects – and optimize those for a variety of stores, all with varying demographics. He needs to start by looking at high-level reports that give an overview of initiatives. Then he must quickly dig into specific areas to understand the cause-and-effect behaviors that will ultimately determine success or failure.

Production and Clerical Staff

The role of production and clerical workers is execution. Similar to employees at all levels within the organization, these workers need information in order to perform their duties. However, as these people do not have traditional decision-making roles, the information they need is usually very narrow in scope (such as a copy of an invoice) and

well understood ahead of time. Their data usage is in the realm of reading and perhaps some real-time monitoring of the activities they are assigned. Information needs for production and clerical staff is about fast access to predefined information and ease-of-use.

Sample Scenario
Every morning the shipping assistant receives a report listing items to be shipped that day. She compares the daily shipping report to the inventory on hand report to ensure order fulfillment and timely delivery.

The New BI Model

The exact distribution of information users throughout the organization will vary by industry and by each individual company. For example, the business user distribution in a commercial lending bank will look much different than that of a labor intensive manufacturing organization. In most cases the "executive" level decision-makers would run in the 3%-8% range (see figure 3). The next two levels, tactical decision makers and production and clerical workers, tend to range widely depending on industry, perhaps 40% / 55% respectively on the high end, or down to a 25% / 70% split on the other end.

Figure 3
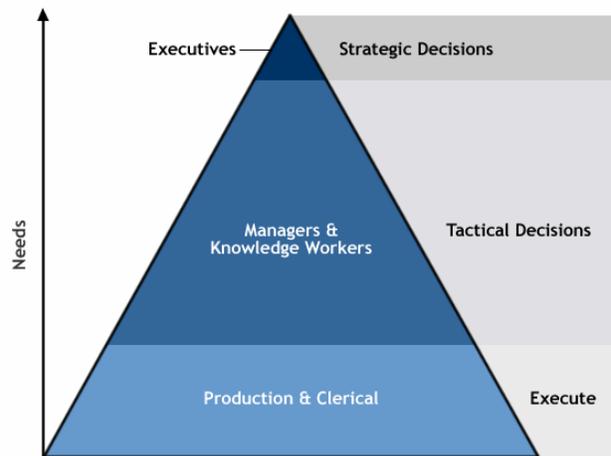
It is important to recognize that while the largest group of information users may be in the production/clerical role, these people are NOT involved in decision-making. They do have information needs, but given their narrow scope and predefined jobs, standard report systems will meet their requirements. Thus, high ROI decision support systems should focus on the top two groups, executives and managers/knowledge workers – where the decisions are being made.

The Staples of Decision Making: Reporting and Analytics

Smart business decisions are the direct result of having the right information at the right time. However, in most environments decision makers are only provided predefined standard and parameterized reports; or in some cases ad-hoc query and reporting tools to make "on the fly" reports. However, complexity in the data schemas, nuances in data encoding, calculation and the time it takes to learn more advanced decision support tools often deter most decision makers from using these tools – leaving users with predefined reports and the reliance on an intermediary to access deeper information. As mentioned earlier, this is the primary cause of decision makers' frustration with the level of support they receive in the decision-making process. Decision makers are literally buried in reports of all shapes and sizes, but never feel they have exactly what they need. This situation is epitomized by the phrase, "data rich but knowledge poor."

Reporting, ad-hoc or predefined, and analytics all have their place in the decision-making process - depending on the specific needs of the user at any point in time. Some groups (e.g. clerical) need simple information delivery in pre-defined reports. Other groups, specifically those with decision-making responsibility, sometimes need basic information delivered to them, while on other occasions they need a much deeper understanding to make the proper decisions.

Reporting – Designed for Distribution
At its core, reporting technology is designed for information distribution. Whether it's ad-hoc or predefined, the reporting paradigm addresses the of information delivery, publishing and distribution. That is why reporting products have menu items that predefine the query, format the resulting data and then publish that report to the people it was designed for.

When describing BI technologies, reporting is often lumped together with analysis to categorize a technology as "reporting and analysis." This makes some sense because analysis is what users ultimately do with a report once it is received. If the user knows ahead of time what data is needed and considers the job complete once the report has been published, then reporting technology is the right tool for the job. Every information consumer in the organization, from executives to production workers, will use these reporting systems.

However, if the user's job is to make decisions, this "delivery" model may only be adequate in certain circumstances and be significantly inadequate in others. The most popular feature in any reporting system is the "Export to Excel" button simply because the decision maker's job with the data is not done when the information is delivered - the job has just begun.

Analytics – Designed for Understanding
True analytic software is different in that it is designed to facilitate the analysis of information: inspection, exploration and question/answer probing that coincide with the human process of assimilating data. Though the software will allow decision makers to specify a query, format it and distribute it, this is not what analysis tools do best. Menu items in analysis software facilitate exploration, root cause and historical context analysis, and using advanced data visualization to help users grasp the relevance of the data.

Analytic software helps decision makers understand the data and quickly gain insight. In short, analytic software gets to the "why" and "how" behind the numbers presented in a report.

Examples:

— I see quarter to date sales are higher than expected, why? Is it a specific product, a specific region, a particular customer or some combination of those factors driving the sales success?
— I see orders are up but shipments are not up as much as expected, why? Is it due to stock problems, production problems or credit issues? Where is the bottleneck?
— I see we have 3% less market share in south than we do in the west, why? Is it because of regional customer demographics, issues with channel partners or sales team effectiveness problems?
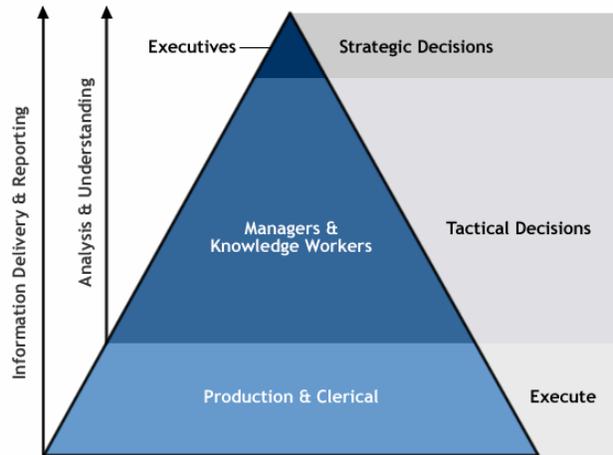
The Best of Both Worlds

Reporting and analytics together provide an organization with the perfect combination of data distribution and necessary tools to understand information. These technologies do different jobs and when deployed correctly can work in conjunction to fulfill the spectrum of an organizations information needs.

Unfortunately, organizations commonly utilize one or the other of these technologies to solve problems the software were not specifically designed to solve. This means using the older, more widely understood reporting technology to address users' needs in data understanding. This leads to the all too common issue of "spreadsheet anarchy," spread-marts and an overall dissatisfaction with the company's decision support efforts. Because analytic software has become available more recently and is less understood, it is rare that this technology is used for information delivery – but it does happen, creating a whole new series of issues.

When these two technologies work seamlessly together, users can get information delivered to them in a variety of ways. When they need to know more about the information, they can simply click on a data point to launch analysis and quickly determine the driving factors that are critical to good decision-making (see Figure 4).

With the emerging class of open standards and next generation reporting and analysis offerings, this integrated approach can be achieved with surprisingly affordable solutions. The key is to pick a reporting solution designed to be a world class reporting system and pick an analysis technology that is equally best in class with offerings that can work seamlessly together. Be cautious with the "one size fits all" offerings – while this approach may make the purchasing process easier, it will compromise certain capabilities that in the end will likely determine the difference between success and failure with your most important customers – the organization's decision makers.

Figure 4

Information Delivery & Reporting

Analysis & Understanding

Executives — Strategic Decisions

Managers & Knowledge Workers — Tactical Decisions

Production & Clerical — Execute

About ProClarity, Inc.

ProClarity and Microsoft have partnered to deliver the next generation of custom, enterprise-ready analytic solutions. ProClarity and Microsoft together continue to gain strength in the business intelligence industry by delivering enterprise-class solutions that meet sophisticated reporting, analytic, and deployment requirements at a fraction of the cost of competing solutions. Through integration with Microsoft Reporting Services, ProClarity is bringing Business Intelligence solutions to the ultimate level by adding the best ad-hoc dimensional query capabilities and the broadest family of tools to facilitate understanding of information.

ProClarity Corporation's industry-leading application development platform helps customers build sophisticated custom analytic solutions that enable decision makers to make more insightful choices faster. These solutions, based on business processes, decision-making workflows and existing database and software technologies, feature patented visualizations, web-like navigation and powerful calculations to transform

information into individual understanding. Headquartered in Boise, Idaho, ProClarity has regional sales and services offices in Europe and Asia-Pacific. Founded in 1995, ProClarity supports more than 1700 customers globally including AT&T, Ericsson, Hewlett-Packard, The Home Depot, Pennzoil QuakerState, Reckitt Benckiser, Roche, Siemens, USDA, Verizon and Wells Fargo.

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