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Business Intelligence
Turning Data into Wisdom

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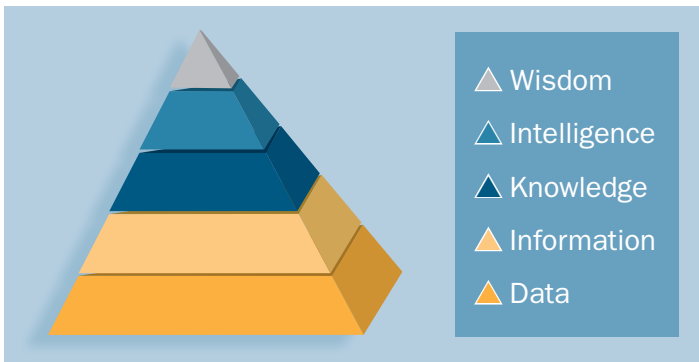


INTRODUCTION

Business Intelligence (or BI) is one of the current hot button topics. As in most cases, it is sometimes difficult to determine if this is a credible resource for the business owner, leader, or manager or just another buzzword used to get business people excited about technology.

BI tools have actually been around for years. Much of the early work was done using spreadsheets. Early Decision Support tools and sophisticated reporting tools became available and were used extensively in business.

In its simplest form, BI is the ability to accumulate, organize, and analyze data from multiple sources. That is it. Pull everything together no matter where it comes from (internal or external databases) and use computing power to make sense of all of the data. This is where the Wisdom Pyramid comes into play.



Everyone has too much data. It is everywhere. There are sales orders, purchase orders, stocking levels, shipping costs and many more. Then you have access to leading indicators, stock market trends, and employments reports. Most business leaders and managers are drowning in data. That is one of the problems. How do you make sense of everything you have?

The answer may be the Business Intelligence or BI Pyramid. It helps explain how raw data can be refined over and over again to make it more usable and valuable.

The first level of analysis is to organize the data into like groups and sort it to create basic information. These are traditional reports. Then make it easy to see global activity—accounts receivable lists by days outstanding sorted by amount.

Working with the information, you can learn what to do with it. For an accounts receivable (A/R) example, teach your employees to start with the oldest A/R with the highest value as one way to prioritize what you will chase. Experience may have also taught you that an automated letter to everyone when they hit 31 days is a very effective way to collect revenue.

Adding the rules developed through experience allows you to convert information into knowledge. But value of knowledge can improve with better information and new ways to do things. Over time you increase the value of your knowledge by improving it with added experience.

Then you are ready to integrate data from different sources. You need to be able to do more than just list data, but to perform various statistical or analytical tasks to refine it and to tease out more valuable results—such that it becomes more valuable, and you can use the results to better manage the operations. Those changes are what Business Intelligence is all about. Through multiple iterations your interpretations and use of the output become more accurate and the results more useful. You learn to act and react based on the intelligence developed from raw data, information, and knowledge.

When you are able to institutionalize business intelligence, it becomes corporate wisdom. Wisdom is the ability to replicate and apply business intelligence consistently throughout an operation. It is the culmination of experience, experimentation, and results. Corporate wisdom is the ultimate value from processing data.

WHAT IS BUSINESS INTELLIGENCE?

As with any buzzword, definitions are not standardized. For the purpose of this paper, BI Tools are a vast combination of reporting, managing, filtering, and analyzing capabilities often found in multiple programs or modules. There is no one defined BI Tool that everyone agrees upon.

Business Intelligence is the ability to apply all of the available tools, mixed with business experience and knowledge to create outputs that can help you better manage your businesses. Some output may be trends to help you see the future; some may



reflect what has occurred in the past so you can fix things that did not work well; still others represent real-time situations so you can act before it is too late.

BI is the combination of many things, with many inputs, and many potential outputs. Your job is to find what will work best, test it, refine it, teach it, and institutionalize it.

WHAT ARE YOUR TOOLS AND INPUTS?

The list of tools is relatively easy to develop. It basically encompasses any program that assists with the accumulation of data, the organization of data, and the reporting of data. Tools include report writers, spreadsheets, and other applications that analyze data using statistical processes, trend analysis, and advanced mathematical capabilities such as regression analysis.

Reporting tools are more than just the report writers of old. Output has to be able to include graphical representations of the information, real-time updates, a “drill down” capability, and collaboration (sharing) with remote peers and trading partners.

Graphical representations encompass all kinds of charts (bar, stacked, pie, and more), dashboards (speedometers, flashing lights, readouts, and so on), and color-coded numbers. The key is that an executive can glance quickly at a screen and get a feeling for how things are working. It is fast and it is available.

Real-time updates mean that the data that is used as input is examined as it changes. If you measure shipment dollar volume, every time a truck leaves the dock that value is updated. Old-fashioned batch processing has no regular place in a world moving at the speed of thought.

Drill down is a capability to point to a number or a bar on a chart and be able to click to see the numbers behind the display. So if the line-items shipped chart looks high, one can click on it and see the line items shipped per hour so far today. The one point that is above expectations can be clicked to see the actual order that has accounted for the “bulge” and provide an opportunity to understand what is happening.

Collaboration is critical in today’ electronically connected society. In terms of BI, it means being able to access and share information. Possibly, a distributor will be allowed to see the manufacturer’s master production schedule. In conjunction

with more accurate sales forecasts, distributors can identify possible future shortages and arrange to purchase product in advance so they will have it even as the rest of the industry is facing shortages.

The input includes all of the data that is available from the ERP (Enterprise Resource Planning) or back office systems. If there are applications that are provided by third parties, all of their collected data needs to be accessible. Input from the best trading partners ratchets the value up. Benchmark data for industry associations and other sources may provide comparative statistics. Finally, there is the public data and leading indicators that can really help turn information into higher levels of knowledge, intelligence, and finally wisdom.

This last category (public data or external databases) is the least recognized the least used, and where the potential benefits are the greatest. For example, if you distribute supplies used in building management (cleaning supplies and such), then how do you determine if your sales force is getting you the opportunity to submit proposals on an appropriate number of potential projects? What if you could get data from the state, city, or county that would provide information on occupancy permit applications? Would that be an indicator of what will be happening in the market? Could you factor that data into a program that watches your bidding activity? If you are not keeping pace with new opportunities (upward) that are being reported, that means there is a gap in your marketing and selling organizations. What great intelligence that would be to have.

Output from the report writers and other BI tools require more than just a passing knowledge of a simple interface. Many of the reporting tools advertise that you do not need a programmer. That may be true for the simplest options, but when you add in capabilities like “drill down” and “collaboration,” you need to have a professional helping.

Basic reporting could move data to information. It was able to sort and organize. It provided for subtotals and grand totals. With a little bit of ingenuity, it would be possible to store intermediate results and even produce simple trend lines showing the results from the end of multiple months.

Advanced techniques needed to turn information into knowledge and intelligence takes more time and learning



than most managers or other staff personnel are willing or able to invest. These tools become very complex; they require knowledge of data structures, security, and management of software.

There is a need for “release control” so that you know that all outputs have been generated by a single, current version of the code (yes, even if you use a tool set, the development requires and then generates code). Plus it is critical to be able to document and verify that the input data sets are the most current or that sufficient documentation is produced to warn a user of where and when the input data was generated.

Consider the potential problems that would exist if sales data was taken from one financial period and then combined with purchasing data from another? The outputs could not be relied upon to provide accurate information, and any decisions made based on the output would be suspect.

Output is becoming more sophisticated all of the time. There are already examples of charts that are animated. It is like watching a loop of the current weather radar. You can see where the storms are and where they are going. The same capabilities can be applied to financial information. A graph or chart could be animated to show the current trend in a visible loop. This could make it ever easier to interpret what the numbers are saying.

RETROSPECTIVE OR PROSPECTIVE

There are two very different time frames in which to develop business intelligence. Both are very useful, although very different. They differ in how they are developed and why they are used.

Retrospective is the most common form of BI. People often complain that this type of reporting (most of which seems to be financially oriented) is mostly used to assess blame. It is a way to look at what happened, figure out who did it, and what the effect it had (usually in dollars and most often negative).

Looking back should be much more than using financial results to affix blame. It is the way to understand your history and use it to project and plan for the future. Think about the value of recognizing regular seasonality in the sales/revenue cycle. The right historical knowledge will allow the organization to better buy the right amount of product for the right timeframes to support the existing client base.

Retrospection can also allow a company to recognize unusual occurrences. Having good information can, for example, allow the company to recognize “outliers” that appear in the sales numbers. Any unusual movement (up or down) should trigger a flag to do more research. Find out exactly what happened and why. Without this step, outliers are allowed to contaminate averages and other reportable items that may affect decision making—causing management to make the wrong decision, which can have outsized consequences.

Another example is for companies wanting to know how well they are doing with their pricing discipline. The ability to analyze a solid year's worth of data will provide the information and knowledge necessary to establish benchmarks. Knowing where you are means you can manage to get where you want to be.

Dashboards are another popular retrospective (although only slightly in the past) reporting device. Real-time dashboards show what just occurred (within the last day, hour, or minute—depending on your needs) so that immediate action can be taken if something falls outside of a given boundary.

The concept of the dashboard has gained a tremendous amount of use recently. The idea is to provide all of the key performance indicators an executive (or other manager) needs in one simple screen that is quickly comprehended. The design of the output is up to the end user, but gauges are a popular motif.

The speedometer is often used because it is easily understood by many different people. As with a tachometer (which shows engine speed) there are green, yellow, and red areas. These correspond to safe, caution, and trouble.

The green means that the numbers are in a normal operating range. In a production environment, it might mean the operating efficiency of the plant is between 80 and 95%. Below 80% and down to 60%, the indicator is yellow. This indicates a possible cause for alarm. It is necessary to look into what is happening right away and take corrective action before the operation gets into trouble. There may be a planned shut down or other expected event. Or, it may be an early warning of a coming disaster.

Over 95% may also be an early indication of coming trouble. The plant may not be designed to operate at full capacity and doing so stresses the equipment, increases future problems, and may mean preventive maintenance is being delayed. Of course,



it may be perfectly OK to run at 100%, but the concept that there can be issues at two ends of a scale is very important.

Less than 60% may be in the red and indicate an unplanned shutdown. This requires immediate and emergency response. It is even possible that when a dashboard indicator goes red, that key executives are sent email messages or telephone calls to alert them to a negative situation.

In a distribution environment, the indicator might be the number of lines picked during the day. Since it is a number that increases all day long, the absolute number may be meaningless. However, it is possible to develop a normal trend curve that provides a guideline at where the firm should be every hour of the day (50 lines at 8 a.m., 120 lines at 9:00 a.m., and so on). Then the gauge turns colors based on how close it is to one standard deviation from the expected norm.

Maybe you want to be warned if the number is 20% above normal for more than two hours. On the negative side, it may be yellow is a number between 10% and 20% below the expectation. A larger drop will get a red color. That is an indication that management interest is required in the warehouse.

As you can see, the warnings can become relatively sophisticated. You can use combinations of numbers integrated with trends or historical averages to establish warning paints. The dashboard makes it easy for an executive (or supervisor) to quickly glance at a screen and know things are all right or need assistance.

As a side note, this is an area where statistical analysis really adds value. Most business people have heard of "6 sigma," even if they are not fully aware of what it means. Sigma is the mathematical symbol for "one standard deviation" about a mean (the arithmetic average of the data points). In English, this means that you can measure how close any point is to the mathematical mean of a series of numbers.

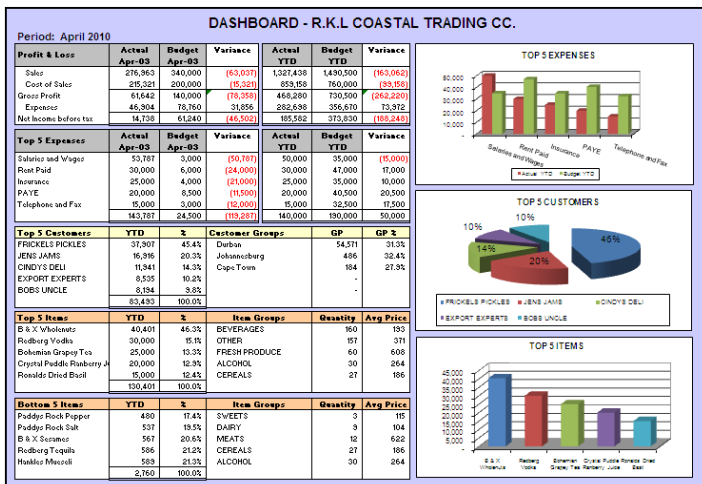
If the majority of the data points are within one sigma, they are well clustered around the mean. By definition, 99.9997% of all points are within 6 sigma of the mean. When you are measuring a process, you have reached 6 sigma quality when 99.9997% of all of the output meets the quality standard.

Combining the dashboard with statistics can allow you to present data within or outside of the quality measures you have designated. It can also be used when incoming material is evaluated by quality control and any time the boundary is surpassed, the dashboard changes color to alert management to a potential problem—as quickly as it appears.

Prospectively, try to look into the future. Demand forecasting is one great example. How do you take the current purchase history of your customers, analyze it according to past patterns of buying (from your historical reporting), and integrate leading indicators to give you a more accurate forecast?

Consider a building material distributor. By factoring in leading indicators from the government on construction forecasts, including the historical trends of your own business, it is easier to forecast more accurately what will happen in the future. It can be used to align your sales force, prepare purchasing, and alert customer service to what might be coming. Then, use all of the resources to get out there before the competition and get the potential business—because you are ready for it.

With the proper tools, it is possible to work with customers to help them where they may not have the capability to do it themselves. Share forecasting models. Prepare for changes together and plan for future needs. The more you partner with them, the more they are tied to you and the greater the barriers to competition.





Other future-type analysis could help forecast warehouse space (real estate) needs, employment levels (hiring requirements), or on a shorter term basis, build truck routings for the next day's deliveries, and predict cash flow needs for tomorrow, next week, next month, or the quarter.

MAKING BI WORK FOR YOU

Getting started is usually easier than most business people think. Start by doing a diagnostic. Identify your pain points. For each one, create or extract metrics that give an accurate picture of where you are and what you are doing. Determine what you need to manage your business.

Most leaders and managers usually require 6 to 12 key metrics to know how they and their team are doing. Each individual must figure out what metrics they want to use. Given the measurements, it is necessary to understand how to calculate them, where the data comes from, how accurate it is, and how reliable are the sources of the data and information.

Once the metrics are established, it is important to know where you are and where you want to be. The second number must be realistic. For example, if you are measuring shipping errors, you may want to get to zero, but it may be unrealistic. Setting a goal of less than 1% based on lines shipped may be more realistic.

The last parameter is time. Again be realistic. Using the same example, if you are at 9% errors (based on lines shipped), then going to 1% in 6 weeks is probably setting the group up for failure. Going to 5% in 6 months and 3% in 12 is probably more in line with what can be done.

Once the questions are answered, the team properly informed, the champion in place, and the goals accepted, it is time to set up the reporting mechanism so each member of the team can track and manage performance. This is a key point. It is not just the top management that gets the BI output,

but all members of the team. It is the way to get cooperation and buy in. Make sure the people being measured know what the measurements are, how they are calculated, and that they see the results as they happen. It helps them be successful.

Probably the single most important factor to be successful in the application of metrics is to allow the persons being measured to participate in defining the metrics themselves. People do not mind being measured. They actually like to know how well they are doing. The problems come in when they are afraid that numbers or measures will be used to hurt them.

It is a shame, but many operations have earned the fear they instill in their employees. The best way to eliminate the fear is to eliminate the unknown. Bring the people to be measured into the conversation. Allow them to help define the metrics to be used to assess their performance. Allow them to be part of recoding data to find out where you are and then to participate in setting the realistic goals and time frames.

Since they understand the measurement, the current status, and the desired goals, they will be much more receptive to receiving feedback from a process they understand. It takes the surprise out of the equation. Now, they can watch the numbers move and see how they can affect the outcomes of the company. It is really very exciting and empowering to employees. Do it right, and the benefits are wonderful. Do it wrong, and it will not work.

This form of open-book management is highly recommended. Let the team see the information and knowledge as it is generated. Let them impact the development of intelligence and wisdom. These simple steps will allow you to move farther in a shorter period of time.

Next, look beyond the normal Key Performance Indicators. If you are a manager of a segment of the business, what would help you better control costs, quality, time, or any other parameter that will allow you to be successful? Figure out what it is—and go beyond the financial reports—and then experiment.



What are some of the areas to consider?

- Develop Activity-Based Costing models to better manage margins on services
- Develop an understanding of the customer base and inventory to be able to segment each to make management easier and more effective
- Pricing discipline and management
- Warehouse space utilization
- Fleet management, down to truck loading and routing
- Cash management
- Sales force automation

Then, get your trading partners involved. Cooperate and collaborate. It is amazing how well you can work together, sharing information (and even raw data) to become much more efficient. The closer you can tie in trading partners, the more they become true partners and not just customers or suppliers. Partners do not change frequently or easily. Customers and suppliers can change at the drop of a hat, or a couple of cents in price.

CONCLUSIONS

Business Intelligence may be a buzzword. It covers a multitude of tools and capabilities in many application systems. When properly understood, implemented, and monitored, it has applicability to the real world of business today.

BI can be a tool to unmask hidden capabilities. It can turn invisible performance into visible results. More importantly, it empowers employees. Finally, they are able to see how their actions affect results. They are able to see how they compare—to others within the organization or to competitors in different geographies.

BI often requires technical expertise to use correctly. However, many of the tools are designed to allow interested users to develop information and knowledge without programming support. The ability to experiment is important when striving for intelligence and wisdom. Users need to recognize that some of the desired results will require dedicated personnel or additional support services from the software publishers.

It is also important to remember that BI can be used to look backward to understand what happened or use trends and external data to peak into the future. Either way, the intelligence and wisdom created can be instrumental in making the right decisions in many different environments.

When considering the BI pyramid from data to wisdom, realize the functionality necessary to get you from the bottom to the top are all encompassed by the umbrella called Business Intelligence. Under this umbrella are the tools to turn data into information and provide the support to convert information into knowledge. By applying BI techniques, you can create Intelligence by taking knowledge to a higher level. Finally, institutionalizing the intelligence allows companies to harvest that most elusive goal of all, corporate wisdom. It is worth the effort. Every time new wisdom is added, it is possible to gain some nominal or significant advantage that allows one company to succeed while another fails.

As you learn to use BI better and in different areas, spread your successes throughout the organization (internal) and your trading partners (external). BI is a tool to improve operations and business in general. Each success or failure is a learning opportunity to do something else better. Take advantage of the capabilities to keep improving and developing corporate wisdom.



BROWN SMITH WALLACE

CONSULTING GROUP

ABOUT THE AUTHOR

Steve Epner is the founder of the Brown Smith Wallace Consulting Group. Steve is also an adjunct professor of Innovation and Entrepreneurship in the graduate program at the John Cook School of Business at Saint Louis University and is a member of the Center for Supply Chain Management Studies. In addition, Steve is a member of the faculty at the University of Industrial Distribution and Arizona State University for the Certified Professional Manufacturers Representative program. Steve has a Bachelor of Science in Computer Science (1970) and a Master of Science (2005) from Purdue University.

ABOUT BROWN SMITH WALLACE CONSULTING

The Brown Smith Wallace Consulting Group has been serving the distribution community for more than 20 years through the publication of various Software Guides, an online evaluation center and resource center at www.software4distributors.com, and assisting companies who need help selecting the best software packages for their business and maximizing benefits from their investment.

BSW Consulting

10151 Corporate Square Drive
Suite 100
St. Louis, MO 63132

314-983-1200

www.bswllc.com

www.software4distributor.com