A BUSINESS LENS ON BUSINESS INTELLIGENCE - TWELVE TIPS FOR SUCCESS

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Abstract

Many organizations are data rich and information poor. In a case study, Oracle business intelligence tools were used to help British Columbia Parks staff set management priorities, by transforming data into information tailored to particular decisions. Through this work and parallel research, a list of success factors for business intelligence projects has been compiled. Many factors including metacontent and a collaborative culture are important; business issues are more significant than technical ones. Because business intelligence tools encourage integrative thinking and shared decision making, their use raises issues about organizational "silos," over-arching organizational goals or needs, collaboration, information sharing, and empowerment of front line staff. If used as a catalyst for open dialogue and enhanced understanding, BI tools have the potential to build bridges from mechanistic organizational structures of the past, to the more systems-based approaches of the future.

Background

This work has been born of the drive, energy, and vision of a business user within BC Parks, co-author Alice MacGillivray. The initiative became the focal point of her graduate thesis. Most of the content and findings in this paper are directly from this body of work. The perspective presented here on Business Intelligence is predominantly a business perspective, hence, the title of this paper.

We start with the premise that the business benefits most from insightful decision making. Put more poetically, our goal is the nurturing of corporate "wisdom". But where does this come from? What tools and cultural characteristics foster this? The business driver is the imperative to manage enterprise data and generate some greater way of "knowing" so that more effective strategic and tactical decisions can be made. This is the realm of Business Intelligence.

Business Intelligence

The term *Business Intelligence* (BI) was in use as early as 1996, when a Gartner Group report said:

> By 2000, Information Democracy will emerge in forward-thinking enterprises, with Business Intelligence information and applications available broadly to employees, consultants, customers, suppliers, and the public. The key to thriving in a competitive marketplace is staying ahead of the competition. Making sound business decisions based on accurate and current information takes more than intuition. Data analysis, reporting, and query tools can help business users wade through a sea of data to synthesize valuable information from it - today these tools collectively fall into a category called "Business Intelligence." (Block et.al. 1996)

The Oracle corporate website describes BI as follows:

> …an umbrella term for a set of tools and applications that allow corporate decision makers to gather, organize, analyze, distribute, and act on critical business information with the goal of helping companies make faster, better, and more-informed business decisions. Successful BI systems provide an integrated view of business, extend

> analytical capabilities to users, and leverage a corporation's data and expertise—wherever that data and expertise reside in a distributed enterprise. (Gill 1999)

The past five years has seen many organizations venture into this area both as technology providers and technology users. There is no consensus in the literature on the definitions of data, information and knowledge and how they relate, let alone "wisdom". One way of looking at how these concepts may relate is as building blocks, with *data being the most common, and the least valuable* of the three as shown in Figure 1.

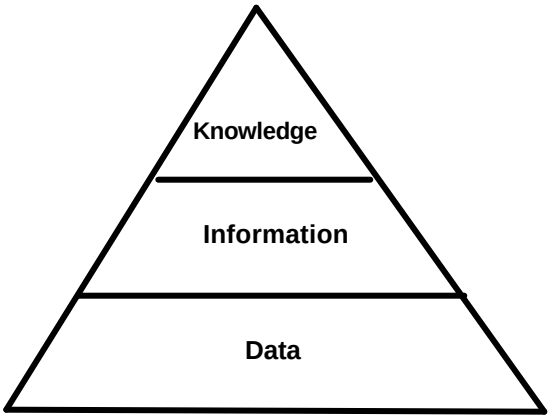

Figure 1. Flow of Data Through Knowledge

Data-to-Information

According to Davenport & Prusak (p.4, 1998), data can be transformed into information by being:

- Contextualized
- Categorized
- Calculated
- Corrected and/or
- Condensed.

They quote Peter Drucker's defining information as "data endowed with relevance and purpose," and go on to say "Information is meant to shape the person who gets it, to make some difference in his outlook or insight." Davenport & Prusak (p.3, 1998). In other words, when the data are organized and put in context, it must be done with considerable thought. Not only must a purpose be defined, but also the information builder must understand the business, the needs, and the culture or style of the persons who might access the information.

Information-to-Knowledge

Davenport & Prusak (p.6, 1998) list the following activities as important for information to be transformed into knowledge:

- Comparison
- Consequences
- Connections
- Conversation.

It is also important to note that comparison, connections and conversation are, by nature interdisciplinary. In fact, Davenport & Prusak state that the staff members who are the most effective knowledge seekers, virtually always have to cross boundaries and ignore formal channels to get what they need. Dialogue and business intelligence tools are both vehicles for encouraging the transformation of information into knowledge, and ultimately into wisdom.

From Data to Knowledge, and Knowledge to Wisdom

This cluster of concepts could be expanded vertically, where it might include understanding, wisdom and application. What this might mean for your organization can be seen in figure 2 as a hierarchical set of quotes that illuminates and expands upon the traditional hierarchy, illustrated earlier, with active statements.

We may speculate on what is required to transform our organization's knowledge into corporate wisdom. The characteristics will include activities like:

- Validation of core values
- Sustainable resource consumption
- Recognition of acceptable risks
- Crossing traditional boundaries for dramatic advancement.

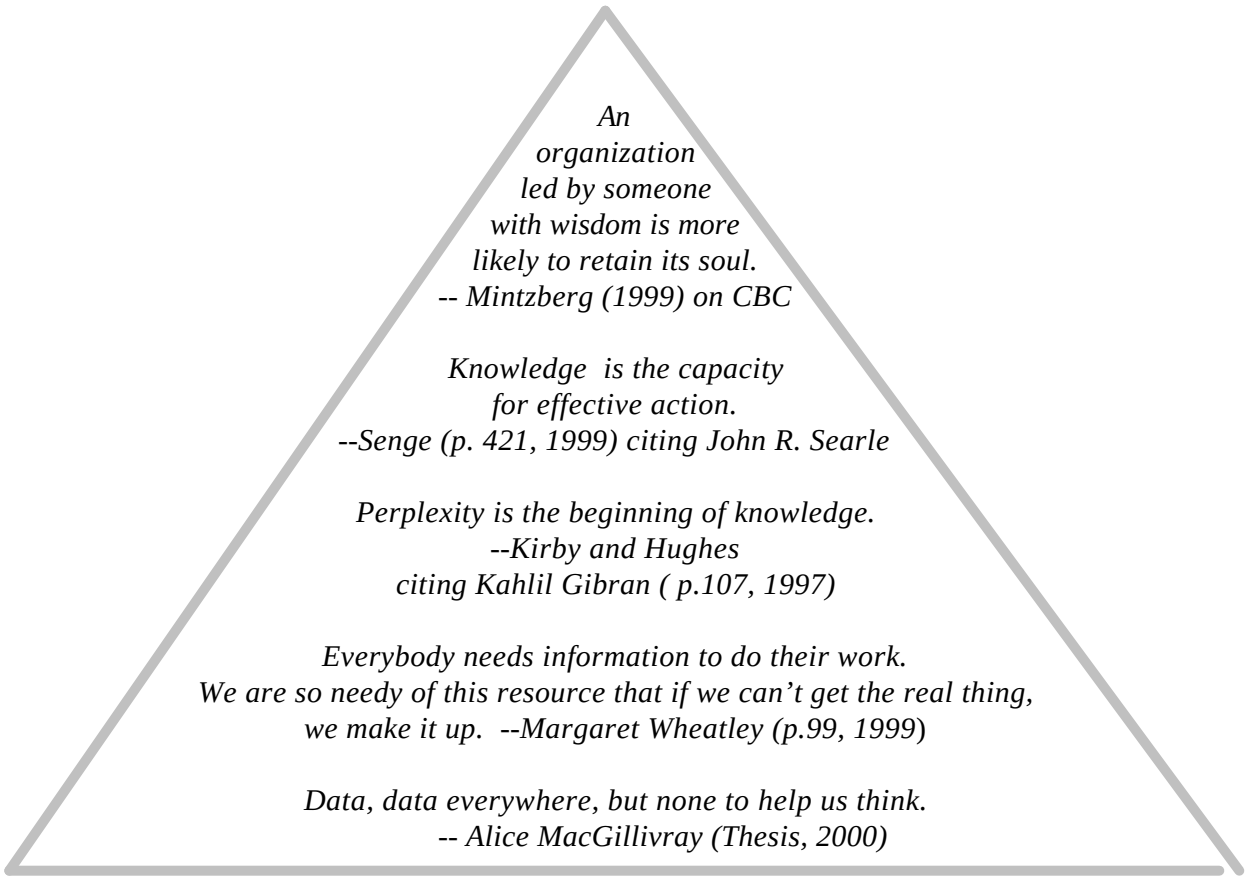

Figure 2. Quotes on Data, Information and Knowledge

A learning organization will strive for the top of the pyramid by leveraging the most that BI has to offer.

Implementing BI: Case Study

BC Parks is not alone in recognizing the need for transforming data into relevant, accessible information. Based on the literature review, the organization may be unusual in that a business person first sought out the information technology tools to fill a business need. In actual fact, there are probably many organizations which, like BC Parks in 1997, have few internal IT specialists and resources, and where business persons need to be change agents.

The subject domain of this BI implementation was in support of the annual management planning (AMP) process. Figure 3 shows an action research framework for AMP. This is undertaken each fall to set management priorities for each park or environmentally protected area within the jurisdiction. Data of value for this process comes from many different sources, in what are normally considered completely different databases (rare species, vegetation maps, facilities, park attendance, public safety, visitor satisfaction, etc.)

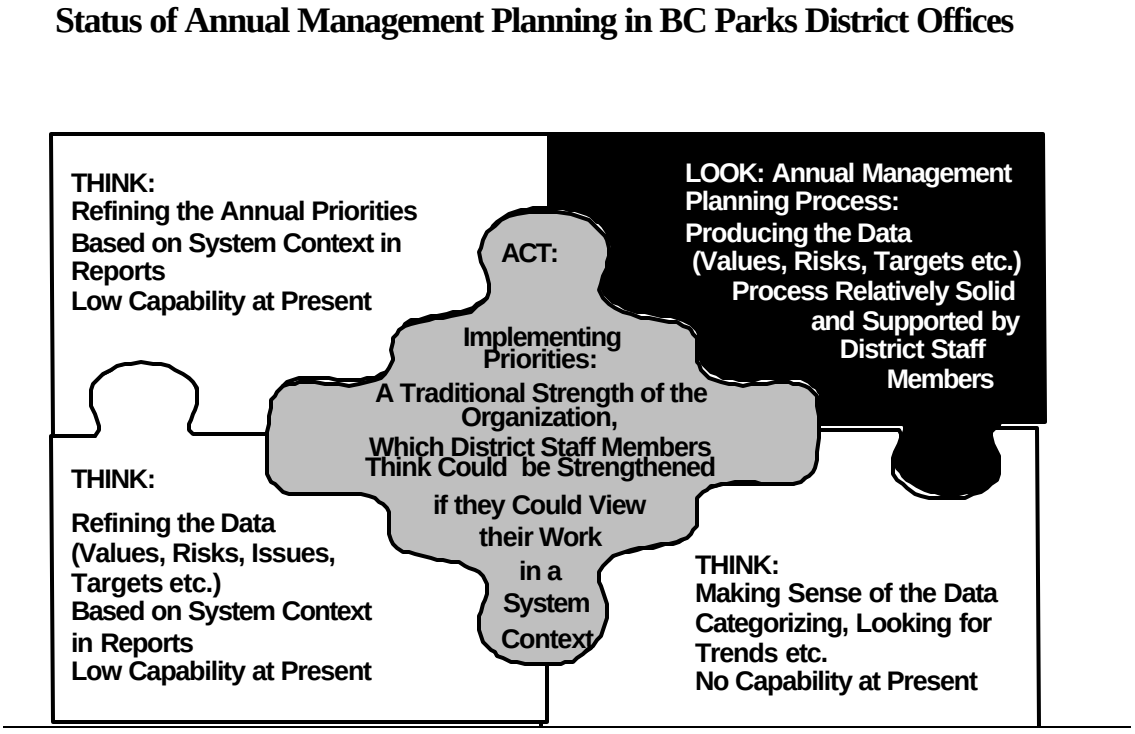

Figure 3. Status of Annual Management Planning in Action Research Framework

All staff are now encouraged to use the workbooks developed, and steps are being taken to make ongoing improvements to AMPs information and process. As one BC Parks staff person said: "This is the first all encompassing, province-wide, systematic process BC Parks has ever had. The ability to view and analyze information in different ways is a huge step forward. Because it is so far reaching, it has been the first to reveal opportunities to improve the flow of information and decision-making among sections and up and down through the organization. It is also important because it builds on, and revitalizes the long standing annual management planning (AMP) process." (Sajko 2000)

System Architecture

The deployment architecture within the organization is more fully described in the technical paper "Deploying Business Intelligence in a Distributed Data Warehouse using Oracle Discoverer & Reports" (Faulkner 1999.) Briefly, the main components are outlined here.

Database Layer – Oracle 8i

The VAX data sets were replicated and converted to Oracle. In other words, users enter data in one system, and without their having to do anything else, it goes through a kind of "translator" so that there is another copy of the data in another form and place, so that the data can much more easily be combined with related data from other systems.

At the time the project began, BC Parks data did not reside in what is referred to as the "master warehouse." This caused two problems. Much of the external data important to the sponsoring organization resides in the master warehouse. By having important internal data side by side with important external data, integration would be simpler, and potentially much more powerful. Also, if we wanted the data to be replicated out to the approximately ten servers situated around the province (into which staff members also put local relevant data for integration) then the master warehouse was the only choice.

The efficiency relates to queries which are quick for users to activate and quick for bringing a response. To resolve performance issues, it is common practice to build new summary tables or views right in the database (as opposed to in the next layer up, referred to as the application layer.) It is a bit like stocking pancake mix in a store, as opposed to just having flour, baking powder etc.

Application Layer – Discoverer 3.1

The Oracle Discoverer administrator layer works as the application layer for the attribute (text, numbers etc.) data in this project. In this layer was defined the information needed to group and link tables, and include newly created views, in such a way that a large percentage of business questions we identified could be easily exp lored. This work was additionally linked for spatial (map) data queries in a customized ArcView tool called "GOAT" (GIS Oracle Attribute Tool).

Deployment Layer – Citrix Terminal Server

Now that the information was housed in the master warehouse, it could be deployed, or shared, through the servers situated in approximately ten locations around the province. The technical deployment work was done through the Ministry's attribute data access expert. The software is also deployed in this manner. So pairs of servers sit in regional centres; one server housing data and the other housing tools to access and integrate those data. Discoverer is a tool designed for many types of access, so it is likely that in the future, staff members will access the reports using web technology.

Key Strategies for the Implementation

An Information Technology unit can assist an organization with BI implementation by focusing on six key strategies:

1. Implement Information Management Core Competency Requirements

In an information age, all staff members need to have a basic working knowledge of information management language, principles, tools and the roles information plays in the development and application of knowledge. This needs to be in an interdisciplinary context, so that work is not duplicated (e.g., metadata for the organization now sits in many locations using many tools including two library software packages, file room software, the IT organization's data registry, and district-generated resource atlases). Are these and other tools being used in effective, complementary ways? Could business intelligence tools be used to access complementary metadata from different sources? Are data collection procedures developed and maintained with input from across the organization? Similar questions about potential overlaps and practices could be asked about budget planning and costing tools, information about core business processes, or any other of the organization's data sets.

2. Set and Support Guideline of 25% Effort on Data Gathering

Foster a culture that transforms data into information, and regularly uses that information as a catalyst for dialogue and improved decision-making. Success is not just making the data available. Strive to provide real information using the techniques of: contextualize, categorize, calculate, correct and condense.

3. Leverage Industry Expertise and Initiatives

The organization should piggyback on relevant, available industry standards and training and other resources such as tutorials and tips available on-line. Recent Ministry training initiatives have included overviews of tools for managers, and different levels of training for end users to access financial or other business data.

4. Leverage Corporate Expertise

Many persons in the organization have specialized knowledge and skills relating to internal or external data sets, software and business processes. By sharing their expertise across boundaries, the whole organization could gain a great deal.

5. Develop Mentors

Develop internal mentors or coaches who can provide follow-up support, and ensure a percentage of their time is available to play a mentoring or coaching role.

6. Provide Tool-Specific Training Tied to Business Processes

The organization should work with IT staff, and contracted resources, to provide subject domain-specific workshops during implementation. These workshops ensure that all staff members have direct or indirect access to the data from within their office or program area removing adoption impediments such as to usernames, firewalls, and desktop configurations. By using business relevant data in the workshops (instead of the canned "Video Store" or "Student Registration" demo) the staff brings their expertise and domain knowledge to the activity.

Tips for Success

Business champions and leaders can avoid many traditional BI pitfalls by adapting the following approaches to their organizations' unique cultures:

1. Reflect Before You Act

As a leader, think long and hard about *your personal values and the values of your organization*. If you share a willingness to look outwards beyond the traditional boundaries within and around the organization, a strong belief in people, diversity, teams and synergy, and are interested in pursuing the potential of business intelligence tools, the rewards can be tremendous. If you and the organization are more comfortable with traditional hierarchies and silos, and reward practices that maintain those boundaries, this technology will not be an easy fit. This stage of reflection is particularly important if you do not have formal management authority. Although top managers can rarely effect significant change in isolation, a lack of formal authority adds to the types of work and amount of energy needed to generate discussion, explore options, make solid decisions, and move forward.

2. Base Your Plans on Urgent Business Needs

In you are with the private sector, assess these tools in the context of customer service, efficiencies, business planning, competitiveness and sustainability. If you are with the public sector, assess these tools in the context of public good, budget transparency, accountability, the interdisciplinary nature of public sector benefits, and the public's desire to have easy access to information about government programs, services and facts.

3. Become an Amateur Anthropologist

Assess not only the business needs these tools must address but also the culture in which they will be addressed. Consider how your organization treats information. Choose tools supporting that approach and that can expand as your business and culture evolve. Analyze your unique strengths and challenges, and identify the challenges that might be turned into strengths.

4. Plan for Success

Assess how the organization is apt to judge success. Will those measures work for you, or do you also need to build support for new forms of success? Manage expectations in that context, planning for incremental successes, which are recognized and celebrated.

5. Be Curious

Whatever your background, you have a lot to learn, and every thing you learn will add value to the project. Become a three year old again; *ask "why" on a regular basis.* Senge (1990) and Kouzes and Posner ((1997) are among leadership authors who emphasize challenging assumptions and fostering a spirit of inquiry. Is proportionally too much effort being put into collection and storage? Why? Are people using lots of jargon? Why? If people pretend to understand (which is often the

norm in boardrooms, especially when there are different corporate sub-cultures at play), important questions will go unasked.

6. Treat Your Project As A Fundamental Change Initiative

Architecture, standards and other technical factors are important. But cultural or business issues such as good metacontent (Kucera & Faulkner 1998), collaboration amongst work units, senior management support and the willingness to share information, can be just as important and much more challenging. Plan for, and actively address, these and other potential challenges common in BI initiatives. Business challenges will typically need the most, and the most sustained, attention. A CBC Newsworld item (April 8 2000) explored the apparently revolutionary changes SAP (Sapphire) technology has brought to some companies. A man interviewed spoke of SAP as a Trojan horse, and about what a shock it can be to realize that the purchase was not simply of software, but of approaches to decision-making, culture and philosophy as well. The interviewer said "but it's a philosophy driven by software." The reply was "It is a philosophy enabled by software." If you are trying to achieve a philosophy enabled by software, treat it as such. Move ahead thoughtfully, and with respect for the persons who may find the changes difficult, or even threatening.

7. Dialogue, Dialogue, and More Dialogue

If you embark on a business intelligence project, place particular emphasis on high quality communication, particularly where [potential] overlaps between information technology and business communities exist. Model and encourage whatever is required for dialogue to build between these communities, regardless of whether this seems time consuming, frustrating, or beyond the traditional roles of the players involved. Discourage elitism, one-upmanship, passive resistance or apathy. A Hewlett-Packard knowledge project manager words this as aiming for "egolessness." (Davenport and Prusak p.113, 1998). Business persons need to gain understanding that information management is vital in an information age. They also need some basic information technology knowledge and skills, just as the technology persons need business knowledge. As people recognize they are all learning from each other, they build a common language. If you already have staff members who speak both languages and understand both worlds, recognize their extraordinary value. We use the word dialogue, which includes authentic openness, focused listening, and potential synergy: much more than what most persons think of as communication, education or training.

8. Let Networkers Help You Build the Leadership Web

Actively recognize the importance of *networking leadership*. Executive and line leadership are critical for successes, but networking leadership skills are particularly important for integrative projects, and often under-recognized and under-supported. Watch for "first contact specialists," a term we use to describe the IT counterparts to business champions, and celebrate their successes. IT specialists who interact well with business people, and help them understand what the tools can do to further organizational goals, are critical.

9. Be Proactive; White Knights are Obsolete, even in BI

Anticipate resistance to change and the resulting limits to growth. Prevent the need for "heroic business intelligence interventions." The best technology and specialists cannot fully compensate for poor data management practices and awkward links between data sets. Moreover, if BI professionals are seen as obstructionist, critical, or as forcing business persons to "re-do perfectly good work," the knights won't be white, and they will need armor. If you have the luxury (and labor) of building a new organization, make the effort to plan so that structures, functions and data fit together as seamlessly and flexibly as possible.

10. With Big Enough Levers, You Can (Almost) Move the World

Look for innovative ways to leverage strengths and resources. Sometimes a lot can be done with little, especially if the core systems are well-designed and integrated from the start. Learn from others. Many experts are willing to share information through publications, online or in person.

11. Assess Costs of Not Using Business Intelligence Tools

There may be direct costs such as data entered in many places, and parts of the organization having to repackage the same data in time-consuming ways for other parts of the organization. There may also be indirect costs. Knowledge may not be reused effectively. Traditional, professional programming often hides data entry and definition issues from business staff, which BI tools can uncover for discussion and correction. The sense of team and direction that comes with collaboration and use of collaborative tools can boost morale, and build a culture that is cohesive, decisive, visionary and flexible.

12. Consider the Big Picture

Finally, realize how important BI is in your organization's evolution. Museums are great places to see the significant artifacts of the past: stone scrapers, arrowheads, ploughs, sawmills, and printing presses. What are the emerging cultural artifacts of the twenty-first century? Would you expect their development and application to be easy? If you are working with business intelligence, you are a knowledge economy pioneer, and pioneering is always hard work. Find ways of sustaining your energy and commitment. The results make it well worthwhile.

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Andrew Faulkner is the Senior Data Manager at the Centre for Education Information in Victoria, British Columbia. He holds a B.A. (Queen's University), Advanced Diploma - Software Development (BCIT), B.Tech. - Computer Systems (BCIT) and is an Oracle Master (DBA, Oracle 7) and OCP. His work focuses on Business Intelligence tools, metacontent, database administration and Data Warehouse management. Previously he worked for government and in systems consulting in Vancouver, Papua New Guinea, and Ottawa.

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Alice MacGillivray has worked for three major Canadian park organizations as a planner, consultant, environmental educator and writer. She "discovered" business intelligence through her interest in park management. The management of protected areas is a very interdisciplinary field, and traditional information technology tools do not provide an integrated view of park systems or their management needs. Since 1997, she has been working with data warehouse architect Andrew Faulkner and others to use BI tools to help front-line staff with priority-setting. She recently completed her thesis for an MA in Leadership and Training at Royal Roads University on this topic.

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