NEWSLETTER

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Guest Editorial

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Business Intelligence (BI) as Foundation for Decision Making

No matter which business organization you visit, Bank, Travel agency, Insurance office you will invariably see the use of computers. Businesses today depend on Information Technology than ever before. This means that whatever may be the size of the business, business related data is stored in digital form and is manipulated in a variety of ways to support business operations each minute.

While organizations may have accumulated vast amount of data over years, it will be interesting to examine whether the organization is leveraging the past data, creating organizational knowledge, gaining insight into business operations and influencing future business success? This article is intended to provide overview of Business Intelligence, a key technology capable of harnessing the power of digital data to help businesses make strategic decisions.

The Need

Businesses have been able to exploit the power of 'Information' to achieve global success and expand beyond regional boundaries. The earlier generations of IT applications delivered basic benefits like speed, accuracy, ability to handle very large volume of data. The current generation of IT applications promises entirely new set of business value such as creating unique global business opportunities, making superior business decisions based on facts; fast to race ahead of competition. Those who implemented IT systems successfully (e.g. ERP/ CRM, SCM systems) and reaped benefits did continued to think of ways of leveraging the key organization asset – DATA. IT industry and researchers heard voice of customers as simple questions such as:

- *Which markets must I focus to achieve huge business growth?*
- *What features are needed in the next product/ service?*
- *How effective are our marketing campaigns?*
- *How could we leverage highly inspired leaders within the organization?*
- *Where can we invest scare resources for maximum effectiveness?*

Typically the IT systems designed for ***Operations Efficiency*** will not be able to answer these questions. Hence researchers and product companies responded to market need with various approaches to harness the power of business data collected. Some of these include Enterprise reporting tools, Data analysis tools, Application integration, Decision support systems, Executive information systems and so on. While many of the underlying technologies got consolidated more robust technologies like Data Warehousing, Extract-Transform-Load (ETL), Corporate Performance Management Systems, Dashboards, Balanced Scorecard, are come to stay and deliver significant Return on Investment (ROI). These IT systems that provide insight into business from multi-dimensional perspectives to various levels of Management is typically termed Business Intelligence systems. Often times these are IT Analytical Applications that utilize the synergy of several technologies including ETL, Multi-dimensional data store and suite of information presentation paradigms like dashboards, traffic lights, scorecard etc.

Key Technology Drivers

The key technology drivers that have enabled the design, development and implementation of Business Intelligence systems include –

- ***Internet*** – Providing ability to deliver information on anytime, anywhere and Any device basis
- ***XML*** – Providing ability to add intelligence to pieces of data
- ***OLAP*** – Online Analytical Processing tools that provide multi-dimensional data handing capabilities
- ***Enterprise Reporting*** – Providing ability to design, publish, and automate report generation
- ***Scorecard*** – Providing systematic approach to designing performance measures for specific areas of business focus.

In addition many Internet related advancements like Enterprise Information Portals and Collaboration tools have helped organizations build strategic business intelligence systems. Relational Database Management Systems (RDBMS) have undergone significant changes in the recent past to support newer technical features needed to build BI systems.

Business Benefits

Businesses implementing Business Intelligence Systems have reported variety of huge benefits and attribute the major impact to the BI systems. Here are some of the benefits:

- ***Single Version of Truth & Status*** – When an organization has multiple IT systems operating in silos with different data capturing, update cycles it is very likely to get different result from different systems that are inconsistent. This confuses decision makers. With BI all users will have only ONE version of truth.
- ***Role Based Information*** – We are living in the information overload era. BI systems help reduce information overload and precisely deliver the information needed for the role played by the user in the organization. This enables fast decision making.
- ***Multi-dimensional Views*** – Users will have opportunity to examine the data from multiple perspectives that will provide insight and help zero-in the trouble spots.
- ***Objective Decisions and Communication*** – With BI systems in place users tend to make fact based decisions that are objective helping organizations bring decision consistency and fairness. Communication among virtual teams is likely to be consistent as all members see the same view of the organization.
- ***Business Measures*** – BI system implementation will bring sharp focus on the key result to be achieved for business success. Users could watch trend, breaches, alerts to take early action to achieve business goals.

Challenges

Businesses implementing Business Intelligence Systems have reported areas that need attention to achieve success. Several aspects like Data quality, User education on multi-dimensional information analysis, Master data integration, Information security, Performance measures design, Tools used for implementation, BI practice methodology and Data Warehouse operations need to be carefully examined and specific initiatives needs to be implemented. Management support for managing change is critical to success of BI projects as well.

In summary, Business Intelligence is a powerful way to leverage organization's data asset to achieve significant business success and ROI. Technologies chosen have reached the level of maturity needed to build robust BI systems. Several products and services are essential to implement effective BI systems.

You may please Email your opinion about this write-up to r_prasad@infosys.com

R. N. Prasad

From Chairman's Desk

A recent book by Matthew May discusses in detail Toyota's formula for mastering Innovation -- The Elegant Solution. The basic proposition concerning the Elegant Solution is: "The quest for the elegant solution shapes true innovation". The formula for the elegant solution is an amalgam of *principles, practices and protocol*. Principles drive practices; but are not enough; they need to be made operational with (ten) key practices supported by tools and techniques, which are described in the book. Mathew May makes a distinction between *Business* Innovation and *Technology* Innovation. Business Innovation is about satisfaction and value, not new gadgetry. Customers do not want products and services; they want solutions to problems.

Defining Elegance:

Elegance is defined as finding the "aha"solution to a problem with the greatest parsimony of effort and expense, and involving the ingredients of *Creativity, Simplicity, Intelligence, subtlety, economy and quality*:

Elegance = Minimum effort and expense
+ Creativity + Simplicity + Intelligence
+ Subtlety + Economy + Quality

Examples of Elegant Solutions:

Mathew May points out that many of the most powerful innovations are singular and deceptively simple ideas that universally change the world's attitudes, beliefs, behaviors, and habits. As examples, he lists: Library, Paper money, Pencil, Wallet, Wristwatch, Icebox, Mortgage, Auto leasing, Social Security, Credit card, Cell phone.

The Toyota Way of Pursuit of Perfection

"Toyota pursues perfection by starting with the ideal, then working backward, removing anything that stands in the way. That means looking at the target in a fundamentally different way. It means asking "what's blocking perfection?" Instead of "what can we improve?" That's what differentiates their brand of continuous improvement from all others".

Defining Innovation

Mathew May points out that there are several distinctive features of innovation: it's distinct from creativity; it goes beyond improvement; it entails seeking and taking big risks; it's all about big ideas and radical departures from convention. David Neelemen, founder and CEO of Jet Blue describes it thus: "***Innovation is trying to figure out a way to do something better than it's ever been done before".***

Some Innovation Principles:

1. Idea of similar traits converging into one new organism:

   Eg: Cellular phones and PDAs, which now combine: telephony, text-messaging, e-mail, internet browsing, voice recording, mp3 music, video and photography. Convergence of cellular and wireless Voice Over Internet Protocol technology in the next wave of dual mode cell phones.
2. Survival of the fittest, which says failure to make small adaptations leads to extinction:

   Eg. The removable storage media industry, which went from 5.25 inch to 3.5 inch drives, then to Zip, CD, DVD, and thumb drives. Many of the leading firms died out, because they failed to adopt newer technology that customers wanted.

The Importance of Learning

Mathew May points out that "Learning and Innovation go hand in hand, but Learning comes first. Before anyone can innovate anything, learning must take place. Learning is how we convert ideas into action. It is the only process by which we improve and advance"."It's not a special activity separate from work. We shouldn't stop work to start learning. Learning is an acquired capability, and a teachable discipline". Toyota is considered to be the ultimate learning organization. "Mastery – perpetual learning – is so ingrained in the organization that it's been declared by many to be a part of the Toyota DNA. And what makes learning at Toyota so different is that the concept revolves around pursuing the *right questions*, rather than securing the *right answers*. What drives learning at Toyota isn't a need to know. It's a need to *inquire*. To *understand*. Toyota doesn't confuse *training* with *learning*. What they teach isn't a hard skill – it's the softest skill known: *thinking*. Their most powerful learning experiences generally occur in a four-phase cycle of : Questioning; Solving; Experimenting; and Reflecting.

Changing Market & Customer Requirements

Toyota recognizes that the market and customer requirements have evolved:

- From: Yesterday's problems, today's solutions
- To: Today's problems, yesterday's solutions
- To: Today's problems, today's solutions
- To: Today's problems, tomorrow's solutions (Which is the essence of *Innovation*)
- To: Tomorrow's problems, tomorrow's solutions.

Prof. R. Natarajan

Guest Lecture by Dr. C. S. Raghavendra, Professor of Computer Science and Associate Dean, USC
On
Sensors Networks and Applications

Venue: BNM Institute of Technology
Date: September 19, 2008
Sponsor: BITES
Host: BNMIT

Sensor networks are typically large scale wireless networks of small inexpensive sensors, which collect, do some local processing and then transmit the semi processed information. Wireless sensor networks make it possible to remotely monitor and also control physical environments. Sensor networks have widespread applications in diverse areas like environmental monitoring, defence applications like multiple target tracking, and bio-medical applications.

The design of robust wireless networks presents many challenges because of their low power and cost constraints as well as the adhoc nature of their deployment. Sensor networks are the focus of academic and industrial research which is trying to address these challenges.

Dr. Raghavendra in his guest lecture gave an overview of wireless sensor networks and touched upon challenges faced in the design and deployment of sensor networks. He also discussed case studies of many sensor network applications and sketched directions for future research.

Typical challenges the designers face are:

Dynamic changes: sensor network should adapt itself to changing connectivity requirements due to addition/deletion of nodes and also due to changes in stimuli

Energy Constraints: The sensor nodes are not powered by any energy source. They have only limited power which must be judiciously used up for both processing and communication.

Ad hoc deployment: Sensor nodes are typically deployed in an adhoc fashion which means that it is up to the nodes to identify their connectivity and distribution; for example tossing sensor nodes from an airplane in a forest to monitor the habitat.

Unattended operation: In most cases, sensors networks have no human intervention once they are deployed and nodes are themselves responsible for reconfiguration in case of any changes.

Some of the research topics that are actively being investigated are;

Localization: The problem of estimating spatial-coordinates of the node in a sensor network is referred to as localization. Several approaches like fine grained localization, course grained localization, Beacon/Node Placement techniques are being pursued as research topics.

Routing protocols: Several new protocols aimed at conserving power during communication like Negotiation based, directed diffusion, energy aware routing, rumor routing and multi-path routing are being investigated.

Some of the case studies that were discussed are;

Habitat monitoring applications: UCB/Intel Research project deployed a mote-based tiered Sensor network on Great Duck Island, Maine, to monitor the behavior of storm petrel. PODS is another research project in University of Hawaii that built wireless network of environmental sensors to investigate why endangered species of plants will grow in one area but not in neighboring areas.

Environment Observation and Forecasting System (EOFS): EOFS is large distributed system that spans large geographic areas and monitor, model and forecast physical processes, such as environmental pollution, flooding etc.

Health Applications: Applications in this category include telemonitoring of human physiological data, tracking and monitoring of doctors and patients inside a hospital, drug administrator in hospitals etc. Other applications include glucose level monitors, organ monitors, Cancer detectors and general health monitors. The idea of embedding wireless biomedical sensors inside human body appears to be promising.

The lecture concluded with an Interactive session with faculty members who are doing research in this area.