BUSINESS INTELLIGENCE: CONCEPTS, COMPONENTS TOOLS, TECHNIQUES, BENEFITS AND CHALLENGES

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Abstract:

For companies keeping direct contact with large numbers of customers, however, a growing number channel-oriented applications (e.g. e-commerce support) etc create a new data management challenge: that is effective way of integrating. The decision supports of system to execute information you can discover in efficient business processes & hidden patterns. Identify areas of strength and weakness. Discover new opportunities.

Common functions of business intelligence technologies are reporting, online analytical processing, analytics, data mining, business performance management, benchmarking, text mining, and predictive analytics. Business intelligence aims to support better business decision making

Keywords—*Business Intelligence, OLAP, OLTP , Data warehousing, Dimensions, Cube, Data marts, ETL, EIS, DSS, ERP , CRM.*

1 INTRODUCTION

The word Business Intelligence (BI) refers to technologies, applications and practices for the collection, integration, analysis, and presentation of business information. The reason of Business Intelligence is to support better business decision making. the fundamental, Business Intelligence systems are data-driven Decision Support Systems (DSS). Business Intelligence is sometimes used apparently identical briefing books, report and query tools and executive information systems.

Business intelligence existed before technology. Today it's understood as a set of analyses that derive value and insight from data.

Cyclopaedia of Commercial and Business Anecdotes contains the first known usage of the term "business intelligence." He uses it to describe the way that a banker, Sir Henry Furnese, succeeded: he had a perception of political issues, lack of stability, and the market before his competitors.

"Throughout Holland, Flanders, France, and Germany, he maintained a complete and perfect train of business intelligence," Devens writes of Furnese. "The new was thus received first by him."

Furnese ultimately used this advance knowledge to duplicitous ends and became renowned as a corrupt financier. The idea of gathering information on business conditions, however, was a seed that would grow. Development until 1958 Technology did not advance to the point where it could be considered an agent of business intelligence until well into the 20th century.
It was with the 1958 publication of a landmark

article on the subject, written by IBM computer scientist Hans Peter Luhn , that the potential of BI was recognized.

The article, titled "A Business Intelligence System", described detail "an automatic system developed to disseminate information to the various sections of any industrial, scientific, or government organization." In the wake of the post-World War II boom, such sectors required a way to organize and simplify the rapidly growing mass of technological and scientific data. Luhn also cited Webster's Dictionary definition of intelligence: "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal."Essentially, this cut to the core of what BI is: a way to quickly and easily understand huge amounts of information so that the best possible decisions can be made by Luhn's work did more than introduce and expand the possibilities of a concept. His research established methods that were built upon to create some of IBM's touchstone analytical systems.

Today, he is popular as the "Father of Business Intelligence." Advancements and Evolution into the late 1980's with the advent of computers in the business world, companies finally had an alternative to storing data on paper.

IBM's invention of the hard disk in 1956 revolutionized data storage. Floppy discs, laser discs, and other storage technologies meant that just as more and more data was being created, so too were there more and more places to store it.

This spawned the creation of the first database management systems, collectively referred to as decision support systems (DSS). By the 1970's a few BI vendors came up with tools that made accessing and organizing this data achieving.

But it was a new and clumsy technology. Most importantly, it was very difficult to use. In 1988 international conference aimed to streamline data processes. The several Data Analysis, held in Rome, was a landmark in simplifying BI analysis.

Turning Points in the 1980's and 1990'sThe modern phase of business intelligence began immediately after the 1988 conference. In 1989 Gartner analyst Howard Dresner again brought the phrase "business intelligence" into the common vernacular. He employed it as a general term to cover for data storage and data analysis, names like DSS and executive information system (EIS).

Competition from more vendors in the field led to advances including data warehouses. This new tool improved the flow of data as it moved from operational systems to decision support. Data warehousing drastically reduced time it took to access data. Data that traditionally had been stored in multiple places was now all in a single location.

Along with this development came supplemental facets of BI data warehousing that are staples of BI today. These included Extract, Transform, Load (ETL) tools and Online Analytical Processing (OLAP) software.[1]

In later years, this phase of development became known as business intelligence 1.0.

1.1 Business Intelligence 1.0

As business intelligence became a commonly known word in the late 1990's and early 2000's, dozens of new vendors hit the market.
During this period, there were two basic functions of Business Intelligence: producing data and reports, and organizing it and visualizing it in a presentable way.
Yet there remained two significant issues holding back this developing phase of the technology: complexity, and time.
multiple projects were owned by the IT department, meaning that most users were still not capable of executing BI tasks on their own. Current BI tools had not been developed with anyone but experts in mind, and large-scale analytics training was required to gain insights.
And because data was siloed, it took more time to formulate and deliver reports to decision makers.
Only knowledgeable person technical experts were able to utilize advanced data analysis software. Tools began to evolve to non-technical users, but it happened slowly.

1.1 Business Intelligence 2.0

The dawn of the 21st century marked a distinct turning point, as technologies developed to address issues of both complexity and speed. They were also provide support to the onset of Cloud-based programs that expanded and simplified the reach of business intelligence platform.

Business Intelligence 2.0 included a host of different technologies such as real-time processing, which incorporated information from events as they happened into data warehouses, allowing companies to make decisions based on the most recent information available.

Other technologies that came into play included self-service access for non-expert users, meaning that employees could now complete projects without interference from the IT department.

The exponential growth of the Internet supported and advanced these developments, in part through the genesis of social networking tools. Facebook, Twitter, and blogs gave users very simple and very quick ways of sharing ideas and opinions. It also provided a way for users to evaluate methods and software, and more broadly spread a basic understanding of the different uses of business intelligence. The more that people communicated, the more that they understood in it.
By 2005, the increasing interconnectivity of the business world meant that companies need real-time information, for a host of reasons. Chiefly they needed to keep abreast of the competition, and understand what their consumers wanted and what they thought of their company. [1]

BI was no longer an added utility, or a mere advantage. It was becoming a requirement for businesses looking to stay competitive, and even to remain afloat, in an entirely new, data-driven environment. Empowering End Users into the Modern Day The agility and speed of the mid-2000s business intelligence platform has undergone an intense refining process.

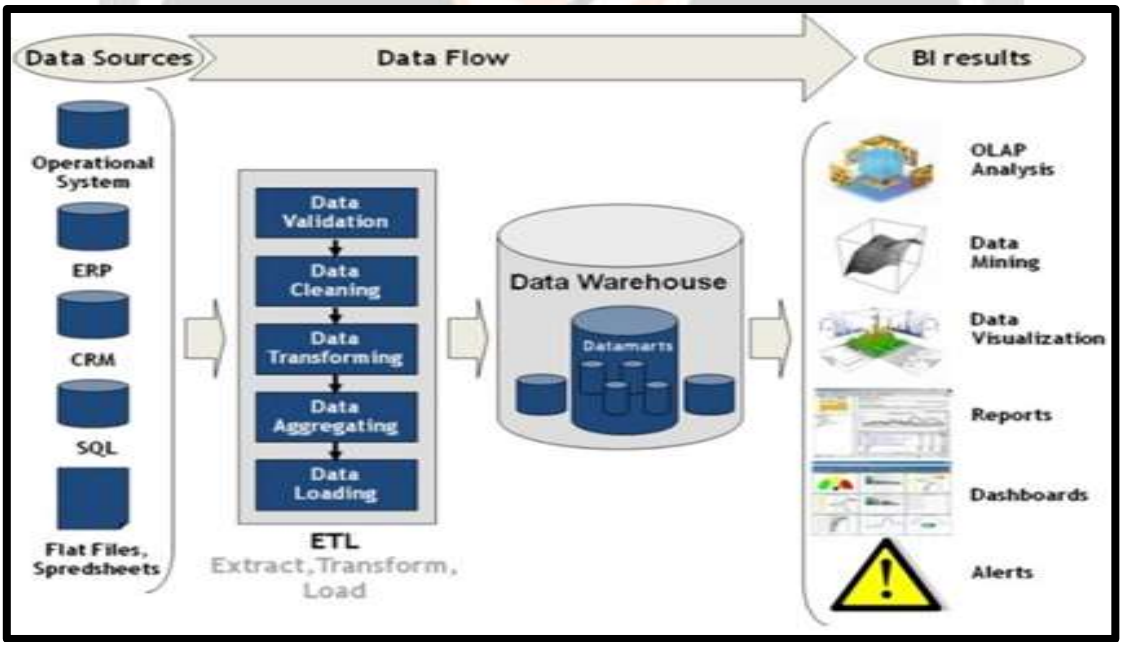

Figure 1: Architecture of Business intelligence

Tool specification, expanding self-service options, and improving visualization are three of the most important traits of the next frontier of BI evolution.

BI tools in the current day are often designed with a specific industry in mind, be it healthcare, law enforcement, or even professional sports. Known as "software virtualization," this growth of industry-specific tools

has contributed significantly to increased adoption of business intelligence. Self-service tools and visualization features rely on one another for their growth.
The big data revolution and explosion of the Internet left organizations with more data than before. Each person creates increasingly large amounts of information. Over 204 million emails are sent per minute.

Companies need even more visualization tools to actionably make sense of it. Visualization tools began to evolve to include the end-user even more. More platforms empowered users to complete self-service access, meaning that they could explore and utilize their data on their own, without training.

1.2 Cloud BI and Mobile BI

As more companies offered these unique, cutting-edge attributes became the only way to stay ahead of the curve.Vendors experimented with faster and cheaper tools.

One way to achieve both was through cloud BI, which hosts the software on the Internet, reducing storage costs and making access to organizational data and insights faster and more convenient.
Tangential to the cloud is the rise of mobile-empowered platforms, which allows users to work with BI on-the-go on smartphones, tablets, and other devices. As tools are perfectly improved, they are also being made simpler and more convenient, encouraging and wider changing.

2. Components of BI :

The research of B.I have the concepts of BI, its components,

- Emergence of BI,
- Benefits of BI,
- Factors influencing BI,
- Technology requirements,
- Designing and implementing business intelligence,
- Cultural imperatives, and various BI techniques.

This paper would be useful for researchers in the field of BI to understand the basic concepts of the OLAP, OLTP, ETL,CUBE and dimension

SQL Server Integration Services (SSIS): Programmable objects for moving, copying and transforming data, also (DQS) Data Quality Services.

SQL Server Analysis Services (SSAS): is BI stack, to develop Online analytical processing solutions. In simple terms, you can use **SSAS** to create cubes using data from data marts / data warehouse for deeper and faster data analysis.

SQL Server Reporting Services (SSRS): client components as in creating, managing and deploying tabular, matrix, graphical, and free from reports.

Master Data Service (MDS): To manage domain (Products, customer, accounts, & industries hierarchies, granular security, transaction, data versioning and business rules as well).

3.Management's tools:

SQL Server Data Tools (SSDT) Provide an IDE for BI components, ssis, ssas, ssrs. in Microsoft business intelligence.

Business Intelligence Tools Business intelligence tools are a type of application software designed to retrieve, analyze, transform and report data for business intelligence. The tools generally read data that have been stored in past, often, though not necessarily, in a data warehouse or data mart.

- Spreadsheets
- Reporting and querying software: tools that extract, sort, summarize, and present selected data
- OLAP: Online analytical processing
- Digital dashboards
- Data mining
- Process Visualization
- Data warehousing
- Local information systems Standalone tools | suites of tools | Components of ERP systems | Components of software targeted to a specific industry | Data warehouse appliances.

4. BI Competitors:

Pentaho, zap business, BIRST, SAS BI, TIBCO, Dataramo, Sisense, IBM CognosAnalytis, Sap Business object, tableau Server, Oracle BI 12c.

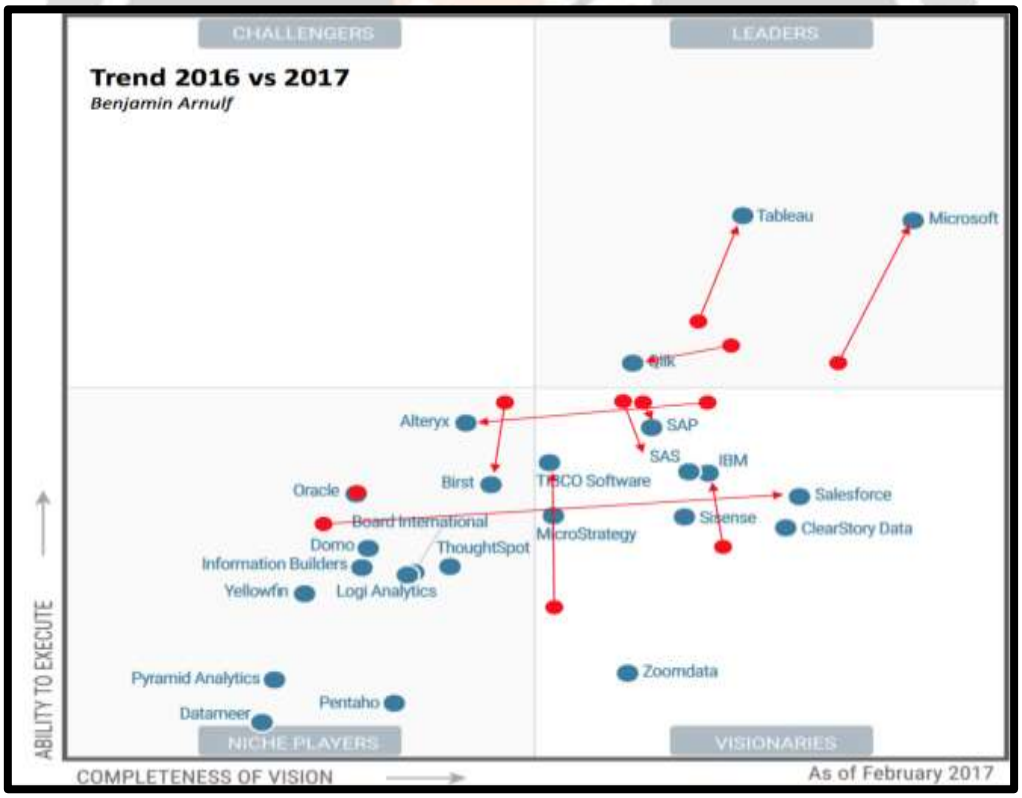

Figure 2: BI Competitors

5. Data warehouse and Data marts:

5.1 Data Warehouse:

Is a digital warehouse with all of the electronic enter data in a company • They store all of the company's information: daily and historical data • They gather heterogeneous information sources in one centralized area • It is used for reporting, data analysis and exploration, to see and detect changes and tendencies • Only two operations exist: load and query. Data Warehouse or Data Mart:

1. A Data Warehouse contains all of the company's information (wide scope, higher risk project). A Data Mart is targeted to solve one company's department needs in particular (limited scope, lower risk project). The Data Warehouse can be built joining multiple specific Data Marts.
2. Data Warehouse Objectives : Must allow easy access to the company's information. Must present this information in a consistent way. Must be adaptable and change-resilient. Must be a safe store, protecting the company's information assets. Must support the decision making process. Must be accepted by the decision makers to be successful
3. Data Warehouse Challenges: Has to unify the whole company's data model. Data latency , past data storage , Data quality, Speed and performance in queries, Independent of OLTP system changes.
4. How do we build a Data Warehouse? ETL processes Extract the information from transactional systems, Transform this information and they Load it into the data warehouse. The information is stored in multidimensional databases • Information is ready to be used. The systems to access information are easy to use.

5.2. Dimensional Modelling:

1. Dimensional Modelling :This Data Warehouse makes a business oriented database Measures Business Variables ,Numerical values , Sums, consolidations, arithmetic operations , Dimensions ,Texts ,Filters
2. Time Date-ID Facts Dimension Year Product-ID Month Date-ID Date-ID SKU Day Product-ID Branch-ID Description Category Total Type Branch-ID # Products Price Country # Tickets State Product Branch City Dimension Dimension
3. Why is it multidimensional : A dimension is one of the "edges" of your business , Customers , It is called multidimensional , Invoices because you can see the information from , Orders different "edges" at , Quotes the same time , Time , Activities
4. Reports : These are the classic reports we already know . When your reports are built with data from the Data warehouse you can trust on a reliable data source. Historical data can be accessed too You can build reports with data coming from different systems in the company All of the reports are accessed from the same location
5. Digital Dashboards: Is an information system similar to a car's dashboard, designed to be easy to read Easy and visual information presented in a way to help you detect and correct tendencies Use them to align company strategies among departments and global objectives
6. Key Performance Indicators (KPI): They measure specific items and help you organize, define and evaluate your objectives SMART: Specific, Measurable, Achievable, Relevant, Time-bound Number of new Customers, Opportunity closing average time, Customer loss index

   Conclusions : OLTP systems to support everyday work and give information to the company • OLAP systems to extract and analyze information and to make decisions • Dashboards to concentrate information in a centralized view • OLAP cubes to solve specific questions and freely explore information
7. Some Software Products you might need , Microsoft SQL Server Analysis Services , Microstrategy, SAS, OpenSource Alternatives (Pentaho)

6. BI Approaches in DW :

It has been said there are as many ways to build data warehouses as there are companies to build them. Each data warehouse is unique because it must adapt to the needs of business users in different functional areas, whose companies face different business conditions and competitive pressures.[10]

I. Top-Down :

· Emphasizes the DW· Starts by designing an enterprise model for a DW· Deploys multi-tier architecture comprised of a staging area, a DW, and "dependent" data marts· The staging area is persistent· The DW is enterprise-oriented; data marts are function-specific· The DW has atomic-level data; data marts have summary data.The DW uses an enterprise-based normalized model; data marts use a subject-specific dimensional model.Users can query the data warehouse and data marts. [10]

Pros
· Enforces a flexible, enterprise architecture. Once built, minimizes the possibility of renegade "independent" data marts. Supports other analytical structures in an architected environment, including data mining sets, ODSs, and operational reports. Keeps detailed data in normalized form so it can be flexibly re-purposed to meet new and unexpected needs. Data warehouse eliminates redundant extracts. [10]

Cons
Upfront modelling and platform deployment mean the first increments take longer to deploy and cost more. Requires building and managing multiple data stores and platforms. Difficult to drill through from summary data in marts to detail data in DW. Might need to store detail data in data marts anyway. [10]

II. Bottom-Up :

· Emphasizes data marts. Starts by designing a dimensional model for a data mart. Uses a "flat" architecture consisting of a staging area and data marts. The staging area is largely non-persistent.
· Data marts contain both atomic and summary data. Data marts can provide both enterprise and function-specific views. A data mart consists of a single star schema, logically or physically deployed. Data marts are deployed incrementally and "integrated" using conformed dimensions. [10]

· Focuses on creating user-friendly, flexible data structures. Minimizes "back office" operations and redundant data structures to accelerate deployment and reduce cost. No drill-through required since atomic data is always stored in the data marts. Creates new views by extending existing stars or building new ones within the same logical model. Staging area eliminates redundant extracts. [10]

· Few query tools can easily join data across multiple, physically distinct marts. Requires groups throughout an organization to consistently use dimensions and facts to ensure a consolidated view.
Not designed to support operational data stores or operational reporting data structures or processes. [10]

III. Hybrid :

· Emphasizes DW and data marts; blends "top-down" and "bottom-up" methods.Starts by designing enterprise and local models synchronously. Spends 2–3 weeks creating a high-level, normalized, enterprise model; fleshes out model with initial marts. · Populates marts with atomic and summary data via a non-persistent staging area .Models marts as one or more star schemas .Uses ETL tool to populate data marts and exchange meta data between ETL tool and data marts. Backfills a DW behind the marts when users want views at atomic level across marts; instantiates the "fleshed out" enterprise model, and moves atomic data to the DW. Provides rapid development within an enterprise architecture framework. Avoids creation of renegade "independent" data marts. Instantiates enterprise model and architecture only when needed and once data marts deliver real value. Synchronizes metadata and database models between enterprise and local definitions. Backfilled DW eliminates redundant extracts. Requires organizations to enforce standard use of entities and rules. Backfilling a DW is disruptive, requiring corporate commitment, funding, and application rewrites. Few query tools can dynamically query atomic and summary data in differentdatabases. [10]

IV. Federated :

· Emphasizes the need to integrate new and existing heterogeneous BI environments. An architecture of architectures. Acknowledges the reality of change in organizations and systems that make it difficult to implement a formalized architecture. Rationalizes the use of whatever means possible to implement or integrate analytical resources to meet changing needs or business conditions. Encourages organizations to share dimensions, facts, rules, definitions, and data wherever possible, however possible. [10]

Provides a rationale for "band aid" approaches that solve real business problems. Alleviates the guilt and stress data warehousing managers might experience by not adhering to formalized architectures. Provides pragmatic way to share data and The approach is not fully articulated.With no predefined end-state or architecture in mind, it may give way to unfettered chaos.It might encourage rather than reign in independent development and perpetuate the disintegration of standards and controls.[10]

7. ISSUES IN BI:

- Applications: In this section of the research agenda we will examine how analytic applications can help organizations make better decisions and manage performance.
- Leadership Competencies: We will develop research focused on issues related to the best practices for developing and organizing IT, user and business skills to lead a successful BI and PM initiative.
- Technology and Infrastructure: We will address and develop research for the complex needs of clients when matching business and user requirements to their technology and infrastructure.
- Vendors and Sourcing: We look at how the suppliers in the BI and PM markets will compete, and what factors organizations should consider when selecting products and providers.

I. Applications:

Key Issue:

How do businesses leverage information and analysis to improve performance? Most organizations equate BI with information delivery. However, the real value of BI is much more than information dissemination — it is strongly linked to achieving business goals and improving business performance. A growing variation of analytic applications is emerging that leverage BI technologies to better understand and manage business performance. Based on this trend, we believe that BI capabilities will become more pervasive in operational and workplace applications, as organizations seek to use BI to lead, support decisions, explore, measure, maintain and optimize their businesses, and thereby drive business transformation. The challenge is that most users (and vendors) don't see BI as a broad strategic initiative, but instead focus on short-term tactical issues. Each department has its own particular need for BI, but doesn't put the whole picture together as a clear and overall vision. The risk is that this could lead to a proliferation of "siloed" information and applications, focused on departmental or functional needs. For more information, see "Gartner's Business Intelligence and Performance Management Framework." Upcoming research will provide guidance on how to build a BI and PM strategy to avoid these pitfalls, how to align and integrate initiatives between IT, business functions and users, and balance tactical and strategic demands.

Key Issue: How can organizations identify the right performance metrics? Building dashboards for most organizations has been relatively straightforward. This is the reason why the measures in most report-centric BI deployments can be swiftly turned into a performance metric by providing a target goal and displaying the measure in an easy way to consume graphic, such as a dial or traffic light. function of this task transforms a report into a dashboard. BI and PM initiatives need to go further, linking the measures together with a cause-and-affect relationship, enabling a user to perform root-cause analysis. For example, if a sales metric is below target, a user could drill to see the primary metrics that impact "sales" to determine if it is excessive price discounting, a shrinking pipeline, or an elongating sales cycle that has the biggest impact. For further information, see "Understand Performance Management to Better Manage Your Business." Forthcoming

research will examine the best practices of moving from a disparate set of performance dashboards to a more coordinated use of performance metrics to give support to organization strategy.

II. Leadership Competencies

Key Issue: How can organizations build the business case for BI and PM?

Using the term "business intelligence and performance management initiative" implies a change from the status quo. Executing change requires the ability of leaders to convince others that the change is justified. Often it is the leaders of IT-centric BI deployments that first envision the use of information to improve the company's ability to make decisions and improve performance. Unfortunately, IT rarely has the political power to enforce this change. As a result, the key issue of building the business case for BI and PM is paramount to convincing executives to sponsor such a change. This could be organizational change, such as moving key business analysts from a departmental to an enterprise role, as part of the BI competency center. It could be a technical change, such as removing a stove-piped data mart architecture for a better integrated datawarehouse architecture. Or it could be a cultural change, affecting how the organization makes decisions and manages performance. IT leaders can use the numerous Gartner BI Excellence Award case studies for examples of where these types of changes have had a demonstrable impact. Also, see "Take these Steps to Develop Successful BI Business Cases." Upcoming research will examine more best practices with another round of BI Excellence Award case studies from this year's finalists and semi-finalists. Future research will also include recommended approaches for IT leaders to leverage industry examples to create their own business case.

Key Issue: What are the best practices for developing the organizational competencies and user skills? Previous research has shown that one of the biggest barriers to the success of BI is a lack of skills surrounding the use of information, tools and applications that are available as part of its implementation. Forthcoming research will define how an organization can develop and organize the program management, development and user skills necessary to turn business intelligence and performance management into a core competency. It will also provide support in terms of best practices for organizations which are employing a BI competency center (BICC) as a shared service/competency within the organization. For a further example, see "Toolkit: How to Define and Run a Business Intelligence Competency Center."

Key Issue: How can BI teams drive adoption of BI across the enterprise?

One of the fatal flaws of BI is believing: "If we build it, they will come." Indeed, lack of adoption is one of the most common and visible signs of failure. The situation often confounds leaders of IT centric BI teams. They gather the requirements directly from the users and generate solutions that exactly match their requirements. Yet the users still don't come. Unless they view the reports as strategic, and make reviewing them a part of their workflow, most business workers are too busy "putting out fires" all day long to stop and review the reports in a data warehouse. See "Business Intelligence Focus Shifts From Tactical to Strategic." Upcoming research will examine various strategies for driving adoption, including tying BI to corporate strategy, embedding it in business processes, more effective training and leveraging emerging technologies such as search, visualization and Web 2.0 that have proven their popularity among mainstream users.

III. Technology and Infrastructure Key Issue:

What are the best practices in generating a BI and performance management architecture?

Many organizations have defined an application architecture for their operational and transactional applications. However, they have not taken the same architectural approach to their BI applications. BI applications — and the technology infrastructure that supports them — are often required to provide capabilities that service multiple user types (for example, strategists, analysts, executives, process managers, partners, suppliers and so on), provide for a variety of planning and analytic functions and allow information to be acquired from multiple sources. Taking a siloed technology or opportunistic/tactical approach to BI implementations can lead to

inconsistent results, inflexible applications and infrastructure, and higher cost of ownership. Forthcoming research will provide organizations with frameworks and toolkits to help them choose the best technology for a more coherent blueprint/architecture and portfolio for BI and PM applications.

Key Issue: What is the best way to govern a portfolio of analytic applications and BI platform capabilities?

BI projects rarely focus on governance because they usually develop from departmental and workgroup applications. Contrast this with top-down-driven enterprise resource planning (ERP) application deployments that have strict security controls, and a formal process for application life cycle management which ensures proper development and testing before moving to production. How many new reports are heavily tested for accuracy before being moved to production and taken as "gospel" by viewers? This problem will be exacerbated when BI and PM projects are more widely adopted by a broader user community — inside and outside the company. For further information, see "Key Issues for Establishing Information Governance Policies, Processes and Organization, 2008." Upcoming research will examine how IT leaders can inject a healthy dose of security and governance into their BI and PM initiative.

IV. Vendors and Sourcing Key Issue:

How will the BI, analytics and performance management markets and vendors evolve? 2007 was a tumultuous year for BI and PM. Business Objects, Cognos and Hyperion — three vendors that pioneered the BI space — were acquired, shifting the balance of power, and market share, toward the megavendors. It is noteworthy that all three of these BI platforms also had a strong corporate performance management offering, signaling the convergence of these two markets. However, unlike the convergence of reporting with ad hoc query and online analytical processing (OLAP) tools, the corporate performance management (CPM) and BI platform markets have distinctly different customer bases — finance and IT, respectively. These different customer constituencies will complicate standardization decisions as vendors attempt to sell suites that combine BI and CPM functionality. For further information, see "Findings: BI and CPM Are Slowly Converging." Upcoming research will closely examine these market trends and discern their impact on customer's product road maps.

Key Issue:

What criteria should be used to evaluate vendor offerings?

The consolidation in the market has not simplified vendor selection decisions; if anything, it has made them more complicated, because the acquisitions have thrown many existing product road maps into confusion. Buyers need to cut through the marketing promotion. to identify the capabilities and solutions from vendors that best meet their business needs. For further information on the need to evaluate vendors, see "Magic Quadrant for CPM Suites, 2007" and "BI Platforms User Survey: How Customers Rate Their BI Platform Vendors." Forthcoming research will examine key selection criteria such as the importance of stack integration, best of breed capabilities and licensing implications.

Key Issue: Should organizations build, buy or customize analytic applications?

In addition to building analytic applications with BI platforms, packaged analytic applications are emerging as an offering across the whole spectrum of BI and PM. Some areas, such as CPM, are relatively mature and are rapidly becoming part of the capability of a BI platform, while others, such as product performance management, are still emerging. Organizations need to conduct a balanced "build vs. buy" analysis; all potential options — including packaged analytic applications, internal development and external development — have unique strengths and weaknesses, and are equally viable, given the appropriate circumstances. For further information, see "Understanding Packaged Analytic Applications." Future research will guide clients on how to balance their application and technology portfolio across these options. It will also explore the role of service providers in delivering solutions.

V. BI Technology used:

Business intelligence (BI) is a technology-driven process for analyzing data and show actionable information to help corporate executives, business managers and other end users make more informed business decisions. BI have a wide variety of tools, applications and methodologies that enable organizations to collect data from internal systems and external sources, prepare it for analysis, develop and run queries against the data, and create reports, dashboards and data visualizations to make the analytical results available to corporate decision makers as well as operational workers.[11]

The potential benefits of business intelligence programs include accelerating and improving decision making; optimizing internal business processes; increasing operational efficiency; driving new revenues; and gaining competitive advantages over business rivals. BI systems can also help companies identify market trends and spot business problems that need to be addressed.Business intelligence combines a broad set of data analysis applications, including ad hoc analysis and querying, enterprise reporting, online analytical processing (OLAP), mobile BI, real-time BI, operational BI, cloud and software as a service BI, open source BI, collaborative BI and location intelligence. BI technology also includes data visualization software for designing charts and other infographics, as well as tools for building BI dashboards and performance scorecards that display visualized data on business metrics and key performance indicators in an easy-to-grasp way. BI applications can be bought separately from different vendors or as part of a unified BI platform from a single vendor. [11]

BI programs can also incorporate forms of advanced analytics, such as data mining, predictive analytics, text mining, statistical analysis and big data analytics. In many cases though, advanced analytics projects are conducted and managed by separate teams of data scientists, statisticians, predictive modellers and other skilled analytics professionals, while BI teams oversee more straightforward querying and analysis of business data. [11]

Business intelligence data typically is stored in a data warehouse or smaller data marts that hold subsets of a company's information. In addition, Hadoop systems are increasingly being used within BI architectures as repositories or landing pads for BI and analytics data, especially for unstructured data, log files, sensor data and other types of big data. Before it's used in BI applications, raw data from different source systems must be integrated, consolidated and cleansed using data integration and data quality tools to ensure that users are analyzing accurate and consistent information.In addition to BI managers, business intelligence teams generally include a mix of BI architects, BI developers, business analysts and data management professionals; business users often are also included to represent the business side and make sure its needs are met in the BI development process. To help with that, a growing number of organizations are replacing traditional waterfall development with Agile BI and data warehousing approaches that use Agile software development techniques to break up BI projects into small chunks and deliver new functionality to end users on an incremental and iterative basis. Doing so can enable companies to put BI features into use more quickly and to refine or modify development plans as business needs change or new requirements emerge and take priority over earlier ones. [11]

8. Challenges faced by BI:

The 5 biggest Business Intelligence challenges facing organisations today Business Intelligence challenges Our recent survey into common Business Intelligence challenges highlighted some interesting problems faced by companies when it comes to producing management reports.

In this article we take a look at the five biggest challenges faced by these businesses and explore what solutions are available.they had 10,857 respondents, coming from over 150 different countries, and representing 18 different industry sectors, vary from manufacturing, logistics and retail to telecommunications, construction and healthcare.

So what were the biggest Business Intelligence challenges faced by these businesses?

‘What is your biggest management information challenge?’

Delivering self-service reporting/ analysis

From the data gathering results, it is clear to see that the biggest Business Intelligence challenge facing our respondents is the ability to provide self-service reporting and analysis across their organisation.
35.8% of respondents listed this as their biggest reporting concern.

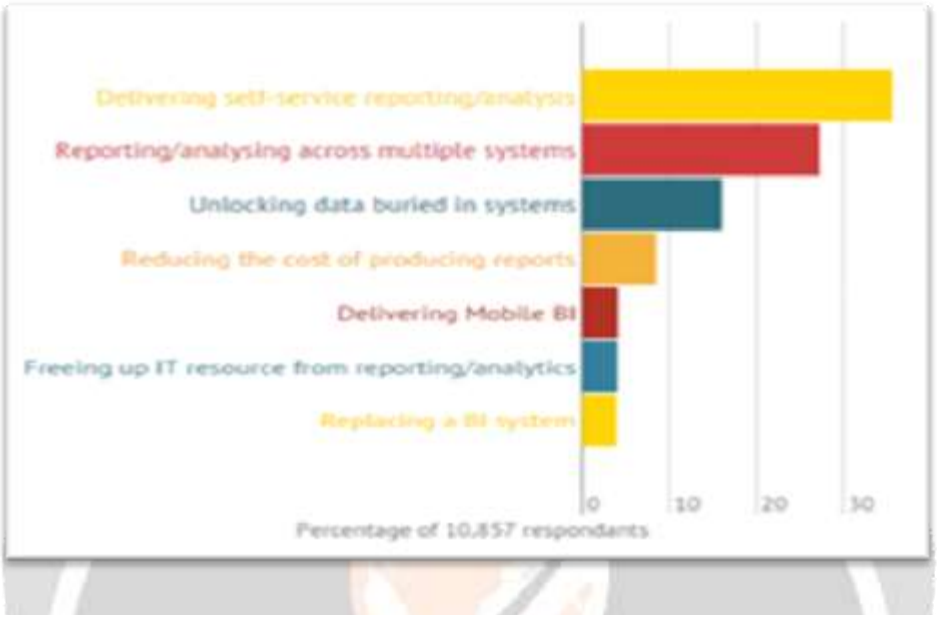

Chart 1: Five business intelligence challenges results

One of the biggest problems with traditional business intelligence tools is that they are so complicated to use that only a few key individuals within the company know how to handle them. Bottlenecks can quickly from around these key individuals, and this can slow down the whole reporting process.

By investing in a business intelligence tool, businesses can reslove these bottlenecks by giving power to those people who really need it as the end users. Research has shown that organizations balance the use of these tools across the business – by making them more user-friendly – achieve a significantly higher Return on investment (ROI) on their investment as a result.

I. Reporting/ analysing across multiple systems :

The second biggest Business Intelligence challenge facing was ‘report generating and analysis across different systems’, with 27.4% given as their biggest challenge. Most companies these days already gather a lot of data surrounding their business operations. The problem is that this data is often spread across a variety of different systems and software, which makes it difficult to bring together.

With data spread across multiple systems, getting at the information you need can be an arduous task, and achieving a ‘single version of the truth’ is almost impossible. Data may be stored in different way of ERP systems, CRMs and Excel spreadsheets.

Extracting data from these several sources, and bringing it together into a centralised data warehouse, can make it much easier to benefit quick and reliable insights.

II. Unlocking data buried in system:

The third biggest Business Intelligence challenge was found to be ‘undo the data hidden in systems’.

Even if you have the data already in place – and you know where it is – this does not necessarily mean that it is easily accessible. Getting at the informational data you need, when you need it, can be an extremely difficult process when the data is putted in complex systems and software.

To gain any real value from your data, you need to be able to transform and manipulate it into the right shape easily. Using a data warehouse and a productive ETL process, you can clean up your data, get it into the right way, and apply any business rules or calculations on it.

III. Reducing the cost of producing reports :

As with many other areas of the business, when it comes to reporting, it is crucial that you keep an eye on costs. It is therefore no hidden surprise to see that 'reducing the cost of effective reports' was found to be the fourth biggest Business Intelligence challenge facing our respondents.

With traditional business intelligence projects, costs can easily get out of control. Not only do you have to work large amounts of investment into getting the software up and running, but you also need to separate out for all the ongoing maintenance and support costs associated with these tools.

IV. Delivering Mobile BI :

'Delivering Mobile BI' is the fifth biggest Business Intelligence challenge facing organisations.

As mobile devices rapidly changing the way we do business, it is no surprise to see that there is a high need for mobile business intelligence and analytics.

As the results show, busy managers and senior executives have to be able to access the an accurate need, when they need them, wherever they are, on a range of different devices.

9. Future of BI:

- Big data as a driver
- Realizing the future
- Training
- Organization
- Workload management.
- Technological advances
- Big data
- Education induces simplification
- Infrastructure changes
- Workload automation
- New technologies
- Data discovery
- Data visualization
- Mobile
- The cloud BI.

10. Conclusion:

In this paper Business Intelligence solutions make it possible for every and each company within organizations to gain actionable insight from business data, and to leverage these insights to meet critical goals.

Business intelligence solutions offer business-focused analysis at a scale, complexity, and speed that is not achievable with basic operational systems reporting or spreadsheet analysis, thereby delivering

significant value it is much easier to search but the past contains the information needed for analysis and decision making.

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