Business Intelligence in Big Data

Er. Chinu[1], Er Kanika[2], Er Ekta[3]

[1]Assistant Professor, Computer Science and Engineering, Baba Farid College of Engg. &Tech,Bathinda,India
[2]Assistant Professor, Computer Science and Engineering, Baba Farid College of Engg. &Tech,Bathinda,India
[3]Assistant Professor, Computer Science and Engineering, Baba Farid College of Engg. &Tech,Bathinda,India

ABSTRACT:- *This paper primarily focuses on Business Intelligence in big data.Business Intelligence is a process for extracting, transforming, managing and analyzing large data to gain information and knowledge to help make decisions in the complex systems. Most companies collect a large amount of data from their business operations and to keep track of that information, it requires various software's to maintain it. Using multiple software programs makes it difficult to retrieve information in a timely manner and to perform analysis. At that time BI plays an important role.*
Index Terms:- *Big data, Business Intelligence, Framework*

I. INTRODUCTION

The term paper primarily focuses on Business Intelligence in big data. Big data Management is one of the key challenges that we people are facing today in the big and small organizations. To digest business intelligence properly we need to know about Big Data. Generally Big Data is the foundation for creating new levels of business value. With integrated storage, analytics, and applications, Big Data helps driving the efficiency, quality, and personalized products and services, producing higher levels of customer satisfaction and experience [1].The amount of data in our world has been exploding, and analyzing these large data sets called as big data will become a key basis of competition, productivity growth and innovation [2].Every day, we create 2.5 quintillion bytes of data that is so much that 90% of the data in the world today has been created in the last two years alone. This data comes from everywhere: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone GPS signals. This data is big data [3].Big data spans in three dimensions Volume,Variety and Velocity.

II. BUSINESS INTELLIGENCE

Business intelligence systems combine operational data with analytical tools to present complex and competitive information to planners and decision makers. The objective is to improve the timeliness and quality of inputs to the decision process, hence facilitating managerial work. Business Intelligence is used to understand the capabilities available in the firm; the state of the art, trends, and future directions in the markets, the technologies, and the regulatory environment in which the firm competes [5].

BI systems combine data gathering, data storage, and knowledge management with analytical tools to present complex internal and competitive information to planners and
decisionmakers[5].

Business intelligence systems provide actionable information delivered at the right
Figure 1 shows the variety of information inputs available to provide the intelligence needed in
Decision Making.

2. What Does BI Do?

BI assists in strategic and operational decision making. The strategic use of BI is in the following order :
1. Corporate performance management
2. Optimizing customer relations, monitoring business activity, and traditional decision   support
3. Packaged standalone BI applications for specific operations or strategies

4. Management reporting of business intelligence

Business intelligence is a natural outgrowth of a series of previous systems designed to support decision making. The emergence of the data warehouse as a repository, the advances in data cleansing that lead to a single truth, the greater capabilities of hardware and software, and the boom of Internet technologies that provided the powerful user interface all combine to create a richer business intelligence environment than was available previously. BI pulls information from many other systems.
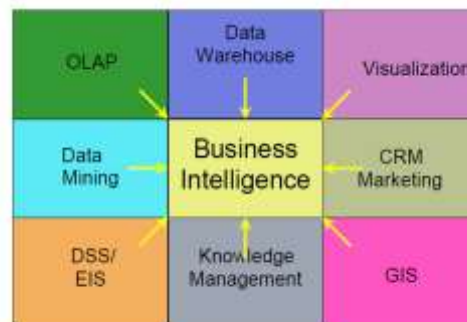
where: OLAP = on-line data processing, CRM=customer relationship management,
DSS= decision support systems, GIS = geographic information systems
Figure 2: BI Relation to Other Information Systems.

Figure 2 depicts some of the information systems that are used by BI[5]

BI converts data into useful information and, through human analysis, into knowledge. Some of the tasks performed by BI are:• Creating forecasts based on historical data, past and current performance, and estimates of the direction in which the future will go.
• Ad hoc access to the data to answer specific, non-routine questions.
• Strategic insight [5]

III.   BI METHODOLOGY

BI is a strategic initiative by which organizations measure and drive the effectiveness of their competitive strategy. BI projects go through the following phases as depicted: [6]

Analysis:
Every BI project should clearly justify the cost and the benefits of solving a business problem. Requirement analysis is performed including a predefined set of the key performance indicators (KPIs) that are required by the end users. The analysis phase produces a high level design of the various components of the solution with the source of relevant information

Designing:
Based on the complexity of the solution and the requirements, appropriate BI technologies are selected. Analysis for the functional deliverables is best done through prototyping. This gives them an opportunity to adjust their delivery requirements and their expectations database[6].

Development:
The requirements for what type of meta data to capture and store must be documented in a meta model. In addition, the requirements for delivering meta data to the users have to be analyzed. If a meta data repository is purchased, it will most likely have to be extended with features that are required by BI applications. If a meta data repository is built, the database has to be designed based on the meta model developed during the previous step. The database design schema must match the access requirements of the business.

Deployment:
Once all components of the BI application are thoroughly tested, the application is deployed to the user ends. The success of BI project primarily lies on the quality of end user training and support. This phase requires an interactive approach, with extensive user training and adjustments to meet the user needs. This phase includes the development of predefined reports and analyses for the business users, and laying the groundwork for more advanced analytics in the future.

Evolution:

Measuring the success of application, extending the application across the enterprise and increasing cross-functional information sharing are the goals of evolution.

The life cycle of BI system repeats with the methodology operating at a new level of focus consisting analysis, re-evaluation, modification, optimization and tuning [6].

IV.   BI FRAMEWORK

Business intelligence is a boon to enterprises because they pull together vast quantities of real time information from different kinds of systems and distill them into focused views of the business. In all business situations, obtaining intelligence is critical [6].

I.   Metrics for determining the necessity for implementing business intelligence within the organization are as follows:
- Generation of huge amount of data in contrast to small amount of information
- Finding history of business records
- Busiest IT section with no time for report generation.
- Enhancing business processes to become more profitable
- Unable to organize data in the way by which it should be organized
- Faster decisions making based on factual information
- Organizational structure wise report generation
- Measuring time spent in extracting and analyzing data [6]

II.   Aspects that the organizations need to consider for implementing business intelligence solutions are as follows:
- What are the goals for using information and
- How are they prioritized?
- Who are the users of information in the organization and how do the information requirements change among user groups?
- Does the organization culture allow information to be used as a strategic asset? How does the organization share information with partners and customers?
- What are the corporate goals for implementing
- BI strategy?
- How are decisions made in the organization?
- Does BI support and facilitate collaboration around data?
- How do the competitors use **BI** for information sharing with customers and partners?
- How will BI deployment add value to existing applications?
- What are the best practices for deploying BI?

III.   Enterprises wishing to implement business intelligence faces the following challenges:
- Providing access to extensive resources from devices with limited capacity.
- Benchmarks and performance targets
- Creating a new information infrastructure to support the development and deployment   of multiple applications.
- Integrating to existing enterprise/ legacy systems and connecting with multiple networks.
- Creating solutions that perform in and out of both network coverage and managing the solution.
- Enforcing security and role-defined access to the data warehouse.

IV.   The completeness and adequacy of BI infrastructure is evaluated by the following guidelines:
- Effective data integration process to create required business intelligence on a daily basis.
- Continuous monitoring processes to allow alerts to be communicated immediately.
- Automated information delivery process. Fully automated warehouse administration infrastructure.
- Availability of information on standardized dimension such as customer, product and geography.
- Delivery of answers to all key business questions.
- Integrated enterprise portal infrastructure and to deliver business intelligence.
- Higher end user acceptance having a consistent look and feel across different applications and clear help desk and training policies [6].

V. BIG DATA VS. TRADITIONAL BUSINESS INTELLIGENCE

An ever-increasing number of B2B organizations of all sizes are moving beyond the constraints of traditional business intelligence by taking on the challenge of harnessing Big Data. As interest in Big Data increases, so do the number of tools available to address its demands [11].

Big Datais Eclipsing Traditional BI

Big Data offers major improvements over its predecessor in analytics. BI has always been top-down, putting data in the hands of executives and managers who are looking to track their businesses on the big-picture level. Big Data, on the other hand, is bottom-up. When properly harnessed, it empowers business end-users

While the scope of traditional BI is limited to structured data that can be stuffed into columns and rows on a data warehouse, the fact is that over 90% of today's data is unstructured. BI could never have anticipated the multitude of images, MP3 files, videos and social media snippets that companies would contend with in the Big Data era, but that's the reality of business today. Traditional BI is left behind by forward-looking businesses that are desperate to gain competitive advantage from unstructured business data floating around within and beyond their enterprise.

How Big Data is killing Business Intelligence?

Business intelligence is dying. The amount of data available is exploding like never before, and within that data valuable knowledge is hiding [7].

Traditional business intelligence vendors are struggling to keep up. Their tools aren't designed to examine through Big Data. They cannot identify what is meaningful and what should be ignored. They simply present reports on all of it, which quickly becomes a hairy mess of charts, graphs, and grids. They are attempting to update their tools to keep up with Big Data by using tools like Hadoop. But with products build for a data world unlike our current reality, these measures are not enough. The volume of data shows BI is outdated.

BI simply cannot put Big Data to work for its customers. Fortunately, there are new tools becoming available which fill this gap. Companies like Tableau are creating solutions which make it easy to explore data and find answers. We classify these types of tools as "Data Discovery" tools. They make it easy (or at least, easier) to find the interesting data within the mountains of available data. The analytics market is bifurcating into two segments: the old "business intelligence" market and the new "data discovery" market.

Data discovery

It is an alternative to enterprise BI platforms offering highly interactive and graphical user interfaces. The two branches of BI can be defined as follows:

1. Enterprise BI platforms:
Key buyers: IT.
Main sellers: megavendors, large independents.
Approach: top-down, IT-modeled (semantic layers), query existing repositories.
User interface: report/KPI dashboard/grid.
Use case: monitoring, reporting.
Deployment: consultants.

2. Data discovery platforms:
Key buyers: business.
Main sellers: small, fast-growing independents.
Approach: bottom-up, business-user-mapped (mashup), move data into dedicated repository.
User interface: visualization.
Use case: analysis.
Deployment: users.
Data discovery capabilities will become increasingly important as the amount of data continues to increase and the traditional business intelligence fails to keep up [7].

3. Business Intelligence Software

Business intelligence software has been used to define a wide variety of applications and platforms. In fact business intelligence software often defines a group of applications and uses - rather than a specific piece of software. With business intelligence software, companies try to influence the data that has been collected over the years to create an easy to use, easy to interact with, visual analysis model for business users. BI software then is primarily used to help business users make decisions.

The Challenges of Business Intelligence Software
- **Getting your Data to Business Intelligence Software:**

This opposite nature of goals and purposes is at the root of the cost problem. First, in the deployment stage, business intelligence software must somehow be able to access the data stores (the SQL databases) where the data is saved. At first this seems to be a simple issue. Just connect to the source database and begin reporting. The problem is that because of the nature of SQL databases the process of issuing queries for large amounts of data can be complex and extremely time consuming. A simple report query from a business intelligence software platform can bring an SQL server to near halt as it becomes busy finding records and computing the necessary results. To solve this problem the data warehouse was invented. A data warehouse sits between a business intelligence software platform and the data stores with a single goal: aggregate data and prepare data for the business intelligence software platform. Preparing data warehouses is expensive and extremely time intensive and has led to multi-billion dollar businesses whose only purpose is the creation and management of data warehouses.

- **Dirty Data and Business Intelligence Software:**

The conflicting goal of SQL databases and business intelligence software creates a second costly problem:

As data is entered in SQL database, an error in data entry creates a problem of data pollution. When viewing data in small segments, the human brain easily and quickly "filters" the data that is not relevant on the fly and helps us make sense of relevant information. A business intelligence software platform, on the other hand, aggregates data based on hundreds, thousands, often millions of rows of data, making the task of visually judging "clean" from "dirty" data nearly impossible.[8]

- **New Trends in Business Intelligence Software:**

The business intelligence software industry has been working for years to try to solve both of these fundamental problems. New technologies like in-memory caching are being coupled with rediscovered ones like columnar databases to help solve the challenge of performance. As companies continue to grow the volume of data they store, using new and improved data caching and storage methods is a critical aspect of any business intelligence software implementation. The problem of solving "dirty data," is not as simple. Data cleansing and filtering tools help, but the challenge of cleaning our data is one that must be solved before the data ever reaches the business intelligence software platform. As the industry continues to evolve we will have to address both challenges to help business users make the most use of their available data [8].

VI.   CONCLUSION

The objective of BI is to improve the timeliness and quality of inputs to the decision process, hence facilitating managerial work. Many industries are using BI applications to reach beyond the enterprise and share information with vendors and customers. Implementing BI within the enterprise is not the destination, but a journey towards an ideal enterprise. Big Data can provide forward-looking insights for businesses but business intelligence has traditionally focused on past data. So, big data is eclipsing the business intelligence.

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