Business Intelligence in Financial Institutions

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Abstract
Businesses are undergoing a fundamental shift in the way they make decisions. In today’s rapidly changing environment, decision-making occurs more frequently and at all levels of an organization. Many organizations invested in their core data infrastructures to facilitate accurate information dispersal, but the trend towards democratization of information and broadening decision-making responsibilities demands more. Various set of software solutions ranging from reporting and data mining tools to data integration and warehousing and prepackaged analytic applications are available. The motivation for investment in any application is consolidation and gain global visibility and streamlining operations and production process. When it comes to supporting diverse decision-making processes, such as manufacturing quality analysis, financial planning, marketing campaign- or supplier relationship management, one-size-fits-all solutions rarely work. It is imperative for organizations to deploy appropriate solutions to support the decision-making needs of end users.

Business Intelligence (BI) technologies can help financial institutions to manage risk, detect fraud, leverage customer insights and gain visibility into their profitability, but few have deployed them to maximum effect. This paper looks at the issue of managing risk through information visibility and availability using BI. It highlights the importance of data quality and integrity to the success of BI projects and explores the practical issues involved in integrating BI into existing application infrastructures.

Keywords
Business Intelligence, Customer Relationship Management, Knowledge Management

1. Introduction
“Business intelligence is the process of gathering high-quality and meaningful information about the subject matter being researched that will help the individual(s) analyzing the information, draws conclusions or make assumptions.” Business intelligence refers to the use of technology to collect and effectively use information to improve business effectiveness. An ideal BI system gives an organization's employees, partners, and supplier's easy access to the information they need to effectively do their jobs, and the ability to analyze and easily share this information with others.

Business Intelligence (BI) is a terminology representing a collection of processes, tools and technologies helpful in achieving more profit by considerably improving the productivity, sales and service of an enterprise. With the help of BI methods, the corporate data can be organized, analyzed in a better way and then converted into an useful knowledge of information needed to initiate a profitable business action. Thus its about turning a raw, collected data into an intelligent information by analyzing and re-arranging the data according to the relationships between the data items by knowing what data to collect and manage and in what context.

Late seventeenth century was an era of growing international trade. New shipping routes were discovered and adventurous sailors brought exotic products from strange and alien lands. But their journeys across the oceans were fraught with danger and unknown risks. They required some kind of protection against the peril lurking in high seas. This gave rise to a new breed of entrepreneurs - marine underwriters - who agreed to cover the losses in return for a fixed amount of premium.

Their business depended on current information about the sea routes, pirates, political condition, weather patterns, conditions aboard the ship, and consumer tastes for exotic products. In order to acquire business information, many marine underwriters began to frequent Edward Lloyd's coffeehouse in London. This was the place where they could share business intelligence with other underwriters and captains of trading ships. In 1771, seventy nine underwriters who did business at Lloyds' got together to form a society that went on to become the most famous of all insurance companies - Lloyd's of London. The very 'Business Intelligence' that brought together the marine underwriters at Lloyds' is, if anything, much more crucial for the insurance industry today. It pervades almost every aspect of the value chain and technology has the potential of making it ubiquitous across the organization. Today, an underwriter would not go to a coffeehouse to gain business intelligence; but, probably, to get away from it. And one thing is sure: she cannot afford to stay in the coffeehouse for long.

The insurance industry is totally dependent on the ability to convert raw data into intelligence - intelligence about customers, markets, competitors, and business environment. Over the years data processing technology has progressed phenomenally and tools like data warehousing, OLAP and data mining, which constitute the cornerstone of an effective business intelligence (BI) environment, have been widely
accepted across industries. However, insurance companies have been relatively slow in adopting these tools, primarily because of lack of competition due to protective regulations. But now, they can no longer afford to be compliant as the Internet, deregulation, consolidation, and convergence of insurance with other financial services are fast changing the basic structure of the industry.

2. Research Approach
First a Literature survey was performed along with the reference to a lot of web-sites for gathering relevant data about the various articles, models, parameters, issues revolving around Business Intelligence. After learning the various aspects of BI the finance industry was looked at a broader level and the ongoing trends in this industry were noted. It was seen that the financial services industry is rapidly changing. Factors such as globalization, deregulation, mergers and acquisitions, competition from non-financial institutions, and technological innovation, have forced companies to re-think their business strategy. “As competition intensifies in the retail financial services marketplace, accurate measures of customer value down to the account level are becoming increasingly pivotal to success at the retail end of the market. This applies both to established players and new entrants.” Financial services companies now have to create new revenue streams, enter new markets, gain market share, and reduce operational costs. In addition, customers’ expectations are changing. They are becoming better informed and more demanding. Companies are therefore transforming their management strategy to become more customer-centric than product focused. Though these challenges span the financial services industry, consumer banking, investment banking, and insurance each has its own unique demands that require different success strategies.

In order to Second, case study method was chosen as the research instrument to evaluate the applicability of the evaluation approach. Case study research was used to primarily consider the qualitative and observational, using predefined research parameters.

Case study like CIB – A BI IMPLEMENTATION CIB-Credit Information Bureau, a State Bank of Pakistan’s department responsible for maintaining the information related to borrowing related to any person, company, and/or group of companies, was investigated to know the critacility of in-depth market intelligence, quick decision-making and implementation in today's quickly changing BFSI (banking, financial services and insurance) marketplace. As customer focus replaces the traditional product focus, organisations are reengineering their businesses, resulting in parameters such as customer satisfaction and loyalty being driven by personalised products and services.

Enterprise-wide access to 'smart' data gives banking companies a critical edge by helping them

- Understand customer needs at specific locations with respect to products and services;
- Identify the characteristics of loyal customers and deploy effective retention programs;
- Cross sell / up sell products to increase revenue generation;
- Streamline processes to achieve higher profitability on every operational unit, product / service, and customer;
- And detect risk early to reduce the probability of defaults.

Thirdly, first hand information was obtained from various Insurance companies (Name withheld) which led to the making of an Integrated model that can be applied to insurance industry in specific.

An Integrated model developed for Insurance Industry

3. Business Intelligence:
Traditionally reporting in an organization often flows up the management hierarchy of the business e.g. Production operators will collect information about a production line, e.g. units produced, production time, down time and utilization %, this information will be passed to a shift supervisor who may well pass it in a summarized form to the production manager and then to a production director. “The key to an information marketplace is an active information repository--or catalog--which contains or points to a variety of “information objects” both inside and external to the organization. Users can browse through the catalog, shopping for objects that interest them and publishing objects that they've created or modified for others to consume.”

3.1 Analytic versus Business Intelligence
“Information workers at all levels of the organization need to be able to interact with the data: to drill down, drill up, slice and dice business information to quickly find the relevant facts on their own, without administrative intervention.” Both business intelligence tools and analytic applications draw on information that has been sourced from multiple disparate systems across (and sometimes
3.2 BI Environment & Business flow:
Business Intelligence is all about converting large amounts of corporate data into useful information, thereby triggering some profitable business action with the help of knowledge acquired through BI analysis. Implementing BI is a long process and it requires a lot of analysis and investment. A typical BI environment involves business models, data models, data sources, ETL, tools needed to transform and organize the data into useful information, target data warehouse, data marts, OLAP analysis and reporting tools.

Setting up a Business Intelligence environment not only rely on tools, techniques and processes, it also requires skilled business people to carefully drive these in the right direction. Care should be taken in understanding the business requirements, setting up the targets, analysing and defining the various processes associated with these, determining what kind of data needed to be analysed, determining the source and target for that data, defining how to integrate that data for BI analysis and determining and gathering the tools and techniques to achieve this goal.

Following sections explain each of these areas in detail and the sample figure shows a BI environment in its simplest form.

Sample Business Intelligence Environment

3.3 Factors driving Business Intelligence
Organizations of all kinds, worldwide, are facing enormous challenges from an increasingly turbulent and highly competitive environment: new types of competitors; deregulation; mergers and acquisitions; "co-opetition," global competition, Internet competition, and new partnerships and alliances.

There's been a revolution in the worldwide business landscape. Companies of all sizes are experiencing the rise of intense international competition and faster production cycles. These businesses are witnessing revolutionary new communications tools, like the Internet, and explosive growth in the service sector.

There's been an exponential growth of data. That includes transactional data from ATMs, checking accounts and points of sale, and data from reservations systems, telephone transactions and the Internet. Increasingly we will see data from the growth of what has been called "pervasive computing" -- chips embedded in sales tags to track purchases, in appliances to monitor and advise of service checkpoints, in automobiles and other products. Then there's operational data from business processes and operations, from sales and service transactions, and from surveys and direct marketing campaigns.

There are 600 million credit cards worldwide and 100 billion credit card transactions a year in the U.S. alone. Telephone companies in the U.S. collect 200 million call detail records every day. And Web site hits are generating mountains of market data.

New technologies -- like parallel processors and parallel data bases -- and the availability of low cost storage -- have the power to deal with all that data. Advanced analytics and sophisticated data mining software that is widely in use today was not even available as recently as two years ago. Increased computing power and lower processing cost makes it practical and affordable for businesses to apply the same kind of "Deep Computing" techniques previously reserved to research institutions and government laboratories -- intense and repetitive data mining of huge amounts of data using complex algorithms and analytics. The result is what many call "Deep Commerce," or the mining, segmentation, strategic analysis and management of vast amounts of customer demographics, product purchase
histories, cross-sales, service calls, marketing campaigns, Internet experiences and other on-line transactions -- all focused on driving strategic business decisions.

Ten years ago the cost of a terabyte of data was some ten times what it is today. Businesses that as recently as a few years ago thought they might top out at 200 or 300 gigabytes of data are revising their estimates to terabytes and beyond.

The Gartner Group, Meta Group, and other analysts and consultants report that just about all their large customers either have, or will soon have, all their essential business information in a data warehouse. These same experts say that business intelligence is the second most asked about topic by their clients; right after the Internet. And a recent survey by InformationWeek magazine of 250 U.S. IT executives determined that business intelligence played in four of their top five business priorities.

For many organizations and businesses, effective use of information technology to manage knowledge in the organization will not only influence how fast they can grow, but whether they can even survive!

3.4 Industries that benefit the most Generally speaking, the industries that stand to benefit the most from Business Intelligence applications are those that

(1) interact with lots and lots of consumers;

(2) gather lots of information in the course of selling products and providing services to their customers; and

(3) are in very competitive businesses, where it is increasingly difficult to differentiate their products and services from those of their competition.

3.5 Creating the 360-Degree View Through Effective Business Intelligence In today’s competitive global environment, organizations seeking to make informed strategic decisions, manage their assets and maximize shareholder value must turn to business and competitive intelligence in order to act ahead of the curve.

Business is constantly moving and changing. Product cycles are becoming shorter and shorter. Partners become rivals overnight as mergers and acquisitions occur on a daily basis. How do we keep an eye on our competitors? We exchange this kind of information all the time. We hear news about our competitors from our sales people in the field. Marketing folks exchange anecdotal information and gossip at trade shows. The Internet gives us more information than we know what to do with, through content rich Web sites, market analyst reports and various discussion message boards.

That’s why competitive intelligence is so important. Business and competitive intelligence are the key success factors in organizational planning, mergers and acquisitions, marketing, pricing and product development activities.

It is certainly not a lack of information that hinders organizations in their pursuit for better business and competitive intelligence. There are a combination of techniques, tools and technologies out there to support business and competitive intelligence initiatives—solutions that systematically capture, create, manage, review, distribute, publish, store and preserve business content based on rules defined by the organization or mandated by regulations. The phenomenon of the Internet and all the many advances in enterprise content management (ECM), business intelligence (BI) and knowledge management (KM) technologies have provided access to so much information that it is hard to know where to start. Today our technologies are capable of providing a 360-degree view of enterprise content—but are we taking advantage of this? Here are the issues:

• Do we have the right systems in place to effectively control and capture all relevant corporate content?

• Do we have a complete and single version of the business and competitive “truth”?

• Are we indexing and categorizing the captured content so we can find it quickly and easily?

• Do we have a way of finding the experts on a given subject matter in the organization?

• Have we built a culture of sharing knowledge across the organization?

4. Business intelligence and the Insurance Value chain During the last three decades, insurance companies acquired significant product development capabilities; but they lagged behind in truly understanding the customer. This led most firms to develop products that they could, rather than those required by their customers. But during last few years, deregulation and growing competition has forced insurance companies to move from traditional product-centric operations to customer-centric operations.

To succeed in this market, insurers have to analyze their customer’s needs and tailor all the business processes in the
value chain to effectively meet their unique requirements. Implicit in this argument is the assumption that insurance companies have the ability to turn volumes of data pertaining to their customers, agents, claims and policies into actionable information. Business intelligence tools like data warehousing, OLAP, and data mining can significantly help in almost all the aspects of the value chain to achieve this objective. Figure 1 illustrates the insurance value chain. In the following discussion we will focus on some of the business intelligence applications in each block of the value chain.

5. Case: CIB – A BI IMPLEMENTATION CIB-Credit information Bureau, a State Bank of Pakistan’s department responsible for maintaining the information related to borrowing related to any person, company, and/or group of companies.

CIB maintains this information by frequently fetching borrowing’s related information from various banks and institutes throughout Pakistan. This is a requirement imposed by SBP on all financial institution that they need to get the credit worthiness report before granting a loan above a certain amount to a customer. The current practice of obtaining a credit worthiness report is that the Financial Institution submits a form in SBP. Here the report is prepared manually by the SBP staff and handed over to the requesting institution on the following day. The reason behind to maintain such an information is to track the net amount hold by any borrower, to eliminate the manual work at SBP end, and to provide quick and easy service to the Financial Institution. This application will allow the user to access the Credit Information Bureau central repository in SBP.

Problem Statement “To provide fast, accurate, and dynamic analysis on both individual borrower and Group basis.” Currently CIB gets borrowings information through fax and/or telephones and if any bank or institutes wants to inquire about the holding of a certain person it has to first contact CIB department and then after 15-20 days the information is provided to the bank. The process is quite complex. CIB provide information about borrowings of a particular borrower, also if the borrower belongs to a particular group of companies then the groups net borrowing also needs to be identified.

Existing Repository Currently the database is running on Oracle 9i. The database contains information related to borrowings and application security.

Entities Summary Following is a summary of the operational data store. These tables will serve as source tables for our business intelligence application. In the table some description of each table is also specified. Table 2: Operational Entity Summary Out of 30 tables, in original schema, we will be using only 4 tables, as specified above, since the required analysis can be performed based on the information in these four tables.

The Solution As with all business intelligence implementations, our solution is not just a software application. As discussed in previous sections a typical business intelligence solution consists of several layers. Starting from OLTP Data bases, to Data extraction, transformation, loading, generation of multidimensional data store, and finally a very user friendly User Interface providing Drill-down and Roll-up facilities.

As specified in the previous sections currently Oracle 9i has been used as data base of OLTP. In the following table the tools/technologies used in implementing each layer is specified.

<table>
<thead>
<tr>
<th>Layer</th>
<th>Tool/Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Database (OLTP)</td>
<td>Oracle 9i</td>
</tr>
<tr>
<td>Data Extraction/Transformation/Loading</td>
<td>Microsoft Data Transformation Service</td>
</tr>
<tr>
<td>Data Staging Area</td>
<td>MS SQL Server 7.0</td>
</tr>
<tr>
<td>User Interface</td>
<td>C# Net, Pivot Table Service</td>
</tr>
</tbody>
</table>

The Schema Design

Star Schema has been used in the data warehouse design. They have developed only one dimension for fulfilling all current analytical requirements.

They have only one fact table, for Borrowing detail information, and four dimension tables for Borrower, Institute, Director/Guarantor and Time related information.

6. Conclusion

The insurance industry is extremely divided in its adoption of business intelligence environment based on technologies like data warehousing, OLAP and data mining. Quite a few insurance companies are in an advanced stage of their business intelligence initiative; yet there are many that are oblivious of its benefits. Some insurers have gone or non-scalable temporary solutions, which often fail to leverage the ever-increasing volumes of data. Hence, recognizing the need for an effective business intelligence environment based on the right architecture is vital. But it is just the first step. The real challenge is to make the BI environment an integral part of the decision making process. Efficiently gathering the information requirements of all the user-groups is thus extremely critical for the success of any data warehouse. The belief that "you build it, they will use it" is wrong. Also a data warehouse cannot be the answer to all the information requirements; hence it is also very important to set clear business objectives for the business intelligence solution with total top management support.

Business Intelligence has significantly matured in recent years due to the deployment of enterprise BI strategies and products. The BI landscape has changed dramatically: from reporting just being viewed as an add-on to a business
system, to BI becoming an organized and centralized management information solution. Large-scale enterprise BI deployments are rolled out to many hundreds of users across organizations with a mixture of success and failure.

Successes have been achieved where the information needs of the business and the actual usage of the BI tools are taken into consideration. However, this is not often the case and giving everyone within a large organization access to a fully featured ad hoc reporting tool has not proven to be the smartest move. The debate over which BI technology platform to use has moved on from a simple ‘features and benefits’ comparison. Today’s BI technology must be part of an holistic approach to information delivery covering an end-to-end understanding of information usage across the organization, from data quality through to data manipulation by users.

7. Key findings from the report are as follows:

- Business Intelligence (BI) technologies can help financial institutions to manage risk, detect fraud, leverage customer insights and gain visibility into their profitability, but few have deployed them to maximum effect.
- Established BI tools face competition in the Financial Services sector both from vertically focused operational and analytic application vendors, and also from in-house custom development.
- No vendor yet offers all the required components to deliver true ‘closed loop’ BI across the enterprise, so solutions must be built around open standards with a unified Common Warehouse Metamodel (CWM)-compliant metadata repository.
- Compliance necessitates integrated business intelligence, but this should be seen as a strategic investment opportunity and used to create competitive advantage. Vendors offering overlapping technologies can give a head start.
- Data accuracy, consistency, and completeness, always important, are given greater urgency by compliance.
- Routine integration and analysis of both structured and unstructured data, in near real time, will require a more sophisticated architecture with fast XML message handling, anticipating growth in XML, for example eXtensible Business Reporting Language (XBRL) reporting.
- Microsoft is turning traditional enterprise reporting into a commodity, forcing established players to find strategies to differentiate themselves.
- Ad hoc, self-service reporting and analysis are increasingly demanded by customers as a vehicle for widening the use of BI within the organisation

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