

The Evolution of Business Intelligence

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Abstract

Business intelligence systems (BI systems) play a critical role in the business development process. They help make critical decisions based on meaningful information culled from a complicated and huge database system. BI also plays a key role in business growth and profitability by capturing real time information and data pieces to predict the market trend.

As electronics media advance, companies are looking for the best data integration processes to integrate important information through electronic and computer devices to their business intelligence systems. The real challenge that organizations are facing is how to get real information in real time. In the past, organizations have adopted different solutions to integrate data into their business intelligence tools. Therefore, in terms of data and information integration, BI has made significant improvements within the past three decades to meet ad hoc requirements of business intelligence users. This paper discusses the evolution of BI throughout different periods of time.

Introduction

Historically, IT departments were handling most business intelligence and data warehousing tasks, and the focus was always to figure out how to automate the delivery of meaningful information to users. The developers took the long approach and wrote lengthy queries and programs to automate data reporting tasks, but those were not “smart” enough to help businesses make educated and intelligent decisions. There has been some proprietary software, such as Access database for reporting and Crystal Reports for scheduling reporting tasks, but due to the lack of user-friendly features, these tools could not hold a solid ground in industry. The basic point of view of a business intelligence system is to somehow support in the decision-making process because all software programs involve a hierarchy of tasks to be completed over a specified time period.

In the mainframe era, the earliest commercial uses of computers aimed to automate decision processes as analyzing sales, updating accounts payable, calculating payroll, and recording credit card charges and payments. Since those early days in the 1950s and 1960s,

the use of computers to support decision making has become increasingly sophisticated by almost completely taking over complex decisions and supporting people who make complex decisions.

80s: Printed Green Bar Reports

During the late 1970s and early 1980s, the concept of decision support systems (DSS) grew and evolved out of two previous types of computer support for decision-making. One was the management information system, which provided (1) scheduled reports for well-defined information needs, (2) demand reports for ad hoc information requests, and (3) the ability to query a database for specific data. The second contributing system was operations research/management science, which used mathematical models to analyze and understand specific problems. The real definition of DSS, which has evolved since the 1970s and is still valid today, was described in *Building Effective Decision Support Systems*. Ralph Sprague and Eric Carlson defined DSS as “computer-based systems that help decision makers confront ill-structured problems through direct interaction with data and analysis model” [2].

In the 80s, the task for business intelligence was to print green bar reports from dot matrix printers. Users had huge stacks of papers on their desks. Management could look through 50- to 60-page sales and inventory reports (Figure).

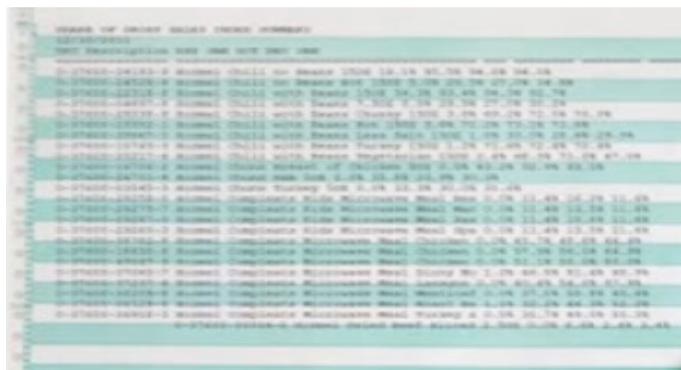


Figure 1. Printed green bar reports [3]

90s: The OLAP/ROLAP Breakthrough

In the 90s, BI transitioned to OLAP (online analysis processing) and ROLAP (relational online analytical processing). In OLAP/ROLAP systems, data warehousing and cubes concepts were introduced where users had the ability to manage departmental data in separate cubes. Users could also run queries directly to relational databases that were ROLAP (Figure 2).

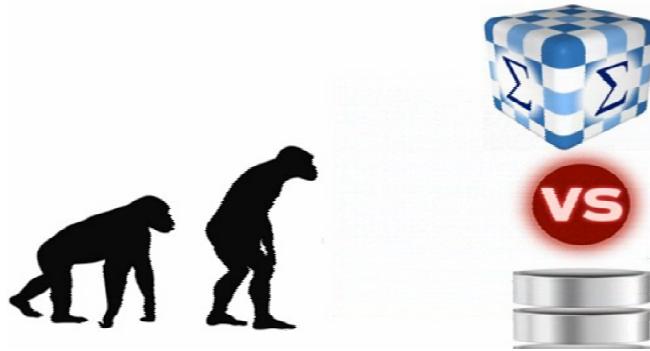


Figure 2. OLAP/ROLAP breakthrough. [3]

Early 2000s: The Rise of the Web

In early 2000s, Web-based BI was introduced for the first time, and users could finally have access to real-time consumption of information. Users could run reports through a Web-based application and make charts and graphs to add graphics. Also, users have been able to aggregate data to summarize complex reports in fewer pages. This was the era when real prediction-based analysis started. Reports produced through Web-based systems are still being used by organizations (Figure 3).

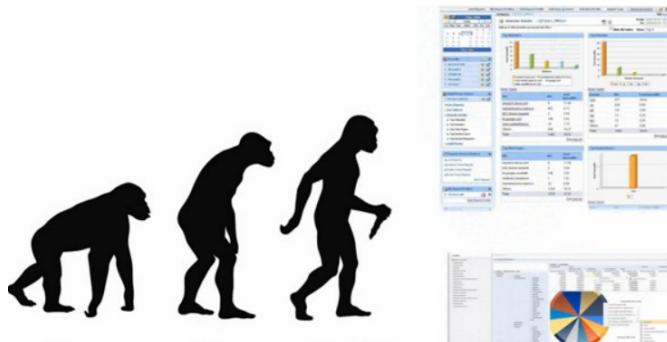


Figure 3. The rise of the Web [3]

Late 2000s: Age of Dashboards

In the late 2000s, we finally built dashboards and moved away from grids and graphs of 50- page reports to dashboards; users can view data and determine business strategies (Figure 4).

Early 2010s: Portable & Swift

Finally, in 2010s, the trend is now in portable and swift BI, also called mobile BI. Portable and swift BI basically takes all the BI created in the past and integrates it into mobile devices, enabling visual data discovery for casual business users (

Figure 4).



Figure 4. Age of dashboards [3]



Figure 5. The age of portability [3]

Business Intelligence Today

Users who have BI in their organizations were polled about their use of BI today. BI has evolved among users to enable intelligent decision making in different organizations (Figure 6).

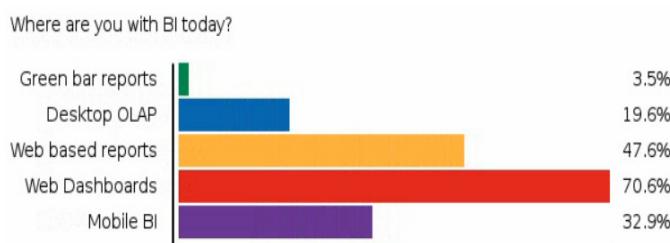


Figure 6. BI today [3]

Need for Intelligent Information

There has always been a need for a tool that allows business users to automate reporting and schedule tasks make strategic decisions based on short-term and long-term data and trend analysis. The business need of data was not only for informational purpose, but users were looking for intelligent answers to the following questions:

- How to get easy and consistent access to financial data?
- How to make a product easily accessible to customers?
- How should a marketing team act when a new product is launched or an old product is updated?
- How quickly can a business take action?
- How to get the right information to the right people at the right time?

The ability to get the right information at the right time and to provide that information to the right people is the main focus of organizations. Organizations that have successfully collected, managed and delivered the right information from the huge amount of transactional data is the leaders of their respective business. The ability to act faster and more effectively than competition can be a huge advantage in today's marketplace and that means the organization is successfully managing customer relationships for the long run.

As organizations look to answer above questions with limited two-dimensional tools such as spreadsheets, such complexity cannot be managed (Figure 7).



Figure 7. Integration of information

There are some solid business reasons why organizations cannot achieve the goals to compete in the market:

- Loss of opportunities due to unpreparedness
- Set goals not achieved regularly
- Frequent change in business objectives
- Inability to scale the business
- Reacting to events not in a timely manner
- Redoing or repeating process, such as re-keying data manually
- Conflicting customer treatment

Apparently, all of the above reasons are related to each other and can be solved at the organizational level. Organizations have already realized that for strategic competition, it is very important to implement BI. Companies use business intelligence to reveal significant events and identify business aspects to adjust quickly to their changing environment [4].

Conclusive Evolutionary Business Approach

In this ever-changing world, most of the biggest organizations believe information and knowledge about it is power. However, how to grasp the latest technology to process this information is the challenge for organizations. An evolutionary business approach shows sound planning to deliver solutions that meet the long-term goals of the organization. This does not mean that an organization will have all the latest and greatest technology, but it does mean that an evolutionary business approach delivers information to establish and maintain an organization's strategic vision. It achieves strategic and tactical goals through information used to create sustainable competitive advantage. This can be done through simple or complex solutions (Table 1).

Table 1. Organization data requirements and technology solutions

Data Requirement	Solution
Entity Data, Track Records, General Ledger	Metadata storage
Business Rules	Rules attachment to Measure Data
What does data mean	Data mapping according user and schema requirement
Information Management	Analysis repository, Information Management and Discovery services
Data Integration	Information integration Services, Data transformation and query
Data warehousing, Data Mart	Consolidation, Aggregation of queries

Organizations have to proactively realize the advantage of enhancing their intelligence approach. Those who plan their evolution in a systematic manner typically lead over those that avoid change.

Conclusion

As an organization moves along the evolutionary process, it expands its capability for delivering increased business value via information. Understanding how to evolve into an intelligent enterprise means the organization has to comprehend the procedure.

Organizations need to recognize where they are and why and then understand how to move to the next level. They need to agree on the level of achievable evolution, establish priorities for improvement, and then implement pragmatic action plans for improving their information maturity to align with organizational goals and objectives.

Businesses have made a huge investment in technology in the past few decades. The spending has decreased and businesses are looking forward towards their technology investments and means to leverage their investments. IT spending may have been decreased in this economy, but overall spending on BI systems has increased.

Finally, in today's shaky economic conditions, businesses have examined every side of their operations to find new revenue or eke out additional cost savings. BI serves this goal by supplying decision support and knowledgeable information to users.

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Biographies

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