Self-Service Business Intelligence

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Abstract

Data is very important for any business. Storage, management and use has helped them in their work. Making decisions based on data through the application of Data Warehouses or BI has been implemented for more than a decade and is increasing the interest more and more for managers. Technological developments and the addition of new trends in BI make it a technology that will be used for a long time. In this scientific paper we will analyze self-service BI qualified as a wish fulfilled for businesses. This study aims to explore study the benefits and challenges and how have they evaluated it different scientific researchers.

Keywords

Business Intelligence (BI), Data Warehouse, Self-Service BI(SSBI)

1. Introduction

Intensive technology developments in the last two decade have greatly increased the amount of data in businesses. With the increase of data, the demand of businesses to manage them increases. Delivering the right information, to the right people, at the right time, is one of the key requirements for today's businesses [3]. Business Intelligence (BI) enables businesses to transform data into information and knowledge.

Gartner (2013) defines BI as "*an umbrella activity that combines architectures, infrastructures, tools, databases, analytical tools, programs and methodologies to improve and optimize decisions and performance*".

It is a content-independent expression, so it means different data to different people. The main objective of BI is to enable real-time access to data, to allow data manipulation and to provide managers and business analysts with the opportunity to transmit adaptive analysis.

Through the analysis of historical, current, situational and performance data, strategy employees make more informed and better decisions. The BI process is based on transforming data into information, then into decisions, and finally into actions. The application of BI can have a significant impact on a business by improving decision-making, faster and easier access to information, increasing operational efficiency, providing better customer insights, enhancing competitiveness, improving financial performance and savings in IT infrastructure cost [18; 10].

Data-driven decision making is increasing the use and reach of BI across all industries [17]. The importance of data and its use in decision making have become very important in the digital age.

In the Figure 1 according to Precedence Research The global business intelligence market size was exhibited at USD 27.24 billion in 2022 and is projected to hit around USD 54.9 billion by 2032[19].

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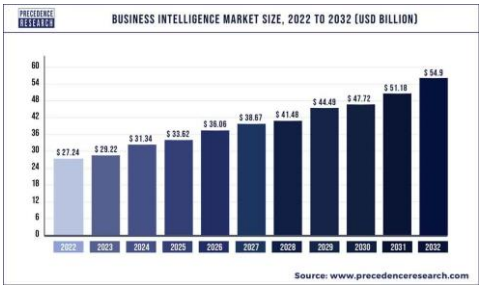

Figure 1. BI market size 2022 to 2032 (USD Billion) [19]

The usage of BI has increased different sectors such as large organizations or SME, manufacturing companies, healthcare, banking, telecommunications, financial services, insurance, and various public sectors are increasing the usage of BI on the incoming years.

1.2. The BI development phases

TechTarget presents the most important stages of BI developments as in the table 1.

Table 1
The evolving landscape of BI [7; 8; 9]

Year	BI development
1999	Data remains controlled by IT departments; reports need to be requested
2003	Introduction of 64-bit computing leads to advent of in-memory processing
2004	Tableau 1.0 is, joining QlikView among pioneering self-service BI tools
2006	Amazon creates Amazon Wen Services, the start or Cloud Computing
2007	Apple introduces the iPhone, opening up the possibility to mobile BI; IMB buys Cognos, SAP purchase Business Objects; Oracle acquires Hyperion and introduce Oracle Business Intelligence Enterprise Edition (OBIEE)
2010	Microsoft has embeds Power Pivot into Excel, extending BI to ordinary business users
2012	Led by Tableau and Qlik, data visualizations help open up BI to self-service users
2015	Microsoft launches Power BI, further cementing self-service software's lead role
2016	Augmented analytics features start a new era of BI aided by machine learning; Oracle introduce Oracle Analytics Cloud (OAC) to empowers users to take control of their data and make better decisions with self-service analytics capabilities
2019	Salesforce acquires Tableau, Google purchases Looker and Sisense buys Periscope; AI machine learning and natural language features are all becoming standard
2020	Vendors expand low/code/no-code, mobile and multi-cloud capabilities
2021	Collaborative BI combines different tools including online tools and social media.
2022	NLP (Natural Language Processing) Self-service and analyzes with written or spoken words. Tableau's Ask Data; Power BI's Q&A.
January 2023	Microsoft presented Power BI in Microsoft Teams for improvement experience

Even with the challenges brought about by the pandemic, the BI landscape is rapidly shifting [13].

2. From traditional BI to self-service BI

Usually, large businesses have their own databases and data warehouses developed, they use them as the main sources for BI. BI is based on these data warehouses to provide accurate, timely and reliable intelligence. The term BIDW became indivisible to show the efficiency of using BI when we have a DW. But should small and medium businesses invest in Data warehouse and then in BI or is it better to focus on their data and their study. BI is considered more user-friendly to business users than the data warehouse.

DWBI is a more traditional approach to BI that emphasizes centralization and standardization of data, while self-service BI is a more agile and user-driven approach that empowers individual users to analyze data in an easier and more intuitive way.

The use of Datawarehouse for BI requires the implementation of ETL (extract, transform, load) process. In ETL data is extracted from multiple sources, transformed into standard formats for analysis, and loaded into the data warehouse. The IT department should assist the analysts with ETL processes if this method is used. Getting data in is the most challenging aspect of BI, requiring about 80 % of the time and effort and generating more than 50 % of the unexpected project costs [11].

The successful implementation of information system (e.g., Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Warehouse Management System (WMS), Data Management Systems (DMS), etc.), typically requires a strategic approach that will correctly anticipate SME needs and requirements for analytical tools such as BI [14].

By using Self-service BI tools, analysts can directly access the data, prepare the data from multiple sources, get insights, model the data and choose the most suitable GUI for the data to make faster business decisions. The tools are typically intuitive and interactive and let users explore data beyond what the IT department has curated.

By implementing a smart BI architecture system, IT staff will be largely released from the tedious work of producing reports giving them enough time to focus on other core issues such as cyber security and operation of right of the business system [15].

SAP, Power BI, Tableau, and Qlik are some of the examples of the most used BI tools. On the other hand, the most popular providers of data warehouses include Azure Synapse, Google Big Query, and Amazon Redshift.

2.1. Self-service BI

Self-service Business Intelligence (BI) refers to a data analysis approach that enables business users to access and analyze data without the need for IT or data analytics experts. It provides business users with tools and technologies that allow them to create reports, dashboards, and visualizations from various data sources quickly and easily [12].

Self-service business intelligence (BI) has been on organizations' wish lists for a long time, and data from the BARC BI Trend Monitor 2017 confirms that it is still a high priority[1].

With self-service BI, business users can perform ad-hoc analysis, explore data, and gain insights into business performance in real-time, without relying on IT departments. This approach democratizes data and empowers business users to make data-driven decisions quickly and effectively.

Power users are even compiling their dashboards using layout components from different sources, adjusting and combining them for their own use and more often for the needs of their teams [1].

Self-service BI tools typically include features such as data visualization, drag-and-drop interface, and natural language querying, which allow users to interact with data intuitively and with little training. These tools may also include features for data cleansing, data blending, and predictive analytics to help users analyze data more effectively.

Self-service BI allows organizations to become more agile, responsive, and data-driven, enabling them to make better decisions faster, gain a competitive advantage, and drive business growth.

Table 2 shows some features of traditional BI compared to self-service BI.

Table 2
Comparison of Traditional BI vs. Self-Service BI

Traditional BI	Self-Service BI
User submits requests to IT specialist for report or dashboard.	IT team sets up the tool and grants access to a user.
Specialist extracts, processes relevant data and creates data model.	User accesses data directly and filter it to create data models.
User approves the report or dashboard or requests changes.	User find and fix generated reports to suit requirements.

2.1.1. Challenges of Self-Service Business Intelligence

According to BARC the most common BI problems from the perspective of user and vendors are shown in the figure.

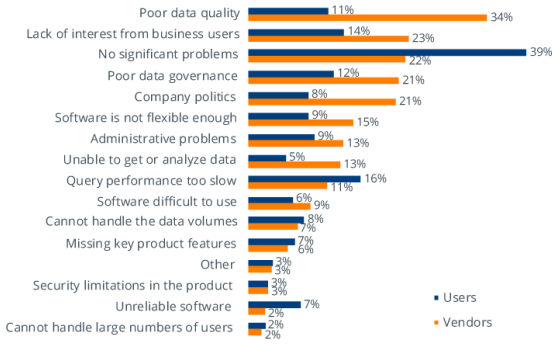

Figure 2. Usage problems: user and vendor perspective (BARC)

It is important that the vendors work closely with customers during implementation and data integration where data quality may be a prevalent issue [2].

Practitioners need to realize that implementing Self-Services BI(SSBI) is not an easy matter and that SSBI comes with three different categories challenges as [5]:

1. Becoming a self-reliant user; Business users are not self-reliant when they need the data although they can create their own reports. In this case they need IT help.

2. Creating SSBI reports; Creating multiple reports and then reusing them can compromise data security if they are not created by users with good analytical skills.

3. SSBI education; Business users must be trained and educated in data analysis if they are to be allowed to use SSBI and perform complex tasks.

To avoid or overcome such challenges, an organization must start with a well-planned BI strategy, use pilot groups, including a solid BI architecture that establishes technology and governance standards, identify user groups and their data needs. Those foundational elements can help ensure that the organization has the right data sets and the infrastructure to support enterprise-wide use of self-service BI tools [7].

Lennerholt suggest nine main factors for managing the SSBI challenges: use pilot groups, use champions, identify user groups and their data needs, allow end users to change faulty data, create common data definitions, serve ready-made standard reports, let business govern SSBI content, integrate IT in the business department, educate users [4].

With more and more businesses planning to use BI to promote data-driven culture, the self-service business intelligence trend will only gain more traction [13]. Self-service analytics has become a reality as modern analytics and BI tools are now widely adopted, but organizations struggle to deliver in a way that satisfies both IT and the business [6]. Data and analytics leaders can avoid chaos and increase efficiency by balancing control and agility. Self-service BI make it possible to change the visualization setting in real time, by led to a better understanding of performance data, alongside encouraging rapid improvements to the shared dashboard [16].

3. Conclusion and future work

The implementation of BI in companies helps and facilitates strategic and operational decision-making. BI environments are changing rapidly. Challenges caused by the pandemic, technological changes and improvements, such as cloud computing and artificial intelligence require the integration of appropriate BI tools to remain competitive.

Self-service BI is being used more and more by businesses. There are many BI platforms that have included self-service BI from the leaders of database technologies such as Oracle and Microsoft and dedicated BI tools facilitating the integration of a lot of data to improve decision making among a wider group of users. Employees who are well-informed and key in the generation of reports find it easier to use them and feel satisfaction in building reports according to their requirements. The challenges in the integration of SSBI affect both the poor data quality and the knowledge of the employees in the analysis of the data. Identifying target groups, choosing and implementing the right tools are the main columns on a successful self-service BI.

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