**Power BI Assignment 1**

1. **What do you mean by BI? Explain.**

**Ans.** BI(Business Intelligence) is a set of processes, architectures, and technologies that convert raw data into meaningful information that drives profitable business actions. It is a suite of software and services to transform data into actionable intelligence and knowledge.

BI has a direct impact on organization’s strategic, tactical and operational business decisions. BI supports fact-based decision making using historical data rather than assumptions and gut feeling.

BI tools perform data analysis and create reports, summaries, dashboards, maps, graphs, and charts to provide users with detailed intelligence about the nature of the business.

**Importance of BI:-**

* Measurement: creating KPI (Key Performance Indicators) based on historic data
* Identify and set benchmarks for varied processes.
* With BI systems organizations can identify market trends and spot business problems that need to be addressed.
* BI helps on data visualization that enhances the data quality and thereby the quality of decision making.
* BI systems can be used not just by enterprises but SME (Small and Medium Enterprises).

**Advantages of BI:-**

**1. Boost productivity**

With a BI program, It is possible for businesses to create reports with a single click thus saves lots of time and resources. It also allows employees to be more productive on their tasks.

**2. To improve visibility**

BI also helps to improve the visibility of these processes and make it possible to identify any areas which need attention.

**3. Fix Accountability**

BI system assigns accountability in the organization as there must be someone who should own accountability and ownership for the organization’s performance against its set goals.

**4. It gives a bird’s eye view:**

BI system also helps organizations as decision makers get an overall bird’s eye view through typical BI features like dashboards and scorecards.

**5. It streamlines business processes:**

BI takes out all complexity associated with business processes. It also automates analytics by offering predictive analysis, computer modeling, benchmarking and other methodologies.

**6. It allows for easy analytics.**

BI software has democratized its usage, allowing even nontechnical or non-analysts users to collect and process data quickly. This also allows putting the power of analytics from the hand’s many people.

**BI System Disadvantages**

**1. Cost:**

Business intelligence can prove costly for small as well as for medium-sized enterprises. The use of such type of system may be expensive for routine business transactions.

**2. Complexity:**

Another drawback of BI is its complexity in implementation of datawarehouse. It can be so complex that it can make business techniques rigid to deal with.

**3. Limited use**

Like all improved technologies, BI was first established keeping in consideration the buying competence of rich firms. Therefore, BI system is yet not affordable for many small and medium size companies.

**4. Time Consuming Implementation**

It takes almost one and half year for data warehousing system to be completely implemented. Therefore, it is a time-consuming process.

**Trends in Business Intelligence**

The following are some business intelligence and analytics trends :-

**Artificial Intelligence:**Gartner’ report indicates that AI and machine learning now take on complex tasks done by human intelligence. This capability is being leveraged to come up with real-time data analysis and dashboard reporting.

**Collaborative BI:**BI software combined with collaboration tools, including social media, and other latest technologies enhance the working and sharing by teams for collaborative decision making.

**Embedded BI:**Embedded BI allows the integration of BI software or some of its features into another business application for enhancing and extending it’s reporting functionality.

**Cloud Analytics:**BI applications will be soon offered in the cloud, and more businesses will be shifting to this technology. As per their predictions within a couple of years, the spending on cloud-based analytics will grow 4.5 times faster.

**Summary:**

* BI is a set of processes, architectures, and technologies that convert raw data into meaningful information that drives profitable business actions.
* BI systems help businesses to identify market trends and spot business problems that need to be addressed.
* BI technology can be used by Data analyst, IT people, business users and head of the company.
* BI system helps organization to improve visibility, productivity and fix accountability.
* The draw-backs of BI is that it is time-consuming costly and very complex process

1. **How Power-BI helps in BI, and how does it help Analysts? Explain.**

**Ans.** Power BI is a BI and data visualization tool that leverages visual analytics to empower people and organizations in making the most of their data. The engaging visualizations created in Power BI take the excel workflow to the next level and help stakeholders make sense of the massive amounts of data available.

According to Gartner, Power BI is the leading data visualization tool with more than 6 million users and 97% of Fortune 500 companies using it to democratize data insights. Power BI is made up of two components:

* Power BI Desktop is a free desktop version that allows for data analysis and report creation and includes the Power Query Editor.
* Power BI Service is a cloud-based version of Power BI, which has lightweight report editing functionality and is designed to share and distribute reports across the organization.

Most commonly, teams would use Power BI Desktop to create reports, and Power BI service to share them. There is a paid Power BI Pro version that provides collaboration abilities, a mobile app, and the ability to publish and share across the Power BI cloud platform.

Moreover, Power BI Pro is part of a [**Microsoft 365 E5 subscription**](https://www.microsoft.com/en/microsoft-365/enterprise/e5?rtc=1&activetab=pivot%3Aoverviewtab&market=af), so chances are you may already have access to it if you’re in an organization that uses Microsoft Office.

## How is Power BI useful?

**1. Extract data insights with no coding skills required**

One of the main strengths of Power BI is its intuitive user interface that allows both technical and non-technical analysts to build data visualizations and analyses efficiently.

The user-friendly drag-and-drop interface makes it easy to answer complex data-related questions without the need for programming skills. This simplicity lowers the barrier for users to perform advanced analytics such as trend analyses, regressions, and statistical summaries.

Power BI can also be integrated with a variety of existing Microsoft apps, such as Microsoft teams, Excel, and PowerPoint, which makes integrating data insights into existing workflows much easier.

**2. Democratize data insights with dashboards**

A classic BI application most people will be familiar with is the **dashboard**, where data is obtained from multiple sources and presented visually in charts and graphs to give a sense of the company’s processes and strategies.

Power BI comes with many reporting features for users to readily create well-designed interactive dashboards. It can also connect to a wide range of data sources and can help you create powerful data models (e.g. SQL Server, Excel spreadsheets, Amazon Redshift, etc.). As a result, these dashboards can be enriched with comprehensive data from various applications across the organization.

These dashboards go a long way in aligning an organization’s strategic efforts, uncovering critical insights, and speeding up enterprise-wide decision-making. When many users are trained to create such dashboards, data insights can be democratized at scale to help transform the business into a data-driven company.

**3. Tell data stories with advanced data visualization**

Compelling data storytelling is more important than ever, given the burgeoning amounts of data generated in the digital age.

Dashboards are great for monitoring data and telling users **what** is happening. However, **data stories** help shape the data into a step-by-step process to explain **why** specific trends are happening.

Power BI allows users to string together a series of visualizations (including dashboards) to form a visual story to communicate data insights, provide context, and demonstrate how decisions relate to outcomes.

The ability to weave advanced visualizations into a coherent data narrative is what sets Power BI apart from other tools like Excel. These data stories are highly effective in framing a compelling case to communicate actionable insights to decision-makers, which aligns with the primary goal of business intelligence.

1. **Explain Descriptive analytics?**

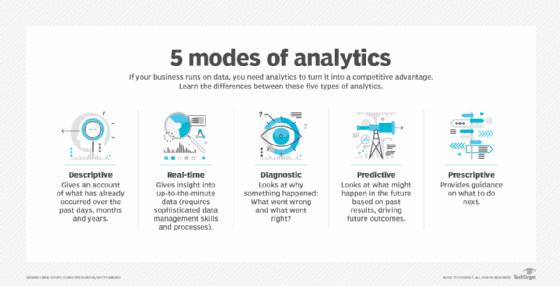
**Ans.** Descriptive analytics is a type of data analytics that looks at past data to give an account of what has happened. Results are typically presented in reports, dashboards, bar charts and other visualizations that are easily understood.

The field of [data analytics](https://www.techtarget.com/searchdatamanagement/definition/data-analytics) is generally divided into four main types: descriptive analytics, diagnostic analytics, [predictive analytics](https://www.techtarget.com/searchbusinessanalytics/definition/predictive-analytics) and prescriptive analytics. A fifth type, [real-time analytics](https://www.techtarget.com/searchbusinessanalytics/feature/7-enterprise-use-cases-for-real-time-streaming-analytics), analyzes data as it's generated, collected or updated.

Descriptive analytics is the simplest of these techniques. It can be used by itself or treated as a preliminary stage of data processing to create a summary or abstraction that, in turn, supports further investigation, analysis or actions performed by other types of analytics.

**How does descriptive analytics work**

Descriptive analytics uses various [statistical analysis](https://www.techtarget.com/whatis/definition/statistical-analysis) techniques to slice and dice raw data into a form that allows people to see patterns, identify anomalies, improve planning and compare things. Enterprises realize the most value from descriptive analytics when using it to compare items over time or against each other. For example, a finance manager might compare product sales month over month or against related categories.

Descriptive analytics can work with numerical data, qualitative data or some combination. Numerical data might quantify things like revenue, profit or a physical change. Qualitative data might characterize elements such as gender, ethnicity, profession or political party. To improve understanding, raw numerical data is often binned into ranges or categories such as age ranges, income brackets or zip codes. Descriptive analysis techniques perform various mathematical calculations that make recognizing or communicating a pattern of interest easier. For example, "central tendency" describes what is normal for a given data set by considering characteristics such as the average, mean and median. Other elements include frequency, variaion, ranking, range and deviatioThe five modes of analytics help organizations understand what and why something happened, what could happen in the future and what should be done next.

**How is descriptive analytics used**

Descriptive analysis supports a broad range of users in interpreting data. Descriptive analytics are commonly used for the following:

* financial reports
* planning a new program
* measuring effectiveness of a new program
* understanding sales trends
* comparing companies
* motivating behavior with KPIs
* recognizing anomalous behavior
* interpreting survey results

1. **Explain Predictive analytics?**

**Ans.** Predictive analytics is an advanced form of data analytics that attempts to answer the question, “What might happen next?” As a branch of data science for business, the growth of predictive and augmented analytics coincides with that of big data systems, where larger, broader pools of data enable increased data mining activities to provide predictive insights. Advancements in big data machine learning have also helped expand predictive analytics capabilities.

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**How does predictive analytics work**

Data scientists use predictive models to identify correlations between different elements in selected datasets. Once data collection is complete, a statistical model is formulated, trained, and modified to generate predictions.

The workflow for building predictive analytics frameworks follows five basic steps:

1. **Define the problem**: A prediction starts with a good thesis and set of requirements. For instance, can a predictive analytics model detect fraud? Determine optimal inventory levels for the holiday shopping season? Identify potential flood levels from severe weather? A distinct problem to solve will help determine what method of predictive analytics should be used.
2. **Acquire and organize data**: An organization may have decades of data to draw upon, or a continual flood of data from customer interactions. Before predictive analytics models can be developed, data flows must be identified, and then datasets can be organized in a repository such as a [data warehouse](https://cloud.google.com/learn/what-is-a-data-warehouse) like [BigQuery](https://cloud.google.com/bigquery).
3. **Pre-process data**: Raw data is only nominally useful by itself. To prepare the data for the predictive analytics models, it should be cleaned to remove anomalies, missing data points, or extreme outliers, any of which might be the result of input or measurement errors.
4. **Develop predictive models**: Data scientists have a variety of tools and techniques to develop predictive models depending on the problem to be solved and nature of the dataset. Machine learning, regression models, and decision trees are some of the most common types of predictive models.
5. **Validate and deploy results**: Check on the accuracy of the model and adjust accordingly. Once acceptable results have been achieved, make them available to stakeholders via an app, website, or data dashboard.

1. **Explain perspective analytics?**

**Ans.** Perspective analytics refers to the practice of analyzing and interpreting data from different perspectives or viewpoints to gain a deeper understanding of a particular subject or situation. It involves examining data from various angles, considering different factors, and taking into account multiple viewpoints to provide a more comprehensive analysis.

In traditional analytics, data is often analyzed based on a single perspective or a specific set of predefined metrics. However, perspective analytics takes a broader approach by considering multiple dimensions, such as time, geography, demographics, and user behavior, among others.

The goal of perspective analytics is to uncover hidden patterns, correlations, and insights that may not be apparent when analyzing data from a single viewpoint. By exploring different perspectives, analysts can gain a more comprehensive understanding of complex phenomena, identify relationships between variables that were previously unnoticed, and make more informed decisions.

Perspective analytics can be applied in various domains, including business, finance, marketing, social sciences, and healthcare. For example, in marketing, perspective analytics can involve analyzing customer data from different angles to understand consumer behavior, preferences, and trends. In healthcare, it can involve examining patient data from various perspectives to identify patterns, improve diagnoses, and develop personalized treatment plans.

To perform perspective analytics, analysts typically use advanced analytical techniques, such as data mining, machine learning, and visualization tools. These techniques enable the exploration of data from multiple angles, the identification of complex relationships, and the presentation of findings in a meaningful way.

Overall, perspective analytics offers a more holistic approach to data analysis, enabling organizations and researchers to gain deeper insights and make more informed decisions by considering multiple viewpoints and dimensions.

1. **Write five real-life questions that PowerBi can solve.**

**Ans.**

**How can we analyze sales data to identify trends and patterns, and optimize our pricing and product strategies?**

**Answer:** Power BI can help you analyze sales data by creating interactive dashboards and visualizations. You can identify trends by examining sales performance over time, product categories, geographical regions, and customer segments. Power BI's data modeling capabilities allow you to slice and dice the data to gain insights into pricing strategies, product preferences, and customer behavior.

**Which marketing campaigns have been the most successful in terms of ROI, and how can we allocate our marketing budget more effectively?**

**Answer:** Power BI can integrate data from different marketing channels, such as digital ads, email campaigns, and social media platforms. By visualizing campaign performance metrics, conversion rates, and customer acquisition costs, you can identify the most successful marketing campaigns. Power BI can also provide data-driven recommendations on how to allocate your marketing budget effectively based on the ROI of each campaign.

**How can we monitor and track key performance indicators (KPIs) across various departments and locations in our organization to identify areas of improvement?**

**Answer:** Power BI can connect to multiple data sources and create consolidated dashboards that display KPIs across different departments and locations. By tracking metrics such as sales revenue, customer satisfaction, employee productivity, and inventory turnover, Power BI enables you to identify performance gaps, set benchmarks, and implement improvement strategies.

**What are the main factors contributing to customer churn, and how can we implement strategies to reduce churn and improve customer retention?**

**Answer**: Power BI can help you analyze customer data, such as demographics, purchase history, and customer interactions. By visualizing churn rates, customer satisfaction scores, and customer behavior patterns, Power BI enables you to identify the main factors contributing to churn. You can then develop targeted retention strategies, such as personalized offers, customer loyalty programs, and proactive customer support, based on the insights gained from Power BI.

**How can we analyze and visualize our supply chain data to identify bottlenecks, optimize inventory levels, and improve overall operational efficiency?**

**Answer:** Power BI can integrate data from various supply chain systems, such as inventory management, procurement, and logistics. By visualizing key metrics like inventory turnover, lead times, and order fulfillment rates, Power BI allows you to identify bottlenecks and areas for improvement. You can optimize inventory levels by analyzing demand patterns, supplier performance, and production lead times. Power BI also enables you to track operational efficiency by monitoring metrics such as on-time delivery, warehouse utilization, and transportation costs.