

Question Bank

Unit -1

Part-A questions

1. Define Business Analytics.

Business analytics, or simply analytics, is the use of data, information technology, Statistical analysis, quantitative methods, and mathematical or computer-based models to help managers gain improved insight about their business operations and make better, fact-based decisions. Business analytics is “a process of transforming data into actions through analysis and insights in the context of organizational decision making and problem solving.

2. Write about Statistical Analysis.

Statistical analysis is the process of collecting and analyzing samples of data to uncover patterns and trends and predict what could happen next to make better and more scientific decisions. Once the data is collected, statistical analysis can be used for many things in your business.

Some include:

- Summarizing and presenting the data in a graph or chart to present key findings
- Discovering crucial measures within the data, like the mean
- Calculating if the data is slightly clustered or spread out, which also determines similarities.
- Making future predictions based on past behavior
- Testing a hypothesis from an experiment

3. Define Data Visualization.

It is the practice of converting raw information (text, numbers, or symbols) into a graphic format. The data is visualized with a clear purpose: to show logical correlations between units, and define inclinations, tendencies, and patterns. Depending on the type of logical connection and the data itself, visualization can be done in a suitable format. So, it's dead simple, any analytical report contains examples of data interpretations like pie charts, comparison bars, demographic maps, and much more

4. What is Data Cleansing?

During the exploration phase, analysts may notice that their data is poorly structured and in need of tidying up to improve its quality. This is where data cleansing comes into play. Cleansing data includes:

- Correcting entry errors
- Removing duplicates or outliers
- Eliminating missing data
- Masking sensitive or confidential information like names or addresses

5. Elucidate the steps involved in Business Analytics.

- Business Problem Framing
- Analytics Problem Framing
- Data Methodology selection and model building
- Deployment

6. What are the types of Analytics?

For different stages of business analytics huge amount of data is processed at various steps. Depending on the stage of the workflow and the requirement of data analysis, there are four main kinds of analytics

Descriptive, Diagnostic, predictive and prescriptive. These four types together answer everything a company needs to know- from what's going on in the company to what solutions to be adopted for optimizing the functions.

1) Descriptive Analytics: Describing or summarizing the existing data using existing business intelligence tools to better understand what is going on or what has happened.

2) Diagnostic Analytics: Focus on past performance to determine what happened and why. The result of the analysis is often an analytic dashboard.

3) Predictive Analytics: Emphasizes on predicting the possible outcome using statistical models and machine learning techniques.

4) Prescriptive Analytics: It is a type of predictive analytics that is used to recommend one or more course of action on analyzing the data.

7. What are the Data collection Methods?

- Surveys
- Transactional Tracking
- Interviews and Focus Groups
- Observation
- Online Tracking
- Forms
- Social Media Monitoring

8. What is Data preparation?

Data preparation, also sometimes called “pre-processing,” is the act of cleaning and consolidating raw data prior to using it for business analysis. It might not be the most celebrated of tasks, but careful data preparation is a key component of successful data analysis.

9. What are the types of Hypothesis?

- Alternative Hypothesis
- Null Hypothesis
- Non-Directional Hypothesis
- Directional Hypothesis
- Statistical Hypothesis

10. What are the common types data visualizations.

The main types of data visualization include charts, graphs and maps in the form of line charts, bar graphs, tree charts, dual-axis charts, mind maps, funnel charts and heatmaps.

11. What are the Measures of variation?

Variability in the data is measured using the following measures:

- Range
- Inter-Quartile Distance (IQD)
- Variance
- Standard Deviation

12. What are the steps in Hypothesis Testing.

- Identification of null and alternative hypothesis
- Identification of test statistic.
- Calculation of p-value.
- Decision criteria for rejection or retention of null hypothesis.

13. What is ANOVA?

Analysis of Variance, it is a statistical analysis technique in which data sets are compared and measured to determine their significance. This test effectively measures how significant the interaction is between variables; they analyze the variance.

14. What is Population and Sample?

Population also known as universal set is the set of all possible data for a given context whereas Sample is the subset taken from the population.

15. What is the mathematical representation of the Decision Model?

$$TC = F + VQ$$

TC = total cost

V = unit variable cost

F = fixed cost

Q = quantity produced

16. What is Optimization and Optimal Solution?

Optimization is the process of finding a set of values for decision variables that minimize or maximize some quantity of interest, profit, revenue, cost, time, and so on called an objective function. Any set of decision variables that optimizes the objective function is called an optimal solution.

17. What is Model Validation?

Model validation is defined within regulatory guidance as “the set of processes and activities intended to verify that models are performing as expected, in line with their design objectives, and business uses.” It also identifies “potential limitations and assumptions, and assesses their possible impact.”

18. What is the Excel function to find the Standard Deviation of Population and Sample?

- STDEV.P (data range) for population
- STDEV.S (data srange) for sample

19. What are the types of Data Interpretation?

- Qualitative data Interpretation
- Observations:
- Groups of people
- Interviews
- Content Analysis
- Narrative Analysis
- Discourse Analysis

- Quantitative data Interpretation
- Median
- Mean:
- Standard deviation:
- Regression analysis
- Cohort Analysis
- Predictive Analysis
- Prescriptive Analysis
- Conjoint Analysis
- Cluster analysis

20. How data can be classified?

Data can be classified into four groups categorical data, Ordinal data, Interval data, and Ratio data.

21. What is Data collection?

Data collection is the methodological process of gathering information about a specific subject. It's crucial to ensure your data is complete during the collection phase and that it's collected legally and ethically. If not, your analysis won't be accurate and could have far-reaching consequences. In general, there are three types of consumer data:

- First-party data, which is collected directly from users by your organization
- Second-party data, which is data shared by another organization about its customers (or its first-party data)
- Third-party data, which is data that's been aggregated and rented or sold by organizations that don't have a connection to your company or users

22. What do the results found by the model mean for the application?

Models cannot capture every detail of the real problem. Managers must understand the limitations of models and their underlying assumptions and often incorporate judgment into making a decision.

23. Define the problem

Clearly defining the problem is not a trivial task. Complexity increases when the following occur:
large number of courses of action

- problem belongs to a group and not an individual
- competing objectives
- external groups are affected
- problem owner and problem solver are not the same person
- time limitations exist

24. Define Problem solving with analytics

- Recognize a problem
- Define the problem
- Structure the problem
- Analyze the problem
- Interpret results and make a decision
- Implement the solution

25. Define optimization

Finding values of decision variables that minimize (or maximize) something such as cost (or profit).

Objective function - the equation that minimizes (or maximizes) the quantity of interest.

Constraints - limitations or restrictions.

Optimal solution - values of the decision variables at the minimum (or maximum) point.

26. What is model in business analytics?

- an abstraction or representation of a real system, idea, or object.
- Often a simplification of the real thing.
- Captures the most important features.
- Can be a written or verbal description, a visual representation, a mathematical formula, or a spreadsheet.

27. How to implement the solution?

Translate the results of the model back to the real world. Requires providing adequate resources, motivating employees, eliminating resistance to change, modifying organizational policies, and developing trust.

28. How to analyze the problem?

Analytics plays a major role. Analysis involves some sort of experimentation or solution process, such as evaluating different scenarios, analyzing risks associated with various decision alternatives, finding a solution that meets certain goals, or determining an optimal solution.

29. How to recognize the problem?

Problems exist when there is a gap between what is happening and what we think should be happening. For example, costs are too high compared with competitors.

30. How to define the problem?

Clearly defining the problem is not a trivial task.

Complexity increases when the following occur:

- large number of courses of action
- the problem belongs to a group and not an individual
- competing objectives
- external groups are affected
- problem owner and problem solver are not the same person
- time limitations exist

PART B & PART C

1. Explain in detail about Business Analytics Lifecycle.

6 Steps in the Business Analytics Process

Step 1: Identifying the Problem

The first step of the process is identifying the business problem. The problem could be an actual crisis; it could be something related to recognizing business needs or optimizing current processes. This is a crucial stage in Business Analytics as it is important to clearly understand what the expected outcome should be. When the desired outcome is determined, it is further broken down into smaller goals. Then, business stakeholders decide on the relevant data required to solve the problem. Some important questions must be answered in this stage, such as: What kind of data is available? Is there sufficient data? And so on.

Step 2: Exploring Data

Once the problem statement is defined, the next step is to gather data (if required) and, more importantly, cleanse the data—most organizations would have plenty of data, but not all data points would be accurate or useful. Organizations collect huge amounts of data through different methods, but at times, junk data or empty data points would be present in the dataset. These faulty pieces of data can hamper the analysis. Hence, it is very important to clean the data that has to be analyzed.

TO do this, you must do computations for the missing data, remove outliers, and find new variables as a combination of other variables. You may also need to plot time series graphs as they generally indicate patterns and outliers. It is very important to remove outliers as they can have a heavy impact on the accuracy of the model that you create. Moreover, cleaning the data helps you get a better sense of the dataset.

Step 3: Analysis

Once the data is ready, the next thing to do is analyze it. Now to execute the same, there are various kinds of statistical methods (such as hypothesis testing, correlation, etc.) involved to find out the insights that you are looking for. You can use all of the methods for which you have the data.

The prime way of analyzing is pivoting around the target variable, so you need to take into account whatever factors that affect the target variable. In addition to that, a lot of assumptions

are also considered to find out what the outcomes can be. Generally, at this step, the data is sliced, and the comparisons are made. Through these methods, you are looking to get actionable insights.

Step 4: Prediction and Optimization

Gone are the days when analytics was used to react. In today's era, Business Analytics is all about being proactive. In this step, you will use prediction techniques, such as neural networks or decision trees, to model the data. These prediction techniques will help you find out hidden insights and relationships between variables, which will further help you uncover patterns on the most important metrics. By principle, a lot of models are used simultaneously, and the models with the most accuracy are chosen. In this stage, a lot of conditions are also checked as parameters, and answers to a lot of 'what if...?' questions are provided.

Step 5: Making a Decision and Evaluating the Outcome

From the insights that you receive from your model built on target variables, a viable plan of action will be established in this step to meet the organization's goals and expectations. The said plan of action is then put to work, and the waiting period begins. You will have to wait to see the actual outcomes of your predictions and find out how successful you were in your endeavors. Once you get the outcomes, you will have to measure and evaluate them.

Step 6: Optimizing and Updating

Post the implementation of the solution, the outcomes are measured as mentioned above. If you find some methods through which the plan of action can be optimized, then those can be implemented. If that is not the case, then you can move on with registering the outcomes of the entire process. This step is crucial for any analytics in the future because you will have an ever-improving database. Through this database, you can get closer and closer to maximum optimization. In this step, it is also important to evaluate the ROI (return on investment). Take a look at the diagram below of the life cycle of business analytics.

2. Elaborate about Data Collection.

Data collection is the methodological process of gathering information about a specific subject. It's crucial to ensure your data is complete during the collection phase and that it's collected legally and ethically. If not, your analysis won't be accurate and could have far-reaching consequences.

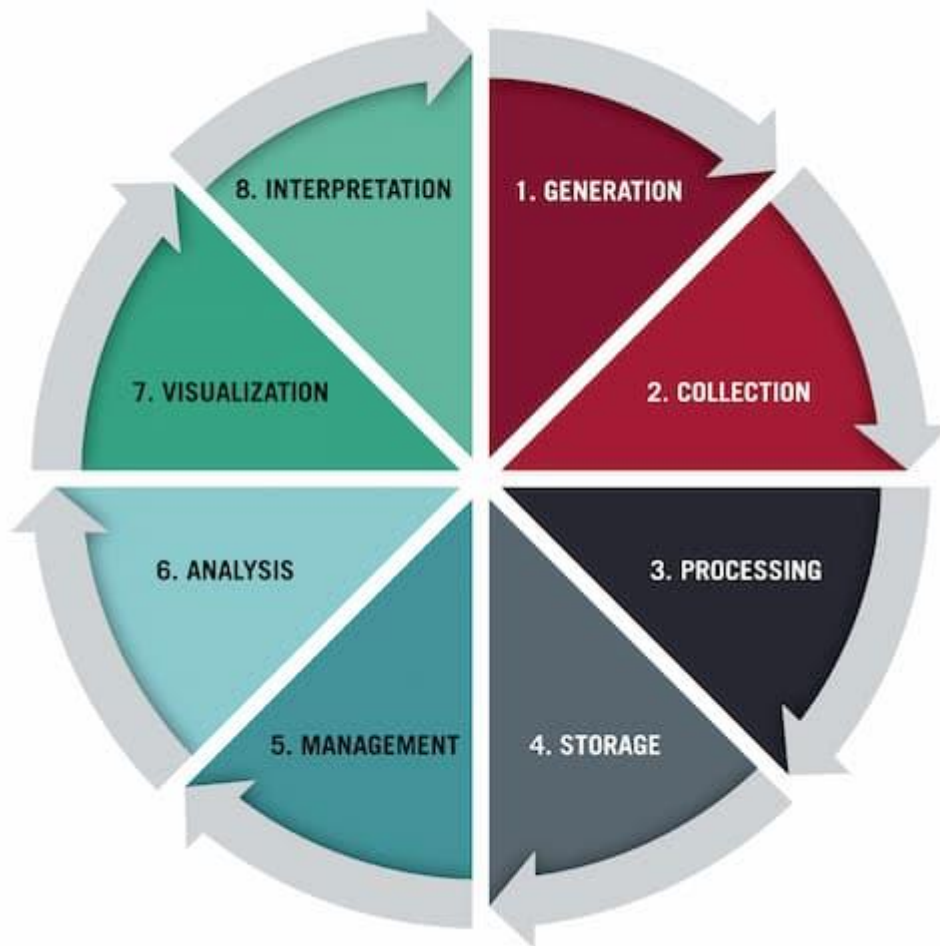
In general, there are three types of consumer data:

- First-party data, which is collected directly from users by your organization
- Second-party data, which is data shared by another organization about its customers (or its first-party data)

- Third-party data, which is data that's been aggregated and rented or sold by organizations that don't have a connection to your company or users
Although there are use cases for second- and third-party data, first-party data (data you've collected yourself) is more valuable because you receive information about how your audience behaves, thinks, and feels—all from a trusted source.

Data can be qualitative (meaning contextual in nature) or quantitative (meaning numeric in nature). Many data collection methods apply to either type, but some are better suited to one over the other.

In the data life cycle, data collection is the second step. After data is generated, it must be collected to be of use to your team. After that, it can be processed, stored, managed, analyzed, and visualized to aid in your organization's decision-making.



Before collecting data, there are several factors you need to define:

- The question you aim to answer
- The data subject(s) you need to collect data from
- The collection timeframe
- The data collection method(s) best suited to your needs

The data collection method you select should be based on the question you want to answer, the type of data you need, your timeframe, and your company's budget.

THE IMPORTANCE OF DATA COLLECTION

Collecting data is an integral part of a business's success; it can enable you to ensure the data's accuracy, completeness, and relevance to your organization and the issue at hand. The information gathered allows organizations to analyze past strategies and stay informed on what needs to change.

The insights gleaned from data can make you hyperaware of your organization's efforts and give you actionable steps to improve various strategies—from altering marketing strategies to assessing customer complaints.

Basing decisions on inaccurate data can have far-reaching negative consequences, so it's important to be able to trust your own data collection procedures and abilities. By ensuring accurate data collection, business professionals can feel secure in their business decisions.

Explore the options in the next section to see which data collection method is the best fit for your company.

7 DATA COLLECTION METHODS USED IN BUSINESS ANALYTICS

1. Surveys

Surveys are physical or digital questionnaires that gather both qualitative and quantitative data from subjects. One situation in which you might conduct a survey is gathering attendee feedback after an event. This can provide a sense of what attendees enjoyed, what they wish was different, and areas in which you can improve or save money during your next event for a similar audience.

While physical copies of surveys can be sent out to participants, online surveys present the opportunity for distribution at scale. They can also be inexpensive; running a survey can cost nothing if you use a free tool. If you wish to target a specific group of people, partnering with a market research firm to get the survey in front of that demographic may be worth the money.

Something to watch out for when crafting and running surveys is the effect of bias, including:

- **Collection bias:** It can be easy to accidentally write survey questions with a biased lean. Watch out for this when creating questions to ensure your subjects answer honestly and aren't swayed by your wording.
- **Subject bias:** Because your subjects know their responses will be read by you, their answers may be biased toward what seems socially acceptable. For this reason, consider pairing survey data with behavioral data from other collection methods to get the full picture.

2. Transactional Tracking

Each time your customers make a purchase, tracking that data can allow you to make decisions about targeted marketing efforts and understand your customer base better.

Often, e-commerce and point-of-sale platforms allow you to store data as soon as it's generated, making this a seamless data collection method that can pay off in the form of customer insights.

3. Interviews and Focus Groups

Interviews and focus groups consist of talking to subjects face-to-face about a specific topic or issue. Interviews tend to be one-on-one, and focus groups are typically made up of several people. You can use both to gather qualitative and quantitative data.

Through interviews and focus groups, you can gather feedback from people in your target audience about new product features. Seeing them interact with your product in real-time and recording their reactions and responses to questions can provide valuable data about which product features to pursue.

As is the case with surveys, these collection methods allow you to ask subjects anything you want about their opinions, motivations, and feelings regarding your product or brand. It also introduces the potential for bias. Aim to craft questions that don't lead them in one particular direction.

One downside of interviewing and conducting focus groups is they can be time-consuming and expensive. If you plan to conduct them yourself, it can be a lengthy process. To avoid this, you can hire a market research facilitator to organize and conduct interviews on your behalf.

4. Observation

Observing people interacting with your website or product can be useful for data collection because of the candor it offers. If your user experience is confusing or difficult, you can witness it in real-time.

Yet, setting up observation sessions can be difficult. You can use a third-party tool to record users' journeys through your site or observe a user's interaction with a beta version of your site or product.

While less accessible than other data collection methods, observations enable you to see firsthand how users interact with your product or site. You can leverage the qualitative and quantitative data gleaned from this to make improvements and double down on points of success.

5. Online Tracking

To gather behavioral data, you can implement pixels and cookies. These are both tools that track users' online behavior across websites and provide insight into what content they're interested in and typically engage with.

You can also track users' behavior on your company's website, including which parts are of the highest interest, whether users are confused when using it, and how long they spend on product pages. This can enable you to improve the website's design and help users navigate to their destination.

Inserting a pixel is often free and relatively easy to set up. Implementing cookies may come with a fee but could be worth it for the quality of data you'll receive. Once pixels and cookies are set, they gather data on their own and don't need much maintenance, if any.

It's important to note: Tracking online behavior can have legal and ethical privacy implications. Before tracking users' online behavior, ensure you're in compliance with local and industry data privacy standards.

6. Forms

Online forms are beneficial for gathering qualitative data about users, specifically demographic data or contact information. They're relatively inexpensive and simple to set up, and you can use them to gate content or registrations, such as webinars and email newsletters.

You can then use this data to contact people who may be interested in your product, build out demographic profiles of existing customers, and in remarketing efforts, such as email workflows and content recommendations.

7. Social Media Monitoring

Monitoring your company's social media channels for follower engagement is an accessible way to track data about your audience's interests and motivations. Many social media platforms have analytics built in, but there are also third-party social platforms that give more detailed, organized insights pulled from multiple channels.

You can use data collected from social media to determine which issues are most important to your followers. For instance, you may notice that the number of engagements dramatically increases when your company posts about its sustainability efforts.

3. Briefly explain about the types of Data Interpretation

Data Interpretation is the process of understanding, organising, and interpreting the given data, for making sense of and getting a meaningful conclusion. The basic concept of data interpretation is to review the collected data by means of analytical methods and arrive at relevant conclusions. There are two methods to interpret the data:

1. Qualitative method – This method is used to analyse qualitative data or categorical data. The qualitative data interpretation used texts instead of numbers or patterns to represent the data. Nominal and ordinal data are the two types of qualitative data. Ordinal data interpretation is much easier than nominal data interpretation.
2. Quantitative method -This method is used to analyse quantitative data or numerical data. Quantitative data interpretation uses numbers instead of texts to represent the data. The types of quantitative data interpretation are discrete and continuous data. The quantitative method of data interpretation requires statistical methods and techniques like mean, median, standard deviation, etc. to interpret the data.

Basic Concept Of Data Interpretation

The basic concept of data interpretation refers to the procedures through which data is reviewed by various analytical methods to arrive at an inference. The data to be interpreted can be collected from various sources like data from the running of industries, census population etc. The importance of data interpretation are:

- The well-analysed and well-structured data help the managing board to examine the data before taking action to implement new ideas
- It helps in predicting upcoming trends and future competition
- The process of data interpretation provided the business with various cost benefits
- The data interpretation mostly helps in decision making
- Data interpretation helps you gain knowledge to achieve a competitive strategy
- The data interpretation helps to manipulate information in order to answer critical questions
- It helps to evaluate consumer requirements

Steps for Interpreting Data

The step by step process for Interpreting Data includes:

1. Collect The Information You'll Need To Interpret Data – collect all the information you will need to interpret the data. Put all this information into easy to read tables, graphs, charts etc.
2. Develop findings Of Your Data – develop observations about your data, summarise the important points, and find the conclusion because that will help you form a more accurate Interpretation.
3. Development Of The Conclusion – the conclusion is remarked as an explanation of your data. The conclusion should relate to your data.
4. Develop The Recommendations Of Your Data – the recommendation of your data should be based on your conclusion and findings.

Types Of Data Interpretation

- Bar Graphs – by using bar graphs we can interpret the relationship between the variables in the form of rectangular bars. These rectangular bars could be drawn either horizontally or vertically. The different categories of data are represented by bars and the length of each bar represents its value. Some types of bar graphs include grouped graphs, segmented graphs, stacked graphs etc.

- Pie Chart – the circular graph used to represent the percentage of a variable is called a pie chart. The pie charts represent numbers as proportions or percentages. Some types of pie charts are simple pie charts, doughnut pie charts, and 3D pie charts.
 - Tables – statistical data are represented by tables. The data are placed in rows and columns. Types of tables include simple tables and complex tables.
 - Line Graph – the charts or graphs that show information in a series of points are included in the line graphs. Line charts are very good to visualise continuous data or sequence of values. Some of the types of line graph
4. Discuss about Deployment and Iteration and its benefits and challenges.

Deployment of Advanced Analytics insights includes all operations to generate reports and recommendations for end users, visualisation of key findings, self-service and data discovery functionalities for business users, and finally, depending on the size and scope of the analytical application, implementation of a scoring process or workflows that integrate analytical outputs (in real time or not) with custom, operational and core systems. During deployment, many iterations, enhancements and fine-tuning activities might be necessary to finalise the deployment of the system. Other activities necessary during deployment include Administration, Security and Authorisation, as well as finalising Documentation and Transferring Ownership to business and operations.

Iterative development is a cyclical methodology that promotes constant improvement. It is the nature of business analytics, that once one project is complete it often spawns an understanding of new requirements and derivative solutions that start the iterative process once again.

There are many reasons why you should use the iterative process in your research and development efforts. It can provide various benefits to you and your organization because it is:

Flexible

One reason to use the iterative process is for its flexibility. A major benefit of the model is its ability to allow users to revise and refine their products or processes quickly. This can be especially beneficial if a company is still in the planning phase of product development and doesn't yet have a completed model available.

Usually, companies who use the iterative process do so to help them evaluate and improve their current products or processes. They might also use it as a troubleshooting strategy to help them arrive at an effective solution. Regardless of how you choose to implement the process, the iterative approach adapts to many scenarios and business types. It allows for environmental or market changes and can aid your efforts to produce deliverables that match the needs of your customers.

Useful

The iterative process can also be a useful way for development teams to create new strategies and establish successful products. Because every iteration improves on the previous step, it's easy to understand what phase you're in with your product development. The iterative process often starts with a rough prototype that enters a testing phase to give you timely feedback as you work toward a completed project. It can also be useful for producing visible results early on. Each cycle or milestone represents significant improvements and changes that can optimize your timeline management.

Efficient

Some alternative development approaches, like the waterfall approach, rely on established steps to arrive at a desired result. When using these processes, external or internal changes can sometimes disrupt teams' ability to implement improvements quickly and stay on track for timelines and specific requirements.

In contrast, the iterative process allows for deviations in the plan and for large changes mid-way through development. This can help companies stay on target and quickly recover as they implement their changes. Typically, iterative processes require an entire team's help as

well. This can increase efficiency because the iterative process often encourages dispersed workloads and well-balanced teams.

Cost effective

Another reason companies choose to use the iterative process is for its cost effectiveness. Compared to methods like the waterfall approach, the iterative process can accommodate changes to overall requirements and scope at lower costs. Again, this is because the process encourages teams to rethink their existing offerings. Change is both expected and necessary for this approach. Each cycle asks teams to evaluate their product using new feedback and to incorporate necessary changes for the next round.

Traditional trial-and-error models can do this somewhat haphazardly. With the iterative process, however, teams plan and strategize their decisions beforehand to make sure they're optimizing their efforts. This can reduce overall development costs in the long term.

Accessible

The iterative process is a useful tool because it is highly accessible. It can encourage collaboration, clear communication and transparency. Because the process highlights inconsistencies and areas where teams can improve a project's design, code or ability to meet client specifications, it's easy to track certain movements and decisions. This feature can help eliminate misunderstandings. Presenting the results of the iterations to clients or stakeholders can also be easier with this approach because they can clearly visualize the product's evolution.

Buildable

The iterative approach allows companies to improve their existing offerings consistently and reliably. Each iteration cycle allows teams to evaluate areas for improvement and to implement the lessons they learned. That means every new iteration is typically better than the last. By improving the development process consistently, teams can create thoughtful products and carefully design processes that possess guaranteed quality.

Low risk

One last reason many businesses and development teams choose to use the iterative approach is because it is relatively low risk. Often, teams address the higher-risk aspects of a product first. Gradually, as the process goes on, each iteration becomes more and more refined. This can reduce the risk for major discoveries near the end of the process because teams have had so long to address issues and concerns. The method can allow companies to identify and resolve risks early.

5. List out the steps involved in Data Preparation Process and explain in detail

Data preparation is done in a series of steps. There's some variation in the data preparation steps listed by different data professionals and software vendors, but the process typically involves the following tasks:

Data collection. Relevant data is gathered from operational systems, data warehouses, data lakes and other data sources. During this step, data scientists, members of the BI team, other data professionals and end users who collect data should confirm that it's a good fit for the objectives of the planned analytics applications.

Data discovery and profiling. The next step is to explore the collected data to better understand what it contains and what needs to be done to prepare it for the intended uses. To help with that, data profiling identifies patterns, relationships and other attributes in the data, as well as inconsistencies, anomalies, missing values and other issues so they can be addressed.

Data cleansing. Next, the identified data errors and issues are corrected to create complete and accurate data sets. For example, as part of cleansing data sets, faulty data is removed or fixed, missing values are filled in and inconsistent entries are harmonized.

Data structuring. At this point, the data needs to be modeled and organized to meet the analytics requirements. For example, data stored in comma-separated values (CSV) files or other file formats has to be converted into tables to make it accessible to BI and analytics tools.

Data transformation and enrichment. In addition to being structured, the data typically must be transformed into a unified and usable format. For example, data transformation may involve creating new fields or columns that aggregate values from existing ones. Data enrichment further enhances and optimizes data sets as needed, through measures such as augmenting and adding data.

Data validation and publishing. In this last step, automated routines are run against the data to validate its consistency, completeness and accuracy. The prepared data is then stored in a data warehouse, a data lake or another repository and either used directly by whoever prepared it or made available for other users to access.

Data preparation can also incorporate or feed into data curation work that creates and oversees ready-to-use data sets for BI and analytics. Data curation involves tasks such as indexing, cataloging and maintaining data sets and their associated metadata to help users find and access the data. In some organizations, data curator is a formal role that works collaboratively with data scientists, business analysts, other users and the IT and data management teams. In others, data may be curated by data stewards, data engineers, database administrators or data scientists and business users themselves.

6. List out the types of Analytics and explain in detail.

The four subsets of data analytics are descriptive, diagnostic, prescriptive, and predictive. Businesses across all types of industries utilize these specialty areas in analytics to increase overall performance at all levels of operations. These four types of analytics all work together and can be used together to help improve business performance.

Descriptive

Analytics

Descriptive analytics can show “what happened” and is the foundation of data insights. According to Investopedia, it is the interpretation of historical data to better understand changes that have occurred in a business. This type of analytics can be used to gain an overall picture of how a business is performing and is often used alongside predictive and prescriptive analytics. Common insights include year-over-year comparisons, the number of users, and revenue per subscriber.

Diagnostic

Analytics

Diagnostic analytics addresses “why things happened.” Common diagnostic analytic techniques/insights include drill-down, data discovery, data mining, and correlations. Companies use this data to identify patterns of behavior and make deep connections within the data they have collected. In order to be effective, diagnostic data must be detailed and accurate.

Predictive

Analytics

Businesses use predictive analytics to “see the future” and predict “what is likely to happen.” Existing data, modeling techniques, and statistical modeling are leveraged to generate predictions about performance and future outcomes. Predictive models are especially useful for marketing and insurance companies which need to make decisions based on what could be coming up.

Common processes in predictive analytics include decision trees, neural networks, and regression models. Compared to descriptive and diagnostic analytics, which is fairly common in most businesses, predictive analytics is more intensive and many companies are not leveraging this type of analytics yet.

Prescriptive

Prescriptive analytics, analytics driven by AI (Artificial Intelligence) systems, helps companies make decisions and determine “what they should do next.” This is the most in-demand type of analytics today, however, it is talent and resource-expensive: Few companies have the skilled employees and resources to conduct it.

Analytics

This type of analytics is on the leading edge of the analytical landscape and requires sufficient investment and commitment across the entire organization that wishes to perform it. Big data players like Apple, Netflix, and Facebook are currently conducting prescriptive analytics successfully. AI itself falls within the category of prescriptive analytics. It requires tremendous data and continuously updated data to help it learn, refine its decisions, and then communicate and act on these decisions in a business setting.

UNIT II

PART A (2MARKS)

1. What is Data warehouse?

A Data Warehousing (DW) is process for collecting and managing data from varied sources to provide meaningful business insights. A Data warehouse is typically used to connect and analyze business data from heterogeneous sources. The data warehouse is the core of the BI system which is built for data analysis and reporting. It is a blend of technologies and components which aids the strategic use of data. It is electronic storage of a large amount of information by a business which is designed for query and analysis instead of transaction processing. It is a process of transforming data into information and making it available to users in a timely manner to make a difference.

2. How data house works?

A Data Warehouse works as a central repository where information arrives from one or more data sources. Data flows into a data warehouse from the transactional system and other relational databases

3. What are the types of Data warehouse?

The three main types of Data Warehouses are Enterprise Data Warehouse,OperationalData Store, Data Mart.

4. What are the components of Data warehouse?

The Four components of Data Warehouses are Load manager, WarehouseManager, Query Manager, End-user access tools.

5. Who needs Data warehouse?

Data warehouse is needed for all types of users like

- a) Decision makers who rely on mass amount of data.
- b) Users who use customized, complex processes to obtain informationfrom multiple data sources.
- c) It is also used by the people who want simple technology to access the data
- d) It also essential for those people who want a systematic approach for makingdecisions.
- e) If the user wants fast performance on a huge amount of data which is anecessity for

reports, grids or charts, then Data warehouse proves useful.

f) Data warehouse is a first step If we want to discover 'hidden patterns' of data- flows and Groupings.

6. What is Data warehouse used for?

The most common sectors where Data warehouse is used are Airline, Banking, Health care, Public Sector, Investment and Insurance Sector, Retail Chain, Tele communication and Hospital Industry.

7. What are the steps to implement Data warehouse?

The best way to address the business risk associated with a Data warehouse implementation is to employ a three-prong strategy

1. Enterprise strategy
2. Phased delivery
3. Iterative Prototyping

8. What are the advantages of Data warehouse?

- Data warehouse allows business users to quickly access critical data from some sources all in one place.
- Data warehouse provides consistent information on various cross-functional activities. It is also supporting ad-hoc reporting and query.
- Data Warehouse helps to integrate many sources of data to reduce stress on the production system.
- Data warehouse helps to reduce total turnaround time for analysis and reporting. Restructuring and Integration make it easier for the user to use for reporting and analysis.
- Data warehouse allows users to access critical data from the number of sources in a single place. Therefore, it saves user's time of retrieving data from multiple sources.
- Data warehouse stores a large amount of historical data. This helps users to analyze different time periods and trends to make future predictions.

9. What are the disadvantages of Data warehouse?

- Not an ideal option for unstructured data.
- Creation and Implementation of Data Warehouse is surely time confusing affair.
- Data Warehouse can be outdated relatively quickly
- Difficult to make changes in data types and ranges, data source schema, indexes, and queries.
- The data warehouse may seem easy, but actually, it is too complex for the average users.
- Despite best efforts at project management, data warehousing project scope will always increase.
- Sometime warehouse users will develop different business rules.
- Organisations need to spend lots of their resources for training and Implementation purpose

10. What are the Data warehouse tools?

The most prominent Data warehouse tools are Mark Logic, Oracle, Amazon Redshift .

11. What is Knowledge Management?

Knowledge management is a process of acquiring, generating, accumulating and using knowledge for the benefit of the organization to enable it to gain a competitive edge for survival, growth and prosperity in a globalized competitive economy.

12. What are the two types of knowledge Management?

Knowledge is of two types – explicit and implicit.

Explicit knowledge is visible information available in literature, reports, patents, technical specifications, communication with customers, suppliers, competitors etc. It can be embedded in rules, systems, policies and procedures etc. of the organization. Tacit or implicit knowledge is personal knowledge residing in the minds of people as a result of their personal beliefs, values, perspectives and experience. There is a need for a learning organization for enhancement, sharing and utilization of tacit knowledge.

13. What are the four kinds of Decision Support Systems?

Executive support systems (ESS), Management information systems (MIS), Decision-support systems (DSS), Group decision-support systems (GDSS)

14. What is Business Intelligence?

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. Business intelligence combines business analytics, data mining, data visualization, data tools and infrastructure, and best practices to help organizations make more data-driven decisions.

15. What is OLAP?

OLAP (*online analytical processing*) is a software for performing multidimensional analysis at high speeds on large volumes of data from a data warehouse, data mart, or some other unified, centralized data store.

16. What are basic Analytic Functions of OLAP?

OLAP cubes enable four basic types of multidimensional data analysis Drill down , Roll-Up, Slice and Dice, Pivot

17. What is the main difference between OLAP and OLTP?

The main difference between OLAP and OLTP is in the name: OLAP is analytical in nature, and OLTP is transactional. OLAP tools are designed for multidimensional analysis of data in a datawarehouse, which contains both transactional and historical data. OLTP is designed to support transaction-oriented applications by processing recent transactions as quickly and accurately as possible.

18. Who are the four types of BI users?

The four key players who are used Business Intelligence System are The Professional Data Analyst, The IT users, The head of the company, The Business Users.

19. What is a Data Mart?

A data mart is a subset of the data warehouse. It specially designed for a particular line of business, such as sales, finance, sales or finance. In an independent data mart, data can be collected directly from sources.

20. What are the three kinds of data?

Data can be,

1. Structured
2. Semi-structured
3. Unstructured data

21. What is Operational Data Store?

Operational Data Store, which is also called ODS, are nothing but data store required when neither Data warehouse nor OLTP systems support organizations reporting needs. In ODS, Data warehouse is refreshed in real time. Hence, it is widely preferred for routine activities like storing records of the Employees.

PART B (16 MARKS)

1. Write the differences between Data warehouse and Data Mart.

Sl.No	Data Warehouse	Data Mart
1.	Data warehouse is a Centralised system.	While it is a decentralised system.
2.	In data warehouse, lightly denormalization takes place.	While in Data mart, highly denormalization takes place.
3.	Data warehouse is top-down model.	While it is a bottom-up model.
4.	To built a warehouse is difficult.	While to build a mart is easy.
5.	In data warehouse, Fact constellation schema is used.	While in this, Star schema and snowflake schema are used.
6.	Data Warehouse is flexible.	While it is not flexible.

Sl.No	Data Warehouse	Data Mart
7.	Data Warehouse is the data-oriented in nature.	While it is the project-oriented in nature.
8.	Data Ware house has long life.	While data-mart has short life than warehouse.
9.	In Data Warehouse, Data are contained in detail form.	While in this, data are contained in summarized form.
10.	Data Warehouse is vast in size.	While data mart is smaller than warehouse.
11.	The Data Warehouse might be somewhere between 100 GB and 1 TB+ in size.	The Size of Data Mart is less than 100 GB.
12.	The time it takes to implement a data warehouse might range from months to years.	The Data Mart deployment procedure is time-limited to a few months.
13.	It uses a lot of data and has comprehensive operational data.	Operational data are not present in Data Mart.
14.	It collects data from various data sources.	It generally stores data from a data warehouse.
15.	Long time for processing the data because of large data.	Less time for processing the data because of handling only a small amount of data.
16.	Complicated design process of creating schemas and views.	Easy design process of creating schemas and views.

2. Illustrate in diagram the stages in Decision Making.

Decision making is the process of making choices by identifying a decision, gathering information, and assessing alternative resolutions.

Using a step-by-step decision-making process can help you make more deliberate, thoughtful decisions by organizing relevant information and defining alternatives. This approach increases the chances that you will choose the most satisfying alternative possible.

Step 1: Identify the decision

You realize that you need to make a decision. Try to clearly define the nature of the decision you must make. This first step is very important.

Step 2: Gather relevant information

Collect some pertinent information before you make your decision: what information is needed, the best sources of information, and how to get it. This step involves both internal and external “work.” Some information is internal: you’ll seek it through a process of self-assessment. Other information is external: you’ll find it online, in books, from other people, and from other sources.

Step 3: Identify the alternatives

As you collect information, you will probably identify several possible paths of action, or alternatives. You can also use your imagination and additional information to construct new alternatives. In this step, you will list all possible and desirable alternatives.

Step 4: Weigh the evidence

Draw on your information and emotions to imagine what it would be like if you carried out each of the alternatives to the end. Evaluate whether the need identified in Step 1 would be met or resolved through the use of each alternative. As you go through this difficult internal process, you’ll begin to favor certain alternatives: those that seem to have a higher potential for reaching your goal. Finally, place the alternatives in a priority order, based upon your own value system.

Step 5: Choose among alternatives

Once you have weighed all the evidence, you are ready to select the alternative that seems to be best one for you. You may even choose a combination of alternatives. Your choice in Step 5 may very likely be the same or similar to the alternative you placed at the top of your list at the end of Step 4.

Step 6: Take action

You’re now ready to take some positive action by beginning to implement the alternative you chose in Step 5.

Step 7: Review your decision & its consequences

In this final step, consider the results of your decision and evaluate whether or not it has resolved the need you identified in Step 1. If the decision has *not* met the identified need, you may want to

repeat certain steps of the process to make a new decision. For example, you might want to gather more detailed or somewhat different information or explore additional alternatives.

3. Write about the Advantages and Disadvantages of Data warehouse.

Advantages of a Data Warehouse:

- Data warehouses facilitate end users' access to a variety of data.
- Assist in the operation of applications for decision support systems such as trend reports, for instance, obtaining the products that have sold the most in a specific area over the past two years; exception reports, reports that compare the actual outcomes to the predetermined goals.
- Using numerous data warehouses can increase the operational value of business systems, especially customer relationship management.
- Makes selections with higher quality.
- For the medium and long term, it is especially helpful.
- Installing these systems is quite straightforward if the data sources and goals are clear.
- Storage of analyses and historical search queries is quite beneficial.
- It has a strong capacity for digesting information.
- Access to information is made more flexible and quick because of it.
- Allows for easier corporate decision-making.
- The productivity of businesses rises.
- Gives the company's many departments reliable communication.
- Strengthen connections with customers and suppliers.
- It makes it possible to keep up with business activity and be constantly informed of successful and unsuccessful outcomes.
- transforms information into knowledge and data into information
- You can plan more successfully, thanks to it.
- Cut back on operating expenses and response times.
- The Data Warehouse assists in fusing many data sources, lessening the production system's workload.
- The data warehouse aids in reducing the overall turnaround time for reporting and research.
- Documentation and review are made easier for the consumer through restructuring and convergence.
- Users have single-point access to multiple sources of private data thanks to the data warehouse. Additionally, it saves users time when they access data from numerous sources.
- In a data center, a significant volume of old data is kept. Users can compare various eras and trends to create potential predictions using this.

Disadvantages of a Data Warehouse:

The data warehouses may project substantial expenditures throughout his life. The data warehouse is typically not stationary. Costs for maintenance are considerable.

Data warehouses could soon become outdated.

They occasionally need to provide complete information before a request for information, which

also costs the organization money.

Between data warehouses and operational systems, there is frequently a fine line. It is necessary to determine which of these features can be used and which ones should be implemented in the data warehouse since it would be expensive to carry out needless activities or to stop carrying out those that would be required.

It could be more useful for making decisions in real-time due to the prolonged processing time it may require. In any event, the trend of modern products (along with technological advancements) addresses this issue by turning the drawback into a benefit.

Regarding the various objectives a company seeks to achieve, challenges may arise during implementation.

It might be challenging to include new data sources once a system has been implemented.

They necessitate an examination of the data model, objects, transactions, and storage.

They were designed in a sophisticated, multidisciplinary manner.

The operating systems must be reorganized to accommodate them.

Data centers are excellent systems for maintenance. Any source systems and business process restructuring could influence the data warehouse, resulting in significant maintenance costs.

The data warehouse may seem simple, but it is too complex for the typical person to comprehend.

The scope of the data storage project will start to expand, despite the best efforts of project management.

At this point, various business regulations may already be in place for warehouse clients.

Uniformization of data Similar data formats in many data sources are another topic data warehousing covers. The loss of some important data components could be the outcome.

4. Write about the Process of Knowledge Management.

1. Discovery

The first step is to pinpoint the knowledge that is useful to the company's goals, operations and bottomline. Like separating wheat from chaff, this can be a mammoth task for several reasons: Not all stored information is a knowledge asset, and extraneous data needs to be filtered out.

It can be easy to overlook critical knowledge, such as highly specialized routines, or uncommonly used procedures.

Management and team leaders need to define what comprises knowledge in their respective domains in the first place.

Because knowledge is scattered throughout the body of the organization, discovery is best done by dividing it into three levels:

Individual level. This is the personal knowledge possessed by each team member. Such knowledge can be tacit, such as know-how, or it can be explicit, if recorded in a manual or handbook.

Group level. This is the knowledge built on the team or department level. It can consist of values, procedures, working relationships, and practical learnings compiled over the years working as a group.

Structural level. This is the embedded knowledge found on the macro or organizational level. It can be the company's values, culture, business processes, and proprietary pieces of knowledge accumulated through application and repetition.

The discovery stage thus involves all levels of the organization, from individual team members

to the enterprise as a whole, and the day-to-day managers in between.

The discovery process can be helped by looking at:

- ✓ The hierarchical structure, and all roles relevant to the knowledge base
- ✓ Existing repositories of knowledge, such as employee handbooks or reference manuals
- ✓ Training and development resources

2. Knowledge Capture

Once the knowledge to be collected has been defined and pinpointed, the next challenge is collection.

The different types of knowledge have their own documentation procedure.

Examples include:

Explicit knowledge – The easiest to collect, since the information already comes from recorded media, such as documents, files, or hard copies.

Implicit knowledge – This refers to the organization's processes, routines and culture. It may already be recorded in employee handbooks, or transcribed in department manuals.

Tacit knowledge – These are lessons acquired through practice and experience, and thus the most challenging to capture.

3. Indexing

After the knowledge acquisition comes organization. The collected knowledge assets will need to be transcribed, categorized and indexed for easy navigation and retrieval.

This is where systems come in. Specialized knowledge management tools help build a “Wiki” style database of company knowledge, so that it can be easily accessed and shared by all members. Such systems are designed for documenting knowledge, and retrieving them for reference, training, or collaboration.

It should be noted that not all knowledge management systems are equal. They vary in terms of interface, features, security, and reporting / analytics functions. Some platforms also make users replicate the data, while others allow them to reference data sets where it already exists to avoid excessive clutter and redundancy. Tetra takes the latter approach.

4. Knowledge Assessment

Once the knowledge base has been organized, it needs to be vetted before rollout. This means reviewing the stored knowledge, validating the information is correct and up-to-date, and extraneous information has been filtered out.

Often, some of the issues that need to be assessed are:

Incorrect or outdated knowledge

Redundant entries that conflict with each other

Incomplete information

Knowledge gaps in departments, procedures, or routines

5. Distribution

Once the knowledge base is organized and vetted, it should be easy and convenient to access and share. This helps facilitate learning and when necessary, updating.

Some factors to consider are:

Ease of access – The interface should be user-friendly and intuitive so that users don't revert back to old methods of finding knowledge

Shareable – Members should be able to collaborate

Security – The database should be secured from external threats and tampering. This is especially important in the age of coronavirus and remote working, as more members access the knowledge base outside the network safety of the office.

Access levels – Sensitive knowledge should be restricted on a position level or need-to-know basis.

Upkeep – There should be systems in place for maintaining the accuracy of the captured knowledge over time

5. Write about four components of Data Warehouse.

Central database: A database serves as the foundation of your data warehouse. Traditionally, these have been standard relational databases running on premise or in the cloud. But because of Big Data, the need for true, real-time performance, and a drastic reduction in the cost of RAM, in-memory databases are rapidly gaining in popularity.

Data integration: Data is pulled from source systems and modified to align the information for rapid analytical consumption using a variety of data integration approaches such as ETL (extract, transform, load) and ELT as well as real-time data replication, bulk-load processing, data transformation, and data quality and enrichment services.

Metadata: Metadata is data about your data. It specifies the source, usage, values, and other features of the data sets in your data warehouse. There is business metadata, which adds context to your data, and technical metadata, which describes how to access data – including where it resides and how it is structured.

Data warehouse access tools: Access tools allow users to interact with the data in your data warehouse. Examples of access tools include: query and reporting tools, application development tools, data mining tools, and OLAP tools.

6. Write about types of OLAP and mention the differences between OLAP and OLTP.

There are three different types of OLAP based on how data is stored in the database.

ROLAP : stands for Relational Online Analytical Processing. It stores data in the form of rows and columns. ROLAP does not pre-compute data; it can be accessed through SQL queries on demand. Thus, ROLAP empowers users to analyze and view data, and is capable of saving storage space while working with massive historical datasets that are not often queried. It can deal with large datasets, but the larger is the dataset more is the processing time. Thus, performance becomes an issue with rising data volumes and concurrencies.

MOLAP: MOLAP is an acronym for Multidimensional Online Analytical Processing. In MOLAP, data is pre-aggregated, summarized, and stored in the form of a multidimensional array. It enables users to model data and visualize it from multiple viewpoints. Since all the complex calculations are done in advance, users can easily perform slice and dice operations on their data with fast response times. However, traditional MOLAP is less scalable than ROLAP, as a limited amount of data can be stored in a multidimensional cube.

HOLAP : Hybrid OLAP is a combination of both MOLAP and ROLAP features. It uses both relational and multidimensional structures to store data, and which one should be used to access data depends on the processing application. Thus, HOLAP provides a mid-way approach to both the methods described above.

Purpose

OLAP helps you analyze large volumes of data to support decision-making.

OLTP helps you manage and process real-time transactions.

Data source

OLAP uses historical and aggregated data from multiple sources.

OLTP uses real-time and transactional data from a single source.

Data structure

OLAP uses multidimensional (cubes) or relational databases.

OLTP uses relational databases.

Data model

OLAP uses star schema, snowflake schema, or other analytical models.

OLTP uses normalized or denormalized models.

Volume of data

OLAP has large storage requirements. Think terabytes (TB) and petabytes (PB).

OLTP has comparatively smaller storage requirements. Think gigabytes (GB).

Response time

OLAP has longer response times, typically in seconds or minutes.

OLTP has shorter response times, typically in milliseconds

Example applications

OLAP is good for analyzing trends, predicting customer behavior, and identifying profitability.

OLTP is good for processing payments, customer data management, and order processing.

3. Explain three main types of Data warehouse.
There are three main types of data warehouse.

Enterprise Data Warehouse (EDW)

This type of warehouse serves as a key or central database that facilitates decision-support services throughout the enterprise. The advantage to this type of warehouse is that it provides access to cross-organizational information, offers a unified approach to data representation, and allows running complex queries.

Operational Data Store (ODS)

This type of data warehouse refreshes in real-time. It is often preferred for routine activities like storing employee records. It is required when data warehouse systems do not support reporting needs of the business.

Data Mart

A data mart is a subset of a data warehouse built to maintain a particular department, region, or business unit. Every department of a business has a central repository or data mart to store data. The data from the data mart is stored in the ODS periodically. The ODS then sends the data to the EDW, where it is stored and used.

4. Explain about the steps to implement the Data warehouse.

Step 1: Determine Business Objectives

The company is in a phase of rapid growth and will need the proper mix of administrative, sales, production, and support personnel. Key decision-makers want to know whether increasing overhead staffing is returning value to the organization. As the company enhances the sales force and employs different sales modes, the leaders need to know whether these modes are effective. External market forces are changing the balance between a national and regional focus, and the leaders need to understand this change's effects on the business.

To answer the decision-makers' questions, we needed to understand what defines success for this business. The owner, the president, and four key managers oversee the company. These managers oversee profit centers and are responsible for making their areas successful. They also share resources, contacts, sales opportunities, and personnel. The managers examine different factors to measure the health and growth of their segments. Gross profit interests everyone in the group, but to make decisions about what generates that profit, the system must correlate more details. For instance, a small contract requires almost the same amount of administrative overhead as a large contract. Thus, many smaller contracts generate revenue at less profit than a

few large contracts. Tracking contract size becomes important for identifying the factors that lead to larger contracts.

As we worked with the management team, we learned the quantitative measurements of business activity that decision-makers use to guide the organization. These measurements are the key performance indicators, a numeric measure of the company's activities, such as units sold, gross profit, net profit, hours spent, students taught, and repeat student registrations. We collected the key performance indicators into a table called a fact table.

Step 2: Collect and Analyze Information

The only way to gather this performance information is to ask questions. The leaders have sources of information they use to make decisions. Start with these data sources. Many are simple. You can get reports from the accounting package, the customer relationship management (CRM) application, the time reporting system, etc. You'll need copies of all these reports and you'll need to know where they come from.

Often, analysts, supervisors, administrative assistants, and others create analytical and summary reports. These reports can be simple correlations of existing reports, or they can include information that people overlook with the existing software or information stored in spreadsheets and memos. Such overlooked information can include logs of telephone calls someone keeps by hand, a small desktop database that tracks shipping dates, or a daily report a supervisor emails to a manager. A big challenge for data warehouse designers is finding ways to collect this information. People often write off this type of serendipitous information as unimportant or inaccurate. But remember that nothing develops without a reason. Before you disregard any source of information, you need to understand why it exists.

Another part of this collection and analysis phase is understanding how people gather and process the information. A data warehouse can automate many reporting tasks, but you can't automate what you haven't identified and don't understand. The process requires extensive interaction with the individuals involved. Listen carefully and repeat back what you think you heard. You need to clearly understand the process and its reason for existence. Then you're ready to begin designing the warehouse.

Step 3: Identify Core Business Processes

By this point, you must have a clear idea of what business processes you need to correlate. You've identified the key performance indicators, such as unit sales, units produced, and gross revenue. Now you need to identify the entities that interrelate to create the key performance indicators. For instance, at our example company, creating a training sale involves many people and business factors. The customer might not have a relationship with the company. The client might have to travel to attend classes or might need a trainer for an on-site class. New product releases such as Windows 2000 (Win2K) might be released often, prompting the need for training. The company might run a promotion or might hire a new salesperson.

The data warehouse is a collection of interrelated data structures. Each structure stores key performance indicators for a specific business process and correlates those indicators to the factors that generated them. To design a structure to track a business process, you need to identify the entities that work together to create the key performance indicator. Each key performance indicator is related to the entities that generated it. This relationship forms a dimensional model. If a salesperson sells 60 units, the dimensional structure relates that fact to the salesperson, the customer, the product, the sale date, etc.

Then you need to gather the key performance indicators into fact tables. You gather the entities that generate the facts into dimension tables. To include a set of facts, you must relate them to the dimensions (customers, salespeople, products, promotions, time, etc.) that created them. For the fact table to work, the attributes in a row in the fact table must be different expressions of the same event or condition. You can express training sales by number of seats, gross revenue, and hours of instruction because these are different expressions of the same sale. An instructor taught one class in a certain room on a certain date. If you need to break the fact down into individual students and individual salespeople, however, you'd need to create another table because the detail level of the fact table in this example doesn't support individual students or salespeople. A data warehouse consists of groups of fact tables, with each fact table concentrating on a specific subject. Fact tables can share dimension tables (e.g., the same customer can buy products, generate shipping costs, and return times). This sharing lets you relate the facts of one fact table to another fact table. After the data structures are processed as OLAP cubes, you can combine facts with related dimensions into virtual cubes.

Step 4: Construct a Conceptual Data Model

After identifying the business processes, you can create a conceptual model of the data. You determine the subjects that will be expressed as fact tables and the dimensions that will relate to the facts. Clearly identify the key performance indicators for each business process, and decide the format to store the facts in. Because the facts will ultimately be aggregated together to form OLAP cubes, the data needs to be in a consistent unit of measure. The process might seem simple, but it isn't. For example, if the organization is international and stores monetary sums, you need to choose a currency. Then you need to determine when you'll convert other currencies to the chosen currency and what rate of exchange you'll use. You might even need to track currency-exchange rates as a separate factor.

Now you need to relate the dimensions to the key performance indicators. Each row in the fact table is generated by the interaction of specific entities. To add a fact, you need to populate all the dimensions and correlate their activities. Many data systems, particularly older legacy data systems, have incomplete data. You need to correct this deficiency before you can use the facts in the warehouse. After making the corrections, you can construct the dimension and fact tables. The fact table's primary key is a composite key made from a foreign key of each of the dimension tables.

Data warehouse structures are difficult to populate and maintain, and they take a long time to construct. Careful planning in the beginning can save you hours or days of restructuring.

Step 5: Locate Data Sources and Plan Data Transformations

Now that you know what you need, you have to get it. You need to identify where the critical information is and how to move it into the data warehouse structure. For example, most of our example company's data comes from three sources. The company has a custom in-house application for tracking training sales. A CRM package tracks the sales-force activities, and a custom time-reporting system keeps track of time.

You need to move the data into a consolidated, consistent data structure. A difficult task is correlating information between the in-house CRM and time-reporting databases. The systems

don't share information such as employee numbers, customer numbers, or project numbers. In this phase of the design, you need to plan how to reconcile data in the separate databases so that information can be correlated as it is copied into the data warehouse tables.

You'll also need to scrub the data. In online transaction processing (OLTP) systems, data-entry personnel often leave fields blank. The information missing from these fields, however, is often crucial for providing an accurate data analysis. Make sure the source data is complete before you use it. You can sometimes complete the information programmatically at the source. You can extract ZIP codes from city and state data, or get special pricing considerations from another data source. Sometimes, though, completion requires pulling files and entering missing data by hand. The cost of fixing bad data can make the system cost-prohibitive, so you need to determine the most cost-effective means of correcting the data and then forecast those costs as part of the system cost. Make corrections to the data at the source so that reports generated from the data warehouse agree with any corresponding reports generated at the source.

You'll need to transform the data as you move it from one data structure to another. Some transformations are simple mappings to database columns with different names. Some might involve converting the data storage type. Some transformations are unit-of-measure conversions (pounds to kilograms, centimeters to inches), and some are summarizations of data (e.g., how many total seats sold in a class per company, rather than each student's name). And some transformations require complex programs that apply sophisticated algorithms to determine the values. So you need to select the right tools (e.g., Data Transformation Services—DTS—running ActiveX scripts, or third-party tools) to perform these transformations. Base your decision mainly on cost, including the cost of training or hiring people to use the tools, and the cost of maintaining the tools.

You also need to plan when data movement will occur. While the system is accessing the data sources, the performance of those databases will decline precipitously. Schedule the data extraction to minimize its impact on system users (e.g., over a weekend).

Step 6: Set Tracking Duration

Data warehouse structures consume a large amount of storage space, so you need to determine how to archive the data as time goes on. But because data warehouses track performance over time, the data should be available virtually forever. So, how do you reconcile these goals?

The data warehouse is set to retain data at various levels of detail, or granularity. This granularity must be consistent throughout one data structure, but different data structures with different grains can be related through shared dimensions. As data ages, you can summarize and store it with less detail in another structure. You could store the data at the day grain for the first 2 years, then move it to another structure. The second structure might use a week grain to save space. Data might stay there for another 3 to 5 years, then move to a third structure where the grain is monthly. By planning these stages in advance, you can design analysis tools to work with the changing grains based on the age of the data. Then if older historical data is imported, it can be transformed directly into the proper format.

Step 7: Implement the Plan

After you've developed the plan, it provides a viable basis for estimating work and scheduling the project. The scope of data warehouse projects is large, so phased delivery schedules are important for keeping the project on track. We've found that an effective strategy is to plan the entire warehouse, then implement a part as a data mart to demonstrate what the system is capable of doing. As you complete the parts, they fit together like pieces of a jigsaw puzzle. Each new set of data structures adds to the capabilities of the previous structures, bringing value to the system.

Data warehouse systems provide decision-makers consolidated, consistent historical data about their organization's activities. With careful planning, the system can provide vital information on how factors interrelate to help or harm the organization. A solid plan can contain cos

5. Write about the significance of Knowledge Management.

- Knowledge management systematizes the acquired knowledge to increase collective learning within the organization. It allows teams to communicate vital information, helping them find the information they need quickly to increase productivity. To organize

this process effectively, you will need a knowledge management solution that allows you to:

- Keep the documents and knowledge structured and easy to find
- Standardize organizational processes
- Save the time of employees
- Organize the training material and make it accessible
- Mitigate the risks of knowledge management when employees are having vacation or leaving the organization.

Unit - 3

PART - A Questions

1. How do you choose the right business forecasting technique?

- Context of the forecast
- Availability and relevance of past data
- Degree of accuracy required
- Allocated time to conduct the forecast
- Period to be forecast
- Costs and benefits of the forecast
- Stage of the product or business needing the forecast

2. What is business forecasting?

Business forecasting is the process of analyzing data to predict future company needs and make insight-driven development decisions.

3. Benefits of business forecasting

- Foresee upcoming changes
- Decrease the cost of unexpected demand by preparing ahead of time. Business forecasting is a great starting point for demand planning.
- Increase customer satisfaction by giving them what they want, when they want it.
- Set long- and short-term goals by tracking your progress.
- Learn from the past by analyzing it. With this new information, your company can make the necessary adjustments to avoid similar mistakes in the future.

4. List of challenges of Business forecasting

- You can't always expect the unexpected.
- It takes time to create an accurate forecast.
- Historical data will always be outdated.

5. List the technique of Business forecasting

Choosing the right business forecasting technique depends on many factors. Some of these are:

- Context of the forecast
- Availability and relevance of past data
- Degree of accuracy required
- Allocated time to conduct the forecast

- Period to be forecast
- Costs and benefits of the forecast
- Stage of the product or business needing the forecast

6. List the examples of Business forecasting

Some forecasting examples for business include:

- Budgeting Calculating cash flow forecasts, i.e., predicting your financial needs within a Time frame
- Estimating the threat of new entrants into your market
- Measuring the opportunity of developing a new product or service
- Estimating the costs of recurring bills
- Predicting future sales growth based on past sales performance
- Analyzing relationships between variables, e.g., Facebook ads and potential Revenue
- contingencies and efficient allocation of resources
- Comparing customer acquisition costs and customer lifetime value over time

7. What is Predictive Analytics?

Predictive Analytics is the domain that deals with the various aspects of statistical techniques including predictive modeling, data mining, machine learning, analyzing current and historical data to make the predictions for the future.

8. List Feature of Predictive Analytics

The term predictive analytics refers to the use of statistics and modeling techniques to make predictions about future outcomes and performance.

Predictive analytics looks at current and historical data patterns to determine if those patterns are likely to emerge again.

This allows businesses and investors to adjust where they use their resources to take advantage of possible future events. Predictive analysis can also be used to improve operational efficiencies and reduce risk.

Predictive analytics uses statistics and modeling techniques to determine future performance.

Industries and disciplines, such as insurance and marketing, use predictive techniques to make important decisions.

Predictive models help make weather forecasts, develop video games, translate voice-to-text messages, customer service decisions, and develop investment portfolios.

9. Why is Predictive Analytics Important?

List Advantages of Predictive Analytics

- Deploying analytics for analyzing past, present and projected future outcome
- Choosing the right step to drive the action in the most optimal manner
- Predictive Analytics includes both decision optimization and advanced analytics
- Supporting action and recommended actions are sent to the decision-makers
- It helps to take proactive risk management measures
- Testing iterative actions for the intended and unintended consequences

- Process improvement, cost reduction and revenue generation are all possible

10. What is Data Mining?

Data mining refers to a process of analyzing data from different contexts and summarizing it into useful information.

The information gathered from data mining could include customer patterns, purchase patterns, transaction times, customer demand, and the relationship between the sold items.

11. List the application of data mining

- Financial Analysis
- Biological Data Analysis
- Market Analysis
- Retail Industry
- Manufacturing Engineering
- Criminal investigation

12. List the Features of Data mining

These are the following key features that data mining usually allows us:

- Sift through all the chaotic and repetitive noise in your data.
- Allows understanding what is relevant and then making good use of that information
- to assess likely outcomes.
- Accelerate the pace of making informed decisions.

13. List the Advantages of Predictive Analytics and Machine Learning

- Automation of processes and, as a result, saving time and money
- Improving economic performance through a well-thought-out financial strategy and logistics
- Getting into the vanguard of a niche due to the ability to foresee the global business trend and understand behavioral factors
- Technology consolidation, simplifying processes for end-users

14. List the Advantages of Predictive Analytics Disadvantages

- The need to collect an impressive amount of data to get a relevant forecast
- You need to keep all trends and patterns that were derived earlier
- Is guided only by the historical data set, not taking into account current information
- The unpredictability of human behavior in some aspects can give an inaccurate
- forecast (for example, if, as a result of an image scandal, the company's indicators
- sagged at the moment)

15. Define Logic driven models

It remain based on experience, knowledge and logical relationships of variables and constants connected to the desired business performance outcome situation.

16. Define Data-driven Model

It refers to the models in which data is collected from many sources to qualitatively establish model relationships. Logic driven models is often used as a first step to establish relationships through data-driven models. Data driven models include sampling and estimation, regression analysis, correlation analysis, forecasting models and stimulation.

17. What is the delphi method? Describe its main advantages and limitations.

In the Delphi method, experts are individually posed questions relating to an Underlying forecasting problem. Then, an independent party seeks to form a consensus forecast by providing feedback to the various experts in a manner that prevents identification of individual positions. The method can be useful in providing consensus forecasts that are unaffected by the persuasive ability of individual expert participants. Needless to say, the effectiveness of this method is sensitive to the expertise of the independent party chosen.

18. Describe the main advantages and limitations of survey data.

Survey data can be highly useful in short-term forecasting when carefully used to elicit consumer perceptions and attitudes. However, survey data are “soft” when they don’t relate to actual market transactions and can be unreliable when consumers have incentives to misreport information.

19. What is trend projection, and why is this method often employed in economic forecasting?

Trend projection involves a simple extrapolation of historical patterns of economic activity. A primary advantage is that many economic series involve a substantial trend element due to the effects of population and economic growth and can be readily forecast using trend projection methods. For example, when past use, personal selling or advertising creates a high degree of customer loyalty, a strong trend element in product sales data will emerge. Similarly, when repeat business is high, there is a trend element in firm sales data. As a result, trend projection methods are often employed to forecast the long-term secular increase or decrease in economic data.

20. What are the main characteristics of accurate forecasts?

The main characteristics of accurate forecasts are a close correspondence, on average, between actual and forecast values and a high correlation between the actual and forecast series. When these two criteria are met, actual and forecast data will be closely related, and a desirable low level of average forecast error (root mean squared forecast error) will be apparent

21. What are the three stages to build the hypotheses or model in machine learning?

- Model building
- Model testing
- Applying the model

22. What is the standard approach to supervised learning?

The standard approach to supervised learning is to split the set of example into

the training set and the test.

23. List down various approaches for machine learning?
The different approaches in Machine Learning are
- Concept Vs Classification Learning
 - Symbolic Vs Statistical Learning
 - Inductive Vs Analytical Learning
24. Explain what is the function of ‘Unsupervised Learning’?
- Find clusters of the data
 - Find low-dimensional representations of the data
 - Find interesting directions in data
 - Interesting coordinates and correlations
 - Find novel observations/ database cleaning
25. Explain what is the function of ‘Supervised Learning’?
- Classifications
 - Speech recognition
 - Regression
 - Predict time series
 - Annotate strings

Part B – Questions

1. Explain Business Forecasting Process

Choose an issue to address

The first step in predicting the future is choosing the problem you’re trying to solve or the question you’re trying to answer. This can be as simple as determining whether your audience will be interested in a new product your company is developing. Because this step doesn’t yet involve any data, it relies on internal considerations and decisions to define the problem at hand.

Create a data plan

The next step in forecasting is to collect as much data as possible and decide how to use it. This may require digging up some extensive historical company data and examining the past and present market trends. Suppose your company is trying to launch a new product. In this case, the gathered data can be a culmination of the performance of your previous product and the current performance of similar competing products in the target market.

Pick a forecasting technique

After collecting the necessary data, it’s time to choose a business forecasting technique that works with the available resources and the type of prediction. All the forecasting models are effective and get you on the right track, but one may be more favorable than others in creating a unique, comprehensive forecast.

For example, if you have extensive data on hand, quantitative forecasting is ideal for interpretation. Qualitative forecasting is best if you have less hard data available and are willing to invest in extensive market research.

Analyze the data

Once the ball starts rolling, you can begin identifying patterns in the past and predict the probability of their repetition. This information will help your company's decision-makers determine what to do beforehand to prepare for the predicted scenarios.

Verify your findings

The end of business forecasting is simple. You wait to see if what you predicted actually happens. This step is especially important in determining not only the success of your forecast but also the effectiveness of the entire process. Having done some forecasting, you can compare the present experience with these forecasts to identify potential areas for growth.

2. Discuss Business Forecasting Methods

Important business forecasting methods

There are several business forecasting methods. They fall into two main approaches:

Quantitative forecasting

Qualitative forecasting

Quantitative and qualitative forecasting techniques use and provide different sets of data and are needed at different stages of a product's life cycle.

Quantitative business forecasting

Use quantitative forecasting when there is accurate past data available to analyze patterns and predict the probability of future events in your business or industry.

Quantitative forecasting extracts trends from existing data to determine the more probable results. It connects and analyzes different variables to establish cause and effect between events, elements, and outcomes. An example of data used in quantitative forecasting is past sales numbers.

Quantitative models work with data, numbers, and formulas. There is little human interference in quantitative analysis. Examples of quantitative models in business forecasting include:

The indicator approach: This approach depends on the relationship between specific indicators being stable over time, e.g., GDP and the unemployment rate. By following the relationship between these two factors, forecasters can estimate a business's performance.

The average approach: This approach infers that the predictions of future values are equal to the average of the past data. It is best to use this approach only when assuming that the future will resemble the past.

Econometric modeling: Econometric modeling is a mathematically rigorous approach to forecasting. Forecasters assume the relationships between indicators stay the same and test the consistency and strength of the relationship between datasets.

Time-series methods: Time-series methods use historical data to predict future outcomes. By tracking what happened in the past, forecasters expect to get a near-accurate view of the future.

Qualitative forecasting

Qualitative business forecasting is predictions and projections based on experts' and customers' opinions. This method is best when there is insufficient past data to analyze to reach a quantitative forecast. In these cases, industry experts and forecasters piece together available data to make qualitative predictions.

Qualitative models are most successful with short-term projections. They are expert-driven, bringing up contrasting opinions and reliance on judgment over calculable data.

Examples of qualitative models in business forecasting include:

Market research: This involves polling people – experts, customers, employees – to get their preferences, opinions, and feedback on a product or service.

Delphi method: The Delphi method relies on asking a panel of experts for their opinions and recommendations and compiling them into a forecast.

3.How to apply Predictive analytics to Business

Fraud detection

In general, multiple analyzing methods are combined to analyze data that improve accuracy of patterns detection and catch criminal behavior, preventing frequent fraud occurrence. With the growing concern of cybersecurity,conducting high performing behavioral analytics is demanding that examines all the suspicious behavior/activities across a network in a real-time to detect fraud actions, zero- day vulnerabilities and underlying threats.

Marketing campaigns optimization

Predictive analytics is beneficial in optimizing marketing campaigns and promotions' events. To determine purchasing response of customers and publicizing cross-sell opportunities, predictive models help in businesses to attract, retain and increase valuable customers.

Minimization in risks

Consider a simple example of reducing risks, Credit Scores, that is highly employed to recognize the likelihood of defaulters from the user's purchasing behaviour. In practice, credit score is the amount generated by a predictive model via analyzing the data relevant to a person's credit history. Other risk- related examples count as insurance claims and fraud claim collections.

Improvements in business operations:

Predictive analytics enables organizations to make smarter decisions by smoothing operations and functions more efficiently.

4.How to apply Predictive analytics in Data Mining

Make the Most of Data Mining and Predictive Analytics

Knowing what your customers are most likely to do or what they want or how much they are likely to spend to get it, are one of the best possible ways to hit your target audience. For example – think of Netflix binge recommending sci-fi shows, this is a pure example of predictive analytics results.

Furthermore, both the procedures data mining as well as predictive analytics deal with discovering secrets within big data but people often get confused with these methodologies. Data mining uses software to search for patterns, while predictive analytics uses those patterns to make predictions and direct decisions. So it is safe to say that data mining turns out to be a stepping stone for predictive analysis. Apart from this, data mining is passive while predictive analytics is active and has the potential to offer a clear picture.

Being a marketer or business owner, it is imperative for you to navigate the whole world of big data. No matter how intimidating the world of information seems, you need to keep embracing it at regular intervals.

Difference between Predictive Analytics and Data Mining

Predictive Analytics

Predictive analytics refers to the use of both new and historical data, statistical algorithms, and machine learning techniques to forecast future activity, patterns, and trends

It helps to make predictions based on future events.

Business analysts and other SMEs perform it.

It applies business knowledge to find patterns to get valid business predictions

Data Mining

data mining refers to the computational technique of discovering patterns in huge data sets involving methods at the intersection of AI.

It helps to understand the gathered information better.

5. Explain Machine Learning algorithms for Predictive analytics

E-commerce

Predictive analytics backed up with machine learning algorithms can help retailers understand customer's behavior and preferences. By studying browsing patterns and click-through rates of particular products, e-commerce companies can effectively place product recommendations and offer to maximize sales.

Personalized recommendations and reminders can also help retailers retain their customers, thus helping in creating a loyal customer base. Machine learning predictive analytics also makes it easier to manage supply chain processes. Using predictive algorithms, retailers can better manage inventory, avoid out-of-stock scenarios, and optimize logistics and warehousing.

Customer service

Almost every application of predictive analytics has the primary goal of providing superior customer service. The insights provided by predictive analytics help in customer segmentation. Segmenting customers based on their response and purchase patterns can further help businesses in creating marketing strategies tailored to each segment's characteristics.

Machine learning-based predictive analytics also helps businesses identify customers who are on the verge of leaving. Such insights empower businesses to design packages and content which suit the customers' needs, thus helping in retaining customers and attracting newer ones.

Medical Diagnosis

Predictive analytics has a large scope of application in the field of healthcare and medicine. By training algorithms with large and varied data sets, patient symptoms can be studied better. This can further help in providing a faster and more accurate diagnosis.

Machine learning predictive analytics streamlines large sets of unstructured data and derives insights from them. This improves operational efficiency and facilitates better management in the health care sector. For example, hospitals can plan if surge issues leading to the bed and staff shortages can be predicted. Such insights and predictions enable hospitals to provide the best patient care.

Sales and Marketing

There are many examples of machine learning in B2B marketing. One of the most common use cases is identifying and acquiring prospects with attributes similar to existing customers. ML-based predictive analytics can also prioritize known prospects, leads, and accounts based on their likelihood to take action.

Many companies have been using predictive lead-scoring algorithms based on intricate data sets to radically improve their lead conversion rates. Machine learning predictive analytics creates a 360-degree view of the prospective customer by combining historical data points of customer behavior with market trends. Using predictive algorithms has helped companies achieve higher targets and streamlined their sales and marketing activities into a data-based undertaking instead of simply taking a shot in the dark.

Financial Services

Finance companies heavily rely on intelligent algorithms and analytics to detect and prevent fraudulent transactions and activities. Predictive analytics scans historical datasets and identifies risk areas so that companies can make decisions to prevent/mitigate risks.

Machine learning-based predictive analytics also helps companies prepare revenue projections so that goals, objectives, cash flows, probable issues, etc. can be planned aptly and well-ahead in advance. Predicting the future using predictive analytics also helps companies keep unexpected losses at bay. Demand forecasting can help in predicting the sales cycle, and as a result, companies can place and market-specific products to increase profitability.

Cybersecurity

Cyber attacks can strike any organization at any time. Thanks to advanced statistical techniques like predictive analytics, cyber-attacks can now be predicted and prevented. Machine learning algorithms process unimaginable amounts of both structured and unstructured data in a short period. Being able to analyze traffic in real-time to track unusual patterns constantly helps companies ward off attacks before any potential harm is done.

Machine learning predictive analytics automates the process of collating data and compiling them into reports and actionable insights. This takes away the burden of your IT professionals, enabling them to focus on designing strategies to protect the system. This also reduces the scope of human error stemming from having to process massive volumes of data.

Unit-4

Part-A questions

1. What is HR analytics?

HR analytics is a data-driven approach to managing people at work. HR analytics, also known as people analytics, workforce analytics, or talent analytics, revolves around analyzing people problems using data to answer critical questions about your organization. This enables better and data-driven decision-making.

2. What are common data sources for HR analytics?

Common data sources include internal data like demographic employee data, payroll data, social network data, performance data, and engagement data. External data sources can include labor market data, population data, LinkedIn data, and much more. Any data that's relevant for the specific project can be used.

3. What skills are required to do people analytics?

Relevant skills for people analytics include business consulting to identify critical issues, analytical skills to run the analysis, stakeholder management to bring everyone together and enable the people analytics project, and storytelling and visualization in order to communicate effectively with the business and share results.

4. Who Is Responsible for Logistics Management?

This differs from company to company and role to role but a specialist in logistics is called a logistician. They are responsible for analysing and coordinating an organisation's supply chain and oversee the entire life cycle of a product from acquisition through to delivery.

5. How Does HR Analytics Drive Business Value?

HR has access to valuable employee data. How can this data be used to enable change in the organization?

There is a great deal of discussion on replicating the consumer experience in the employee experience. Essentially, the data on consumer behavior and mindset can help develop strategies to maximize sales by capitalizing on those factors. Similarly, the data useful for the HR function can be used to improve employee performance, the employee experience, and in turn, maximize business outcomes. Collins offers an example of how HR analytics can be used to enhance business value. "HR analytics could be used to measure investments in reskilling, which will deliver the right competencies to support a new revenue model, using data-driven insights to modify the training offering as sales results emerge." This is definitive granular data that can not only impact the bottom line, it can also transform employee engagement in an organization. "As such," Collins continues, "you might think about the 'ROI' of HR analytics being that of increasing the business value derived from using data for talent decisions."

7. What is Human Resource Planning?

Human Resource Planning (HRP) is the process of forecasting the future human resource requirements of the organization and determining as to how the existing human resource capacity

of the organization can be utilized to fulfill these requirements. It, thus, focuses on the basic economic concept of demand and supply in context to the human resource capacity of the organization

8. Why Are Supply Chain Networks So Important?

Supply chain networks mostly manage the flow of consumer goods in our everyday life. The professionals of the supply chain are skilled and experienced to face any sort of unexpected situation. They can work out the best feasible approach to deliver the necessary products to the consumers. And, to do so they analyze the situation and accordingly take productive steps. The supply chain network is very important for the majority of businesses which is a great boost for the success of a business.

9. List Categories of Supply Chain

- There are two types of the supply chain:-
- The Push Model- is the marketing oriented approach. The inventory is generated as per the authentic demands.
- The Pull Model- which is the customer oriented approach. According to this approach, the consumer placed the first order. After that only the ordered product production start.

10. What Is a Supply Chain Network?

A supply chain network describes the movement of both materials & information, assessing the programs and policies that impact the supply chain. Most business units in an organization have an interest in efficient supply chain operations. A supply chain network design documents these interactions, tracks improvements and sets long-term goals.

11. What is Demand Planning?

Demand planning is a supply chain management process of forecasting, or predicting, the demand for products to ensure they can be delivered and satisfy customers. The goal is to strike a balance between having sufficient inventory levels to meet customer needs without having a surplus. A wide variety of factors can influence demand, including labor force changes, economic shifts, severe weather, natural disasters or global crisis events.

12. Definition of Logistics Management

The management process which integrates the movement of goods, services, information, and capital, right from the sourcing of raw material, till it reaches its end consumer is known as Logistics Management. The objective behind this process is to provide the right product with the right quality at the right time in the right place at the right price to the ultimate customer.

13. Define Inbound logistics and Outbound logistics

Inbound Logistics: The activities which are concerned with procurement of material, handling, storage and transportation

Outbound Logistics: The activities which are concerned with the collection, maintenance, and distribution or delivery to the final consumer.

Part B – Questions

1.Explain human resources analytics working Methodology
The key features of an HR analytics solution

They answer the business questions the C-suite asks. This may require that you invest in a solution to address each question, leading to investments in multiple analytics solutions for granular data on each question. Alternatively, you may choose a unified solution that can assess multiple metrics to answer each business question.

They are easy to use by individuals who are not data scientists. An accessible solution created for laypersons is ideal when they want to assess any one or more metrics without interrupting the workflow of the data scientist.

They are cloud-based rather than on-premise. A cloud-based solution also aids accessibility without heavy IT integration. This grants HR the autonomy to use the solution as and when needed.

They are powered with statistical analysis and machine learning technology. Big data platforms require advanced data management systems powered by machine learning and natural language processing. This allows the technology to learn and reason autonomously, revealing insights that data scientists can then analyze.

They are based on predictive analytics. “[Predictive analytics is] the practice of extracting information from existing data sets to determine patterns and forecast future outcomes. Analysts use statistical methods to forecast future alternatives – will the current termination rate continue at the same pace or might we expect a surge of exits as the job market strengthens?” explains Collins.

They are powered with visualization technology. A visual representation of vast amounts of data can allow for better understanding of trends and events. The complex data processed through an analytics engine requires advanced visualization software, as it cannot be presented in simple charts and presentations.

They are available through a subscription model. Subscription models of software as a service (SaaS) platforms are useful because they easily allow you to access the latest upgrades in technology. They also eliminate the significant upfront expense of purchasing an analytics solution and may be a more cost-efficient way of investing in analytics.

2.Explain hr analytics training and development process

Training and Development is a subsystem of an organization which emphasize on the improvement of the performance of individuals and groups. training is an educational process which involves the sharpening of skills, concepts, changing of attitude and gaining more knowledge to enhance the performance of the employees. Training is about knowing where you are in the present and after some time where will you reach with your abilities. By training, people can learn new information, new methodology and refresh their existing knowledge and skills. Due to this there is much improvement and adds up the effectiveness at work. The motive behind giving the training is to create an impact that lasts beyond the end time of the training itself and employee gets updated with the new phenomenon. Training can be offered as skill development for individuals and groups.

Organizational Development: Organizational Development is a process that —strives to build the capacity to achieve and sustain a new desired state that benefits the organization or community and the world around them. Development is made to answer the training problems:

TRAINING

Training is meant for operatives

It is reactive process

AIM: To develop additional skills

It is short term process

OBJECTIVE: To meet the present need of an employee

Initiative is taken by the management

Development is meant for executives

It is pro- active process

AIM: To develop the total personality

It is continuous process

OBJECTIVE: To meet the future need of an employee

Initiative is taken by an individual

Importance of Training and Development:

- Optimum utilization of Human resources
- Development of skills
- To increase the productivity
- To provide the zeal of team spirit
- For improvement of organization culture
- To improve quality, safety
- To increase profitability
- Improve the morale and corporate image

Reasons to go for Training and Development:

When management thinks that there is a need

- To improve the performances of employees
- To set up the benchmark of
- To improvement so far in the performance improvement effort
- To train about the specific job responsibility
- To test the new methodology for increasing the productivity

3 Discuss supply chain network management steps

4.Explain logistics process in supply chain analytics

Logistics

Supply chain management (SCM) is one of the main ways to optimize the budget of enterprises producing goods and/or services. At the same time, a great role in the supply chains is played by

logistics – the management of physical, informational, and human flows in order to optimize them and avoid unnecessary waste of resources.

Difference Between Logistics and Supply Chains

Logistics and supply chain should not be confused. Logistics is a rather narrowly focused concept (narrower than the SCM), which simply means globalization of resource management — from every local unit to the entire network of production points.

In turn, supply chain management is a more complex category. Supply chain management involves logistics and thus performs end-to-end optimization – that is, not only within the enterprise but also when working with counterparties.

The purpose of efficient logistics management is to achieve maximum competitiveness and profitability of the company, as well as the entire network structure of supply chains, including the end-user. In this regard, the integration and introduction of innovations into the processes of supply chains, as well as into the processes of logistics, should be aimed at increasing the overall productivity of all their participants.

The Functions of Logistics within Supply Chain Management

If we systematize all areas of logistics that need to be developed for the rational management of production resources, we can single out the following functions:

Warehouse design and management. This role of logistics in supply chain management covers several tasks at once: from the design of storage facilities to the requirements for storage of products and ending with the introduction of various automation solutions (for example, for machinery intended for transporting goods within warehouses);

The formation of packages. Packaging, tracking and accounting – all of these tasks allow for end-to-end control of goods on the way to the customer/distributor;

Transportation of products. This includes work with cargo carriers and vehicles listed in the company's fleet: planning their routes, calculating fuel costs, etc.;

Working with customs. When an enterprise plans international delivery of goods, it is very important that during their transportation the goods fully comply with customs requirements and contain all the necessary documentation;

Working with intermediaries. Intermediaries in logistics are all third-party, non- company resources that are directly involved in the implementation of supply chains. In turn, finding intermediaries with the most acceptable ratio of quality to cost of services, as well as establishing long-term, reliable relations with them are also included in the list of tasks for efficient logistics management;

Working with written off and returned goods. There is also such a thing as “reverse logistics”, which establishes the rules and routes for transporting the returned/discarded goods, as well as ways to dispose of them.

Challenges Logistics Helps to Overcome in Supply Chain Management

Given the above list of tasks that logistics performs in supply chain management, we can single out a number of advantages provided by its correct implementation:

Minimization of enterprise expenses. The main role of logistics in supply chain management is primarily to increase the overall value of each delivery, which is identified by customer

satisfaction. This means that the reduction and optimization of labor resources must be tied in with keeping up a certain level of quality customer service. This problem is solved both by reducing the total labor resources (primarily by eliminating unnecessary chain links), and by introducing automation solutions;

Consolidation of traffic volumes. Transportation costs are one of the largest expense categories in logistics management. In general, transportation costs increase depending on the distance, batch size, and product exposure to damage. On the other hand, the transportation cost per unit of weight decreases as the lot size increases on long runs. Thus, the maximum consolidation of transportation volumes can help reduce transportation costs. Enlargement can be achieved by combining small lots into a single large one, intended for a long run (i.e., for a longer distance);

Improving the quality of service. With regard to the quality of service, it is largely influenced by the speed of delivery of the goods to the end-user, as well as its transportation in proper conditions (for example, many products today are supplied with RFID tags so that both the manufacturer and the end customer could track whether all storage conditions are being observed during the transportation of the goods) and within the allowed time limits (this refers primarily to perishable goods);

Reduction of actual losses and reduction of possible risks. As you know, a business is profitable if the value it creates exceeds the costs associated with the implementation of activities. To achieve a competitive advantage, a company must either carry out these activities at lower costs or carry them out in a way that will lead to differentiation and price increment. The first thing to be done to effectively solve this problem is reducing the losses that are associated with the return of goods. It is very important to plan not only the routes on the way to the distributor or the end-user but also the routes by which the goods are delivered back to the warehouse or to the establishments for their disposal. The second factor affecting risk reduction is the correct planning of enterprise resources, which minimizes the likelihood of damage or loss of goods or manufacturing components on the way from the extraction of raw materials to delivery of the finished product/service to the end-user;

Minimization of the need for intermediary services. Intermediary services (transportation, storage, marketing, recycling, etc.) take up the lion's share of the cost of the implementation of supply chains. Experienced logisticians plan routes so as to minimize the need for involving third-party services for efficient logistics management;

Supporting goods with the necessary documentation. Insurance and support of documentation are two fundamental tasks of logistics, solving which helps to eliminate any problems associated with legal restrictions in the storage, transportation, and marketing of goods;

Timely response to changing market demands. Advanced logistics scenarios also help to quickly adapt to changing market requirements and, thereby, maintain top positions against the backdrop of competitors and remain in demand for the target audience.

5.Explain supply chain analytics applications

Hiring The Right Talent With Competency Acquisition Analytics

Hiring the right talent is instrumental to a company's success with employees amounting to one of the biggest costs and greatest opportunities in most businesses. Hence, in order to study whether or not you are acquiring the right talent for your business, competency acquisition analytics can be used.

The primary step includes identifying the core competencies that are crucial for the success of your business. Then, you can map these competencies against the existing talent, their current capabilities and their potential for growth. Talent gaps, if any, can also be identified at this stage. The HR team can assess whether the existing resources can be trained to plug the identified competency gaps, or whether new talent with those competencies need to be hired.

Recruitment Channel Analytics

Just as important as hiring the right talent, is understanding where the best talent is coming from. Recruitment channel analytics is a process that helps determine where an organization's best employees have been recruited from, and what recruitment channels have been most effective in hiring the right resources for the company.

This analysis includes gaining insights by drilling down into historical employee data, surveys and feedback records and assessing KPIs such as the return per employee and human capital value-added.

Classification Analysis To Determine The Success Rate Of Teams

Classification analysis is the process of analyzing historical data to identify patterns that help us predict which category a particular observation or data entity belongs to. In HR, this analytical method can be used to study the composition of a team, and other context variables in order to determine how successful the team will be.

Instead of forming teams merely on the experience, availability of resources, organizations can use insights from classification analytics to understand what other factors such as leadership style, team dynamics and size, the duration of a project, etc, impact the success rate of a team. Being able to determine the success rate of a team beforehand, enables organizations to form the right teams for a project.

Attrition Analysis

High attrition is a huge challenge for HR teams and cost intensive for companies. Job postings, recruiting, onboarding and training are some significant expenses of losing employees and replacing them. This is a bigger problem if you're in a customer-facing business as customers prefer to work with a particular set of people they're habituated with. One way to reduce attrition is by using advanced analytics and NLP to harness the employee reviews data from employment websites like Glassdoor, Indeed, Comparably etc. This analysis helps you measure the employee satisfaction towards the brand and understand the common factors that lead to attrition.

Personalizing Training Programmes

Instead of applying run-of-the-mill training methods and general programs for all employees, the HR team can instead personalize courses to suit the learner's preference.

In order to do so, 'adaptive' learning technology must be used in which data analytics determines the learning pace of the employee, the mode of training, as well as what questions are best suited for them, in order to personalize the course to suit the learner.

Capacity Analytics And Utilization

One of the major business benefits of advanced analytics in HR is in cutting down costs. HR teams can use Capacity Analytics to determine:

What the team capacity is and how much of it is actually being utilized.

What activities the team is engaged in when they are working.

What processes, tools, and applications are being used to complete the work and how much they cost the company.

How operationally efficient the team is – helps determine if the team is either overworked or underutilized.

The capacity for growth.

Improving Employee Performance

Although traditional methods of determining and managing employee performance such as peer and manager review, monitoring KPIs, etc, are globally used, they have not been very impactful in improving employee performance. In fact, a PwC report on Performance Management highlights that 52 percent of organizations have made or are planning to make changes to employee performance management in the near future.

But with Employee performance analytics, individual employee performance can be measured much more efficiently with the help of both historical and real-time data. Employee performance analytics provides both a retrospective as well as a forward-looking analysis of what employee performance was and how we can improve it. With the resulting insights, we can identify the employees that are performing well and which employees need additional training and motivation in order to perform better.

Anomaly Detection Analysis

Anomaly detection analysis is used to recognize unexpected or deviant patterns. In HR management, anomaly detection analysis can help identify relationships between accidents at work and employees who are working longer working hours and possibly fatigued. By identifying resources that work longer than a specified threshold, HR teams could prevent accidents and injuries in the workplace.

6. Explain human resources analytics applications

- To understand the essence of HR analytics and to explain how it impacts business performance, we asked Mick Collins, Global Vice President, Workforce Analytics & Planning Solution Strategy and Chief Expert at SAP SuccessFactors, to break it down for us.
- "HR analytics is a methodology for creating insights on how investments in human capital assets contribute to the success of four principal outcomes: (a) generating revenue, (b) minimizing expenses, (c) mitigating risks, and (d) executing strategic plans. This is done by applying statistical methods to integrated HR, talent management, financial, and operational data," says Collins in an exclusive discussion with HR Technologist.
- HR analytics focuses primarily on the HR function and is not – as is largely

- believed – exactly interchangeable with people analytics or workforce analytics.

Unit-5

Part A – Questions

1. What is sales analytics?

Sales analytics is used in identifying, modeling, understanding and predicting sales trends and outcomes while aiding sales management in understanding where salespeople can improve. Sales analytic systems provide functionality that supports discovery, diagnostic and predictive exercises enabling the manipulation of parameters, measures, dimensions or figures as part of an analytic or planning exercise.

2. What are the benefits of sales analytics?

- Implementing a sales analytics system brings increased accountability and increases understanding of the factors that impact sales.
- List 5 Ps of Marketing
- Product
- Promotion
- Pricing
- Place (or distribution system)
- People

3. Why Marketing Strategy Is Necessary

1. Systematic futuristic thinking by management
2. Better co-ordination of company efforts
3. Development of better performance standards for control
4. Sharpening of objectives and policies
5. Better prepare for sudden new developments
6. Managers have a vivid sense of participation

4. List the Advantages of marketing analytics.

- Advantage: Gain a full view of customers across channels.
- Become more proactive and effective.
- Personalize your marketing and customer engagements.
- Sharpen social media strategies.
- Engage your customers in real-time.
- Visualize success across the enterprise.
- Treat data as a strategic asset.

5. Discuss the need of marketing analytics.

Understand your target audience in greater detail Identify where your competitors are investing their efforts Measure how well your marketing campaigns are performing Monitor current trends and predict future trends Use data to decide the future course of action

6. Explain the components of marketing analytics.

- Customer Description
- Customer Perception
- Market Trends
- Market Projections
- Competition

7. Differentiate market research and marketing analytics.

Market research is a form of primary research, taken from the source and providing firsthand evidence; market analytics is a form of secondary research, a summary of descriptive documentation and synthesis of data drawn from a number of sources.

8. What is Sales Analytics?

Sales Analytics involves leveraging the power of Data Analytics to improve your Sales team's performance both in the long and short-term. This is helpful when it comes to suggesting recommendations to Sales reps and managers. These recommendations could be regarding the best decisions to make when it comes to capitalizing on the Sales trends or generating models to boost revenue

9. What is needed to monitor Sales Analytics?

- Clarification of Future Decisions
- Identification of Missed Opportunities
- Recognition of Market Trends
- Sales Funnel Optimization
- Increase Efficiency and Productivity

10. List of applications of Sales Analytics

- Sales Forecasting
- Customer Health Metrics
- Predictive Lead Scoring
- Sales Team Management
- Customer Contact Analytics
- Monitoring Individual Rep Performance
- Multi-touch Sales Attribution
- Sales Process Improvements
- Performance Management

11. List Different Types of Sales Analytics

- Predictive Sales Analytics
- Prescriptive Sales Analytics
- Diagnostic Sales Analytics
- Channel of Distribution
- Store Keeping Units (SKUs)
- Per Comparable Economic Data
- Per Capita
- Category Development Index (CDI)

- Competitive Trends
- Brand Development Index (BDI)

12. How do Sales Analytics Systems Work?

- There is essentially a prediction problem at the heart of sales analytics.
- The Sales and Revenue of your company depend largely on the customer experiences you create for them. The Sales Analytics Systems store all the data with respect to the customers, their journey, their interests, and their behavior. Customer interaction with Sales Reps, interactions on all digital platforms, Lead Scores, Sales Attribution, and Key Metrics are recorded and analyzed in the systems. These metrics play a major role in coming up with a Data-Driven Marketing Strategy/Decision.

13. List Best Practices for Sales Analytics

- Presence of Sales Operations Expertise
- Understanding the Key Outputs
- Ensure Data is Accurate and Complete:
- Keep it as Simple as Possible
- Coach With Metrics

14. How to Run a Sales Data Analysis?

- Select what kind of Sales Data you want to analyze, who or what you are interested in analyzing.
- Zero in on specific, definitive, and measurable objectives.
- Set the frequency of your Sales Data Analysis.
- Compile your Sales Data manually or use Sales Analytics tools on a rolling basis.
- Leverage Data Visualization Tools to make sense of vague numbers and metrics.
- Analyze your data and try to identify trends or patterns in it.
- Implement your findings to optimize the Sales Performance of your company.

15. Sales Analytics Tools

Some of the most popular and useful Sales Analytics Tools are discussed below.

- Power BI
- HubSpot
- Tableau
- Zoho

16. Limitations of Sales Analytics

Carrying out Sales Analysis makes sense for an organization having more than 10 reps, a stable product, and a target market so that the customer behaviour is not too variable for comprehensive analysis. For an organization having a Sales operation that can fit comfortably in a spreadsheet, using analytics tools may become unnecessary. Some analytics systems suffer from drawbacks associated with modern AI (Artificial Intelligence) systems. For instance, some systems might not be able to provide a coherent explanation for certain results, making them counter-productive

Part B – Questions

1. Explain Marketing Strategy in detail

Marketing Analytics Strategies Process

With marketing analytics, you can gather intelligence into several different areas of your marketing strategy. It will help you understand how your programs are performing against the cost and which programs are delivering the best ROI. It will help you to segregate your efforts and identify the area that you need to focus on the most.

Analytics strategy will help you to realise how your programs are working in conjunction to nurture your leads. With this, you can build a solid base upon which you can qualify them and pass the leads on to your sales reps as opportunities.

With marketing analytics, you can also identify laggards, i.e. the programs that are not providing adequate return based on efforts invested at them. You can then choose to redefine your data-driven strategy at them or remove them from your focus altogether.

Market and competitor analysis will give you crucial insights into your competitor data-driven strategy and which channels/ programs are working for them. Learning from your competitors is an old business principle and marketing analytics can give you a powerful arsenal to use and base your actions on the digital platforms.

Even better! Advanced analytics can provide insights into trends, make forecasts and capitalise on opportunities before anyone else.

This will help grow your bottom line and avoid wastage on marketing spending, optimising the dollar spend and viewing campaign performance in real-time. It helps you to measure the impact of your strategies and compare it against the cost.

5 Marketing Strategies For Your Business

Keyword Research– With keyword research, you can obtain very detailed insights into how your business is appealing to your potential customers and if there are areas that you can optimise. View how competitive your target keywords are, the average monthly search volume for that particular keyword, the estimated CPC's if you decide to bid on those keywords, the number of clicks that you are getting for that keyword and the click-through rates.

Website Marketing Analysis– Understand your top pages that are generating a high amount of conversion and getting maximum traffic. Conversely, you can also identify pages that are receiving high traffic but not getting enough conversions. By using heatmaps, you can also analyse how your audience is interacting with each element on your page. Understand, with heatmaps, where your visitors are abandoning your pages. Identify pages that are getting a high bounce. Identify who your audience is, their demographics, which device are they using to access your content, what keywords your webpages are ranking for.

Campaign Analytics- Understand how your campaigns are performing, get a real-time view into the leads that are on the nurture list. Understand the lead conversion rate from multiple channels, identify the opportunities by product category and lead source. Identify which content and platform are resonating best with your audience. This will help you optimise the messaging and target of your content strategy.

Social media analytics– With social media analytics, you can track the sentiment to understand in real-time how people are responding and engaging with you. It will help you to maximise the impact of taking the right action. Identify your most engaged followers, and understand what improvements can you make to reach more brand evangelists.

Link analytics– Links remain one of the crucial ranking factors in search algorithms. With link analytics, you can view the site’s link profile, the domain and page authority of the referring domains, the total number of inbound links, top pages by link, anchor text for the links.

For marketing managers, transparency into business metrics and a common agreement on the different KPIs. This requires them to build competency on their data analytics capabilities and connect the different data points to get a clear insight into the different tactics. Data analytics will deliver useful insights into the important questions that businesses seek. With a data strategy framework, you can analyze the gaps to inform where your business strategy needs tweaking. But you need to ensure that every stakeholder has a common understanding of which metrics are important and how they are going to be measured. Otherwise, they can result in confusion.

Another important aspect of having a reliable marketing analytics framework in place is to create effective analytics dashboards. The dashboard should list down the important KPIs and should be designed using effective design principles that makes it easier to consume the information. Utilizing the principles of data visualization are key here to creating effective dashboards. The dashboard should present KPIs by unifying data strategy from all the different marketing data sources. The dashboard should also provide the necessary levels of customization and personalization to the consumers.

Lastly, it can never be overemphasized how important data storytelling will be to your analytics success. The numbers and KPIs need to be weaved into a narration for business impact. A magical and beautiful analytics dashboard will fail to drive its point unless it is tied to a business question or objective. It also makes the numbers and KPIs more memorable for the executives and business managers.

Marketing strategies and tactics are normally based on explicit and implicit beliefs about consumer behavior. Decisions based on explicit assumptions and sound theory and research are more likely to be successful than the decisions based solely on implicit intuition.

Knowledge of consumer behavior can be an important competitive advantage while formulating marketing strategies. It can greatly reduce the odds of bad decisions and market failures. The principles of consumer behavior are useful in many areas of marketing, some of which are listed below –

Analyzing Market Opportunity

Consumer behavior helps in identifying the unfulfilled needs and wants of consumers. This requires scanning the trends and conditions operating in the market area, customer’s lifestyles, income levels and growing influences.

Selecting Target Market

The scanning and evaluating of market opportunities helps in identifying different consumer segments with different and exceptional wants and needs. Identifying these groups, learning how to make buying decisions enables the marketer to design products or services as per the requirements.

Example – Consumer studies show that many existing and potential shampoo users did not want to buy shampoo packs priced at Rs 60 or more. They would rather prefer a low price packet/sachet containing sufficient quantity for one or two washes. This resulted in companies introducing shampoo sachets at a minimal price which has provided unbelievable returns and the trick paid off wonderfully well.

2. Discuss Marketing Mix methods

Establish Your Goals

- The end goal of any marketing analytics strategy is to parse through and gather insights from your data sets.
- That means that marketing mix modeling is meant to help organize your data and your analytics methods.
- Therefore, it makes sense that the first step is to establish the specific goals you want to attain through your strategy.
- Your goals might center around budgets, marketing campaigns, product pricing, or your brand in comparison to competitors.

Create Internal Alignment

In order to succeed, you need to have clear alignment across your organization.

As with most data analytics, marketing mix modeling requires you to pull data from many different systems from different departments.

That requires compliance across different teams and with the key stakeholders in your organization, such as:

- CMO Media agencies
- Marketing agencies
- Marketing executives and managers
- CRM managers
- Sales leads

Consumer Behavior Tutorial

Consumer behavior is about the approach of how people buy and the use merchandise and services. Understanding consumer behavior will assist business entities to be more practical at selling, designing, development of products or services, and every other different initiative that impacts their customers. In this tutorial, it has been our endeavor to cover the multidimensional aspects of Consumer Behavior in an easy-to-understand manner.

Audience

This tutorial will help management students as well as industry professionals who work in a product development environment, or in packaging, or for that matter, any part of a company that has an interface with the customers.

Prerequisites

To understand this tutorial, it is advisable to have a foundation level knowledge of basic business and management studies. However, general students and entrepreneurs who wish to get an understanding about consumer behavior may find it quite useful.

Consumer Behavior - Consumerism

Consumerism is the organized form of efforts from different individuals, groups, governments and various related organizations which helps to protect the consumer from unfair practices and to safeguard their rights.

The growth of consumerism has led to many organizations improving their services to the customer.

Consumerism

Consumer is regarded as the king in modern marketing. In a market economy, the concept of consumer is given the highest priority, and every effort is made to encourage consumer satisfaction.

However, there might be instances where consumers are generally ignored and sometimes they are being exploited as well. Therefore, consumers come together for protecting their individual interests. It is a peaceful and democratic movement for self-protection against their exploitation. Consumer movement is also referred as consumerism.

3.How to analysis Customer Behavior

Consumer behavior is multidimensional in nature and it is influenced by the following subjects – **Psychology** is a discipline that deals with the study of mind and behavior. It helps in understanding individuals and groups by establishing general principles and researching specific cases. Psychology plays a vital role in understanding how consumers behave while making a purchase.

Sociology is the study of groups. When individuals form groups, their actions are sometimes relatively different from the actions of those individuals when they are operating individually.

Social Psychology is a combination of sociology and psychology. It explains how an individual operates in a group. Group dynamics play an important role in purchasing decisions. Opinions of peers, reference groups, their families and opinion leaders influence individuals in their behavior.

Cultural Anthropology is the study of human beings in society. It explores the development of central beliefs, values and customs that individuals inherit from their parents, which influence their purchasing patterns.

4.Explain selling Process in detail

Prospecting

The first step in the sales process is prospecting. In this stage, you find potential customers and determine whether they have a need for your product or service— and whether they can afford what you offer. Evaluating whether the customers need your product or service and can afford it is known as qualifying.

Keep in mind that, in modern sales, it's not enough to find one prospect at a company: There are an average of 6.8 customer stakeholders involved in a typical purchase, so you'll want to practice multi-threading, or connecting with multiple decision-makers on the purchasing side.

Preparation

The next step is preparing for initial contact with a potential customer, researching the market and collecting all relevant information regarding your product or service. Develop your sales presentation and tailor it to your potential client's particular needs. Preparation is key to setting you up for success. The better you understand your prospect and their needs, the better you can address their objections and set yourself apart from the competition.

Approach

Next, make first contact with your client. This is called the approach. Sometimes this is a face-to-face meeting, sometimes it's over the phone. There are three common approach methods.

Premium approach: Presenting your potential client with a gift at the beginning of your interaction

Question approach: Asking a question to get the prospect interested

Product approach: Giving the prospect a sample or a free trial to review and evaluate your service

Presentation

In the presentation phase, you actively demonstrate how your product or service meets the needs of your potential customer. The word presentation implies using PowerPoint and giving a salesy spiel, but it doesn't always have to be that way—you should actively listen to your customer's needs and then act and respond accordingly.

Handling objections

Perhaps the most underrated step of the sales process is handling objections. This is where you listen to your prospect's concerns and address them. It's also where many unsuccessful salespeople drop out of the process—44% of salespeople abandoning pursuit after one rejection, 22% after two rejections, 14% after three, and 12% after four, even though 80% of sales require at least five follow-ups to convert. Successfully handling objections and alleviating concerns separates good salespeople from bad and great from good.

Use this flowchart to map out objections and link to relevant collateral (Click on image to modify online)

Closing

In the closing stage, you get the decision from the client to move forward. Depending on your business, you might try one of these three closing techniques.

Alternative choice close: Assuming the sale and offering the prospect a choice, where both options close the sale—for example, “Will you be paying the whole fee up front or in installments?” or “Will that be cash or charge?”

Extra inducement close: Offering something extra to get the prospect to close, such as a free month of service or a discount

Standing room only close: Creating urgency by expressing that time is of the essence—for example, “The price will be going up after this month” or “We only have six spots left”

Follow-up

Once you have closed the sale, your job is not done. The follow-up stage keeps you in contact with customers you have closed, not only for potential repeat business but for referrals as well.

And since retaining current customers is six to seven times less costly than acquiring new ones, maintaining relationships is key.

5. Illustrate Sales Planning techniques

Sales planning is an important aspect of business that identifies current issues, such as a lack in sales, and seeks to find solutions or develop strategies. Sales planning takes advantage of new opportunities, such as when a company develops a new product, to create brand awareness or interest. Sales plans address various sales opportunities and the plan's objectives may vary depending on whether the company sells directly to the consumer, or to another business.

Ideally, a sales plan:

- Define targets Creates strategies Identifies tactics Motivates teams
- Sets budgets to achieve targets
- Reviews goals and suggests improvements
- Analytics applications in Marketing and Sales Measure Performance of Marketing Campaigns

The most basic form of marketing analytics is to provide marketers with the tools to understand what business impact their marketing campaigns have. This task can range from something as straightforward as providing standard metrics (click-through rate, ROI, etc..) at the campaign level to an analysis as complex as developing a Market Mix Model to come up with the optimal marketing strategy to maximize profit.

6. Explain Analytics applications if Marketing and Sales

The full list of applications we have seen are:

- Sales forecasting
- Sales force management Sizing
- Geo-distribution
- Predictive/prescriptive lead scoring Customer contact analytics
- Sales rep compensation improvements
- Sales attribution between marketing and sales
- Sales process improvements

Performance management

Additionally sales analytics enables numerous applications we listed above. Some of these applications have dramatic benefits:

Reduction of sales support activities

Sales reps spend more time on non-sales activities according to most research on the topic. These include making sales forecasts, prioritizing leads, deciding how to approach leads which can all be automated with sales analytics applications. To perform such tasks, sales reps can use behavioral analytics.

Improved prioritization

There are several levels of improved prioritization thanks to sales analytics: Predictive/prescriptive lead scoring techniques enable improved prioritization by sales reps Sales rep compensation can be improved with advanced analytics enabling

company to focus on successful sales reps

Sales attribution models allow the company to focus its resources appropriately between sales and marketing.

Improved sales processes and practices

Insights can lead managers to learn from top performers, improve their coaching and sales processes as outlined in the example below.