Data Presentation: Visualisation and Graphical Presentation

10

This Module Includes

Data Presentation: Visualisation and Graphical Presentation

SLOB Mapped against the Module:

To equip oneself with application-oriented knowledge in data preparation, data presentation and finally data analysis and modelling to facilitate quality business decisions.

Module Learning Objectives:

After studying this module, the students will be able to –

- Understand the basic concepts of developments of data presentation
- Understand the basic objectives and functions of data Visualisation
- Understand the basic concepts of data presentation architecture (DPA)
- Understand the basic tools available for data Visualisation and presentation

Data Visualisation of Financial and Non-Financial Data

10.1

There is a saying '**A picture speaks a thousand words**'. Numerous sources of in-depth data are now available to management teams, allowing them to better track and anticipate organisational performance. However, obtaining data and presenting it are two distinct and equally essential activities.

Data visualisation comes into play at this point. Recent studies reveal that top-performing finance directors are more likely than their peers to emphasise data visualisation abilities.

Why data Visualisation is important?

Scott Berinato, senior editor and data visualisation specialist for Harvard Business Review, writes in a recent post that data visualisation was once a talent largely reserved for design- and data-minded managers. Today, he deems it indispensable for managers who wish to comprehend and communicate the significance of the data flood we are all experiencing.

This is particularly true for finance, which is becoming the data hub of the majority of progressive enterprises. David A.J. Axson of Accenture highlights in his paper "Finance 2020: Death by Digital" that finance is transitioning from "an expenditure control, spreadsheet-driven accounting and reporting centre" to "a predictive analytics powerhouse that generates business value."

Finance is able to communicate these analytic findings to the entire business through the use of data visualisation. Several studies indicate that sixty five percent of individuals are visual learners. Giving decision makers an opportunity to have visual representations of facts improves comprehension and can eventually lead to better judgments.

In addition, the technique of developing data visualisations may aid finance in identifying more patterns and gaining deeper insights, particularly when many data sources or interactive elements are utilised. For example, contemporary finance professionals frequently monitor both financial and non-financial KPIs. Data visualisation may assist in correlating these variables, revealing relationships, and elucidating the actions required to enhance performance.

Doing data Visualisation in the right way

All data visualisation isn't created equally engaging. When properly executed, it simplifies difficult topics. However, if data visualisations are executed improperly, they might mislead the audience or misrepresent the data.

Finance professionals who are investigating how data visualisation might help their analytics efforts and communication should keep the following in mind:

- **Know the objective:** Before the development of great images, one must first grasp the objectives. HBR's Berinato suggests, first establishment of the information if it's conceptual or data-driven (i.e. does it rely on qualitative or quantitative data) is required. Then specify if the objective is exploratory or declarative. For

instance, if the objective is to display the income from the prior quarter, the goal is declarative. If, on the other hand, one is curious as to whether the income increase correlates with the social media spending, the objective is exploratory. According to Berinato, determining the answers would assist in determining the tools and formats required.

- **Always keep the audience in mind:** Who views the data visualisations will determine the degree of detail required. For instance, finance data presentations for the C-suite require high-level, highly relevant information to aid in strategic decision-making. However, if one is delivering a presentation to 'line of business' executives, delving into the deeper details might offer them with knowledge that influences their daily operations.
- **Invest in the best technology:** There are a multitude of technological tools that make it simple to produce engaging visualisations in the current digital age. The firm should first implement an ERP that removes data silos and develops a centralised information repository. Then, look for tools that allows to instantly display data by dragging and dropping assets, charts, and graphs; offer search options and guided navigation to assist in answering queries; and enable any member of the financial team to generate graphics.
- **Improve the team's ability to visualise data:** Most of the agile finance directors rank their team's data visualisation abilities as good, compared to only twenty four percent of their counterparts, according to an AICPA survey. While everyone on the finance team can understand the fundamentals of data visualisation, training and a shift in hiring priorities may advance the team's data visualisation skills. Find ways to incorporate user training on data visualisation tools, so that the staff is aware of the options that the technology affords. Additionally, when making new recruits, look out individuals with proficiency in data analytics and extensive data visualisation experience.

The amount of data analysed by financial teams has grown dramatically. Data visualisations may help the team convey its strategic findings more effectively throughout the enterprise.

Objective and Function of Data Presentation

10.2

The absence of data visualisation would make it difficult for organisations to immediately recognise data patterns. The graphical depiction of data sets enables analysts to visualise new concepts and patterns. With the daily increase in data volume, it is hard to make sense of the quintillion bytes of data without data proliferation, which includes data visualisation.

Every company may benefit from a better knowledge of their data, hence data visualisation is expanding into all industries where data exists. Information is the most crucial asset for every organisation. Through the use of visuals, one may effectively communicate their ideas and make use of the information.

Dashboards, graphs, infographics, maps, charts, videos, and slides may all be used to visualise and comprehend data. Visualizing the data enables decision-makers to interrelate the data to gain better insights and capitalises on the following objectives of data visualisation:

- **Making a better data analysis:**

  Analysing reports assists company stakeholders' in focusing their attention on the areas that require it. The visual mediums aid analysts in comprehending the essential business issues. Whether it is a sales report or a marketing plan, a visual representation of data assists businesses in increasing their profits through improved analysis and business choices.

- **Faster decision making:**

  Visuals are easier for humans to process than tiresome tabular forms or reports. If the data is effectively communicated, decision-makers may move swiftly on the basis of fresh data insights, increasing both decision-making and corporate growth.

- **Analysing complicated data:**

  Data visualisation enables business users to obtain comprehension of their large quantities of data. It is advantageous for them to identify new data trends and faults. Understanding these patterns enables users to focus on regions that suggest red flags or progress. In turn, this process propels the firm forward.

The objective of data visualisation is rather obvious. It is to interpret the data and apply the information for the advantage of the organisation. Its value increases as it is displayed. Without visualisation, it is difficult to rapidly explain data discoveries, recognise trends to extract insights, and engage with data fluidly.

Without visualisation, data scientists won't be able to see trends or flaws. Nonetheless, it is essential to effectively explain data discoveries and extract vital information from them. And interactive data visualisation tools make all the difference in this regard.

The continuing epidemic is a current example that is both topical and recent. However, data visualisation assists specialists in remaining informed and composed despite the volume of data.

(i) Data visualisation enhances the effect of communications for the audiences and delivers the most convincing data analysis outcomes. It unites the organisation's communications systems across all organisations and fields.

(ii) Visualisation allows to interpret large volumes of data more quickly and effectively at a glance. It facilitates a better understanding of the data for measuring its impact on the business and graphically communicates the knowledge to internal and external audiences.

(iii) One cannot make decisions in a vacuum. Data and insights available to decision-makers facilitate decision analysis. Unbiased data devoid of mistakes enables access to the appropriate information and visualisation to convey and maintain the relevance of that information.

Objectives of data presentation

1. **Decision making:** By providing relevant information and supporting evidence.
2. **Communication:** By allowing the recipient to grasp key message without any difficulty.
3. **Influence:** By influencing stakeholders or decision makers to take specific actions or adapt certain view points.
4. **Story telling:** By presenting data in a narrative format, audience can understand the context, the problem and the solution or outcomes.
5. **Clarity and completeness:** By presenting data in a clear concise and visually appealing manner, easily understood by the audience.

Data Presentation Architecture

10.3

Data presentation architecture (DPA) is a set of skills that aims to identify, find, modify, format, and present data in a manner that ideally conveys meaning and provides insight. According to Kelly Lautt, "data Presentation Architecture (DPA) is a rarely applied skill set critical for the success and value of Business Intelligence. Data presentation architecture weds the science of numbers, data and statistics in discovering valuable information from data and making it usable, relevant and actionable with the arts of data Visualisation, communications, organisational psychology and change management in order to provide business intelligence solutions with the data scope, delivery timing, format and Visualisations that will most effectively support and drive operational, tactical and strategic behaviour toward understood business (or organisational) goals. DPA is neither an IT nor a business skill set but exists as a separate field of expertise. Often confused with data Visualisation, data presentation architecture is a much broader skill set that includes determining what data on what schedule and in what exact format is to be presented, not just the best way to present data that has already been chosen (which is data Visualisation). Data Visualisation skills are one element of DPA."

Objectives

There are following objectives of DPA:

(i) Utilize data to impart information in the most efficient method feasible (provide pertinent, timely and comprehensive data to each audience participant in a clear and reasonable manner that conveys important meaning, is actionable and can affect understanding, behaviour and decisions).

(ii) To utilise data to deliver information as effectively as feasible (minimise noise, complexity, and unneeded data or detail based on the demands and tasks of each audience).

Scope of DPA

In the light of abovementioned objectives, the scope of DPA may be defined as:

(i) Defining significant meaning (relevant information) required by each audience member in every scenario.

(ii) Obtaining the proper data (focus area, historic reach, extensiveness, level of detail, etc.)

(iii) Determining the needed frequency of data refreshes (the currency of the data)

(iv) determining the optimal presentation moment (the frequency of the user needs to view the data)

(v) Using suitable analysis, categorization, visualisation, and other display styles

(vi) Developing appropriate delivery techniques for each audience member based on their job, duties, locations, and technological access

It involves several steps. They are

1. Identify requirements: Understand the purpose, audience and types of data to be presented.
2. Data collection and processing: Gather necessary data from various sources and clean, transform and aggregate it as needed.
3. Choose visualization technique: Select appropriate charts, graphs or visual elements that best represents the data and its insights.
4. Select tools and platforms: Pick suitable software or platform based on the data and visualization needs.
5. Create the architecture: Develop the framework for data presentation, including data storage, processing and visualization layers.
6. Implement and test: Build and integrate the architecture ensuring it meets the requirements and functions accurately.
7. Optimize and maintain: Continuously maintain the architecture, optimize performance and update it to adapt to changing data and user needs.

Dashboard, Graphs, Diagrams, Tables, Report Design

10.4

Data visualisation is the visual depiction of data and information. Through the use of visual elements like dashboards, charts, graphs, and maps etc, data visualisation tools facilitate the identification and comprehension of trends, outliers, and patterns in data.

10.4.1 Dashboard

A data visualisation dashboard (Figure 10.3) is an interactive dashboard that enables to manage important metrics across numerous financial channels, visualise the data points, and generate reports for customers that summarise the results.

Creating reports for your audience is one of the most effective means of establishing a strong working relationship with them. Using an interactive data dashboard, the audience would be able to view the performance of their company at a glance.

On addition to having all the data in a single dashboard, a data visualisation dashboard helps to explain what the company is doing and why, also fosters client relationships, and gives a data set to guide decision-making.

There are numerous levels of dashboards, ranging from those that represent metrics vital to the firm as a whole to those that measure values vital to teams inside an organisation. For a dashboard to be helpful, it must be automatically or routinely updated to reflect the present condition of affairs.

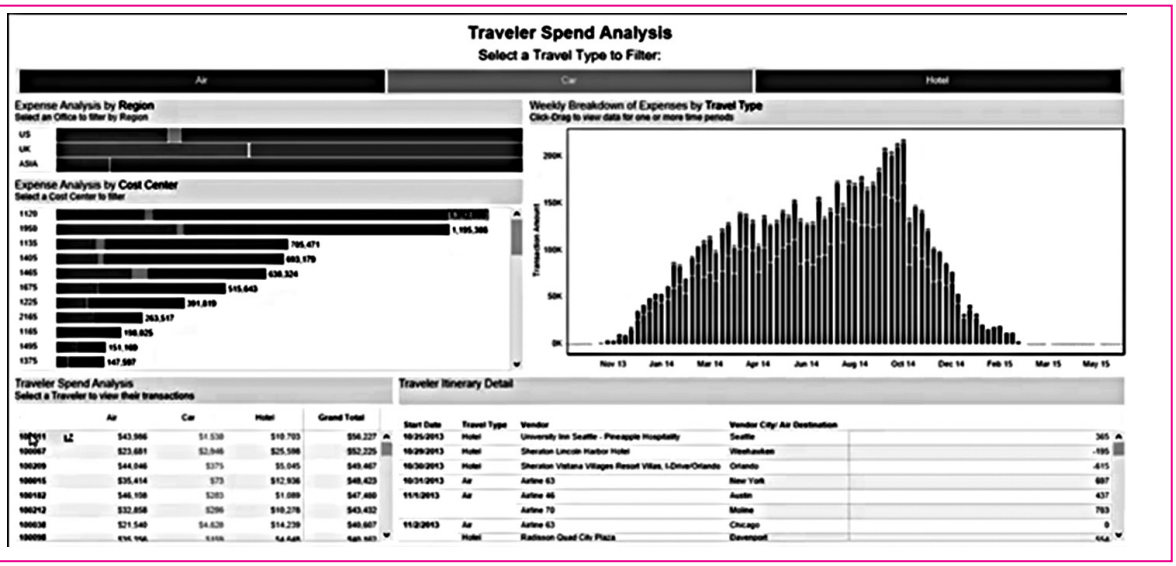


Figure 10.3: A sample dashboard showing traveller spend analysis using Tableau (Source: https://www.tableau.com/)

10.4.2 Graph, Diagram and Charts

Henry D. Hubbard, Creator of the Periodic Table of Elements once said, "There is magic in graphs. The profile of a curve reveals in a flash a whole situation — the life history of an epidemic, a panic, or an era of prosperity. The curve informs the mind, awakens the imagination, convinces." Few important and widely used graphs are mentioned below:

(i) Bar Chart:

Bar graphs are one of the most used types of data visualisation. It may be used to easily compare data across categories, highlight discrepancies, demonstrate trends and outliers, and illustrate historical highs and lows. Bar graphs are very useful when the data can be divided into distinct categories. For instance, the revenue earned in different years, the number of car model produced in a year by an automobile company, change in economic value added over the years (Figure 10.4) etc.

To add a zing, the bars can be made colourful. Using stacked and side-by-side bar charts, one may further dissect the data for a more in-depth examination.

Economic Value Added

	IGAAP			INDAS						
	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Cost of Capital Employed (COCE)										
1. Average Debt	0	0	0	0	0	0	0	0	0	0
2. Average Equity	4,018	3,715	4,338	5,664	5,831	6,181	6,668	7,227	46,890	47,156
3. Average Capital Employed: (1)+(2)	4,018	3,715	4,338	5,664	5,831	6,181	6,668	7,227	46,890	47,156
4. Cost of Debt, post-tax %	6.02	6.36	5.56	5.43	4.90	5.21	5.77	5.25	4.70	4.81
5. Cost of Equity %	10.07	11.62	10.91	11.98	12.25	14.19	11.84	9.11	8.86	9.09
6. Weighted Average Cost of Capital % (WACC)	10.07	11.62	10.91	11.98	12.25	14.19	11.84	9.11	8.86	9.09
7. COCE: (3)x(6)	405	432	474	679	714	877	789	658	4,153	4,289
Economic Value Added (EVA)										
8 Profit after tax, before exceptional items	3,314	3,555	3,843	4,116	4,247	5,135	6,080	6,743	7,963	8,724
9. Add: Interest, after taxes	17	24	11	0	0	0	0	0	0	0
10. Net Operating Profits After Taxes (NOPAT)	3,331	3,579	3,854	4,117	4,247	5,135	6,080	6,743	7,963	8,724
11. COCE, as per (7) above	405	432	474	679	714	877	789	658	4,153	4,289
12. EVA: (10)-(11)	2,926	3,147	3,380	3,438	3,533	4,258	5,291	6,085	3,810	4,435

*Opening balance adjusted for GSK CH merger

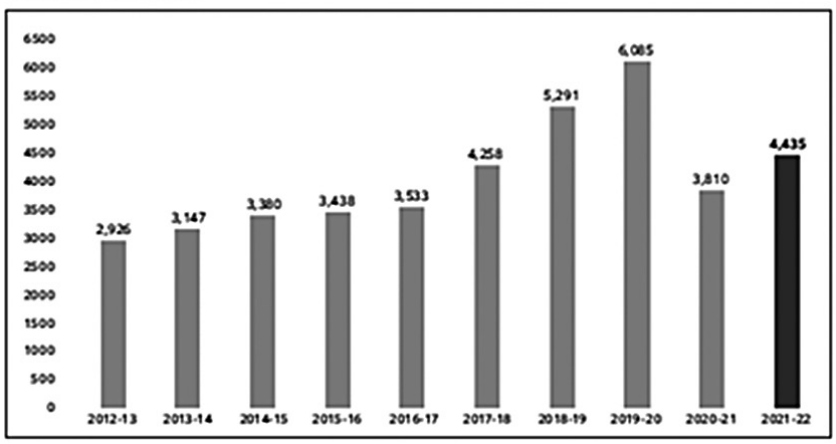


Figure 10.4: Bar chart showing the change in EVA for Hindustan Unilever Ltd. (Source: HUL annual report for the year 2021-22)

(ii) Line chart:

The line chart or line graph joins various data points, displaying them as a continuous progression. Utilize line charts to observe trends in data, often over time (such as stock price fluctuations over five years or monthly website page visits). The outcome is a basic, simple method for representing changes in one value relative to another.

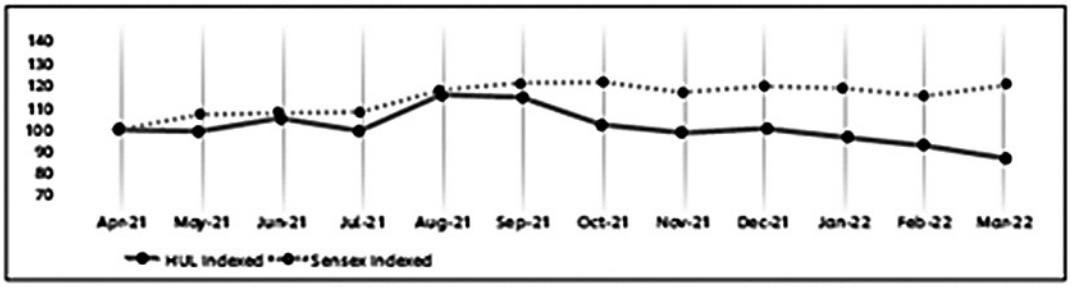
For a better visual impact, the area under the line may be shaded. Also if feasible, the line graph may be presented combining with bar chart.

Share Price Data

The monthly high and low prices and volumes of shares of the Company at BSE Limited (BSE) and the National Stock Exchange of India Limited (NSE) for the year ended 31st March, 2022 are as under:

Month	BSE			NSE		
	High	Low	Volume	High	Low	Volume
Apr-21	2,504.30	2,300.00	19,43,851	2,505.90	2,300.00	4,22,81,914
May-21	2,446.00	2,320.00	11,23,105	2,446.95	2,319.35	2,65,69,848
Jun-21	2,531.50	2,329.95	26,05,898	2,533.95	2,330.60	3,22,68,417
Jul-21	2,512.00	2,318.15	15,81,958	2,513.40	2,318.00	2,24,40,490
Aug-21	2,736.90	2,325.00	27,00,819	2,737.45	2,324.60	3,52,33,493
Sep-21	2,859.10	2,677.45	22,39,867	2,859.30	2,677.00	3,34,75,102
Oct-21	2,733.25	2,368.30	32,16,963	2,734.00	2,368.00	4,00,11,262
Nov-21	2,445.95	2,286.00	13,51,606	2,449.00	2,284.70	3,25,87,886
Dec-21	2,388.55	2,200.00	17,54,638	2,389.90	2,201.15	2,88,39,519
Jan-22	2,424.90	2,240.60	18,46,514	2,425.00	2,240.90	3,51,55,340
Feb-22	2,333.50	2,120.00	16,93,674	2,333.00	2,120.00	2,81,62,744
Mar-22	2,164.00	1,901.80	26,68,847	2,167.95	1,901.55	5,96,75,399

BSE SENSEX Vs HUL share price (Indexed)



NSE NIFTY Vs HUL share price (Indexed)

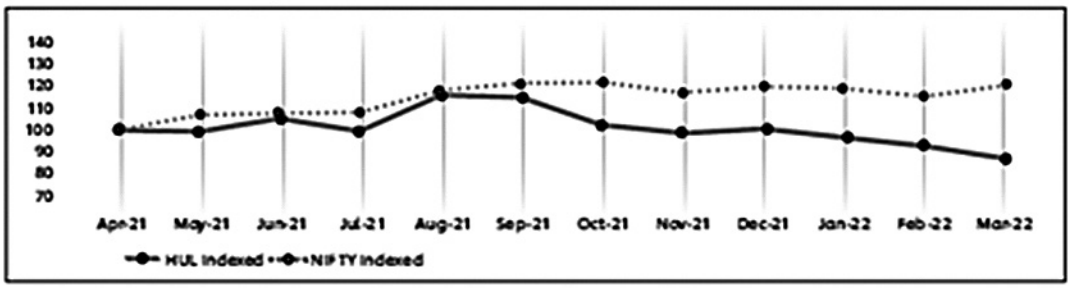


Figure 10.5: Line graph: The movement of HUL share price over time (Source: HUL annual report for the year 2021-22)

(iii) Pie Chart

A pie chart (or circle chart) is a circular graphical representation of statistical data that is segmented to demonstrate numerical proportion. In a pie chart, the arc length of each slice (and, by extension, its centre angle and area) is proportionate to the value it depicts. Although it is called for its similarity to a sliced pie, it can be served in a number of other ways. The corporate world and the mass media make extensive use of pie charts. For a better representation, the number of wedges in pie chart should be kept in limit. The categories of HUL shareholders are shown in Figure 10.6 below.

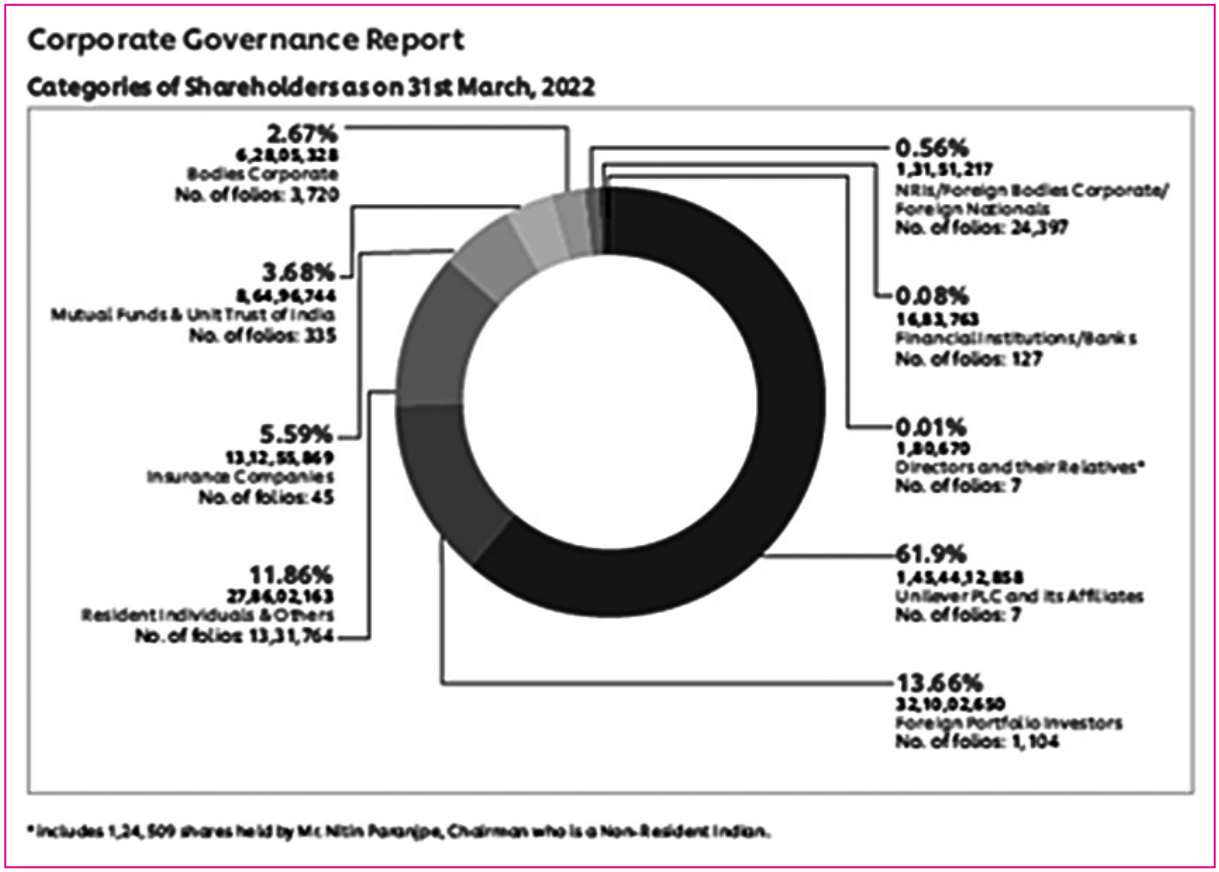


Figure 10.6: Pie Chart - Categories of HUL shareholders as on 31st March 2022 (Source: HUL annual report for the year 2021-22)

(iv) Map:

For displaying any type of location data, including postal codes, state abbreviations, country names, and custom geocoding, maps are a no-brainer. If the data is related with geographic information, maps are a simple and effective approach to illustrate the relationship.

There should be a correlation between location and the patterns in the data. Such as insurance claims by state and product export destinations by country, automobile accidents by postal code, and custom sales areas etc.

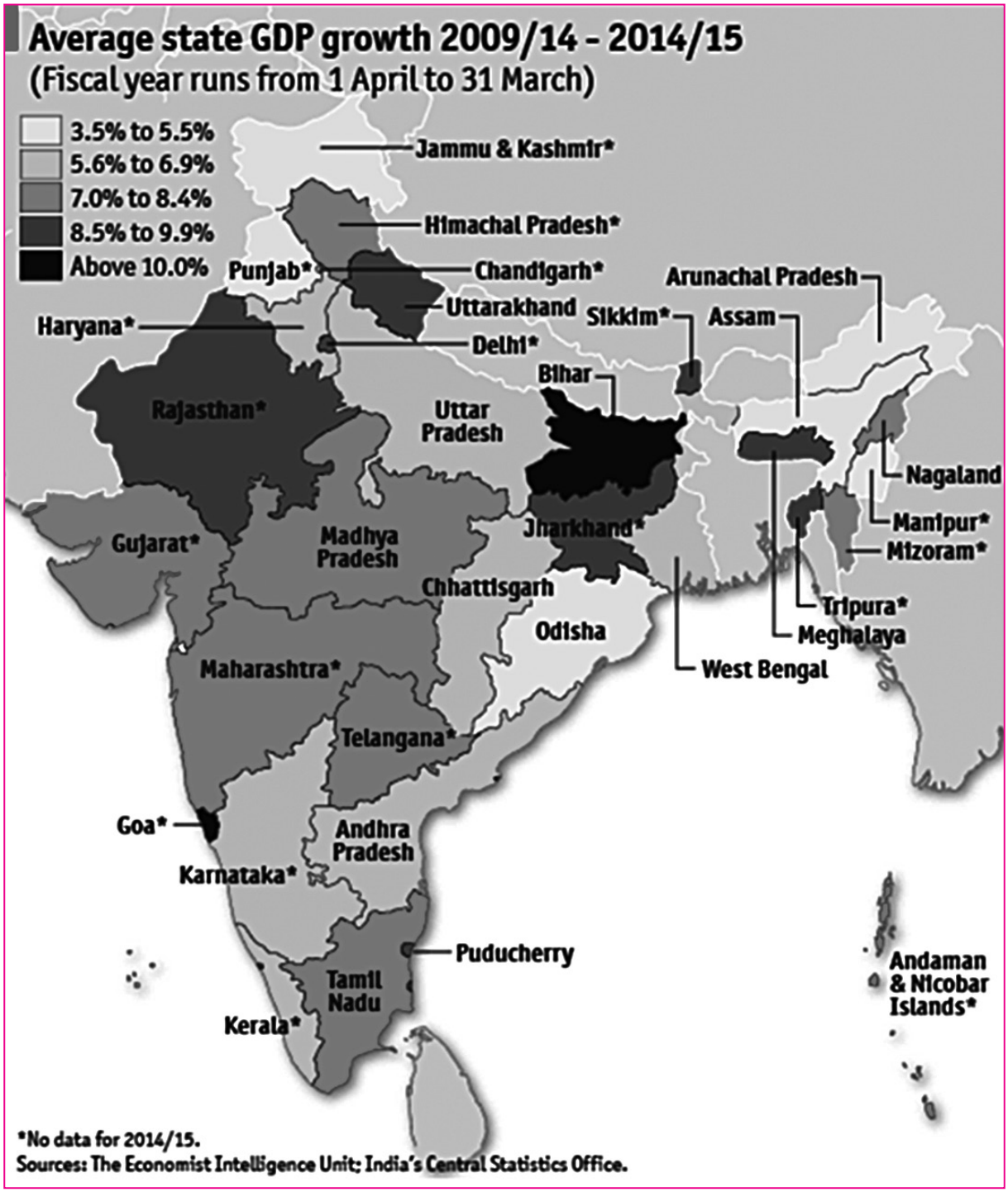


Figure 10.7: Map: Average state GDP growth (Source: Economist intelligence unit)

(v) Density map:

Density maps indicate patterns or relative concentrations that might otherwise be obscured by overlapping marks on a map, allowing to identify areas with a larger or lesser number of data points. Density maps are particularly useful when dealing with large data sets including several data points in a limited geographic region. Figure 10.8 shows the Cyclone hazard prone districts of India through a density map.

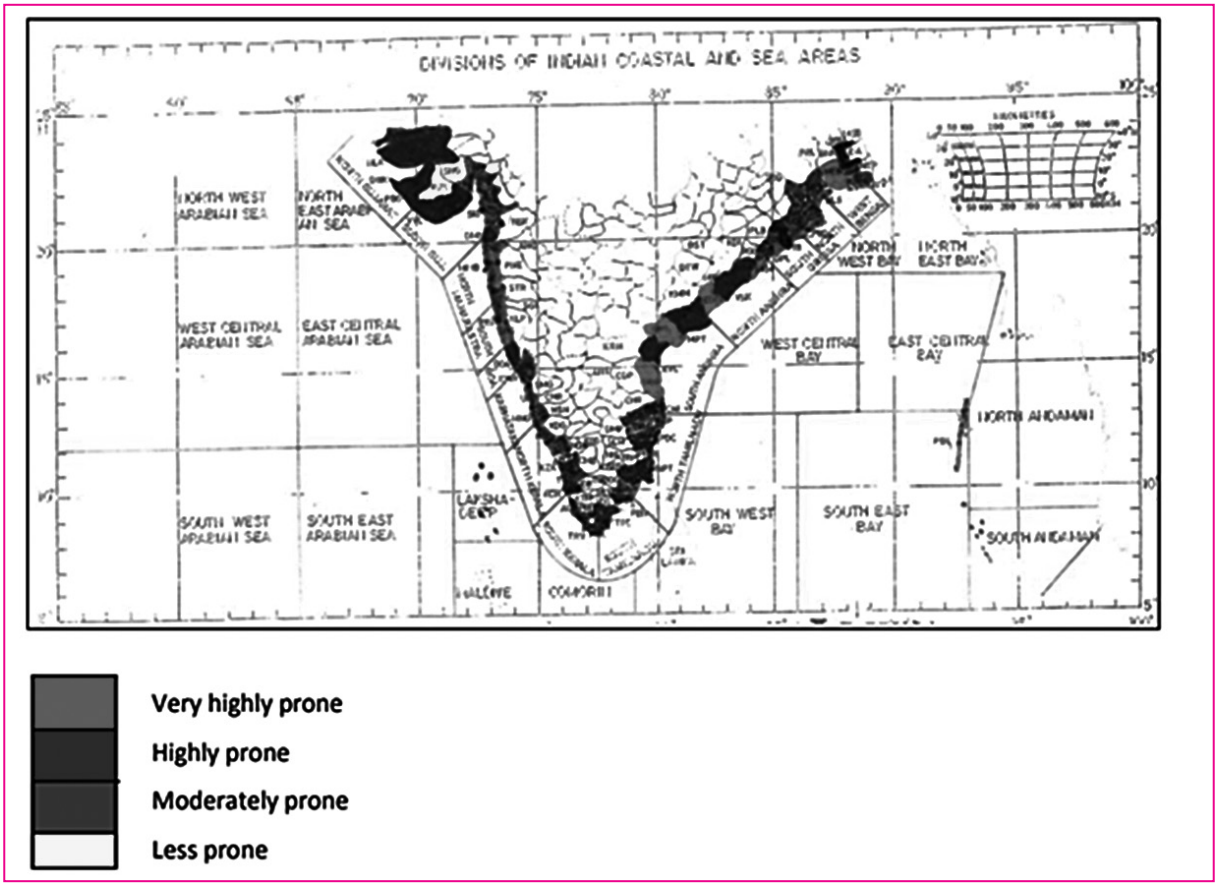


Figure 10.8: Cyclone hazard prone districts of India considering all the parameters and wind based on BMTPC Atlas (Source: www.ndma.gov.in)

(vi) Scatter plots

Scatter plots are a useful tool for examining the connection between many variables, revealing whether one variable is a good predictor of another or whether they tend to vary independently. A scatter plot displays several unique data points on a single graph.

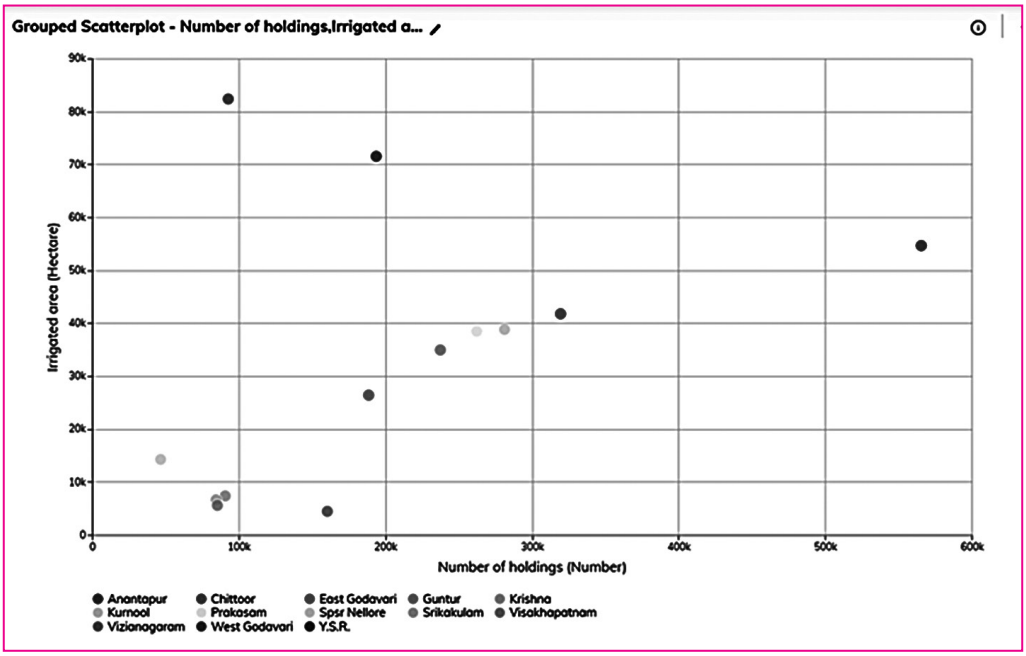


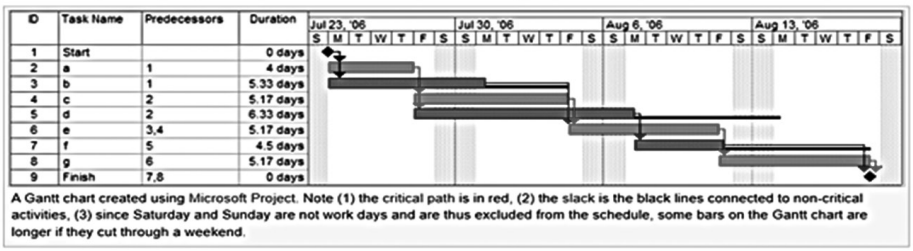
Figure 10.9: Grouped Scatterplot - Number of holdings and Irrigated area in Andhra Pradesh. (Source: indiadataportal.com)

(vii) Gantt Chart

Gantt charts represent a project's timeline or activity changes across time. A Gantt chart depicts tasks that must be accomplished before others may begin, as well as the allocation of resources. However, Gantt charts are not restricted to projects. This graphic can depict any data connected to a time series. Figure 10.10 depicts the Gnatt chart of a project.

Activity	Predecessor	Time estimates (in days)			Expected time (T_E)
		Opt. (O)	Normal (M)	Pess. (P)	
a	—	2	4	6	4.00
b	—	3	5	9	5.33
c	*a*	4	5	7	5.17
d	*a*	4	6	10	6.33
e	*b*, *c*	4	5	7	5.17
f	*d*	3	4	8	4.50
g	*e*	3	5	8	5.17

Once this step is complete, one can draw a Gantt chart or a network diagram.



A Gantt chart created using Microsoft Project. Note (1) the critical path is in red, (2) the slack is the black lines connected to non-critical activities, (3) since Saturday and Sunday are not work days and are thus excluded from the schedule, some bars on the Gantt chart are longer if they cut through a weekend.

Figure 10.10: Gnatt Chart for a project (Source: Wikipedia)

(viii) Bubble chart

Although bubbles are not exactly their own sort of visualisation, utilising them as a method enhances scatter plots and maps that illustrate the link between three or more variables. By varying the size and colour of circles, charts display enormous amounts of data in an aesthetically engaging manner. Figure 10.11 shows the bubble chart showing the proportions of professions of people who generate programming languages

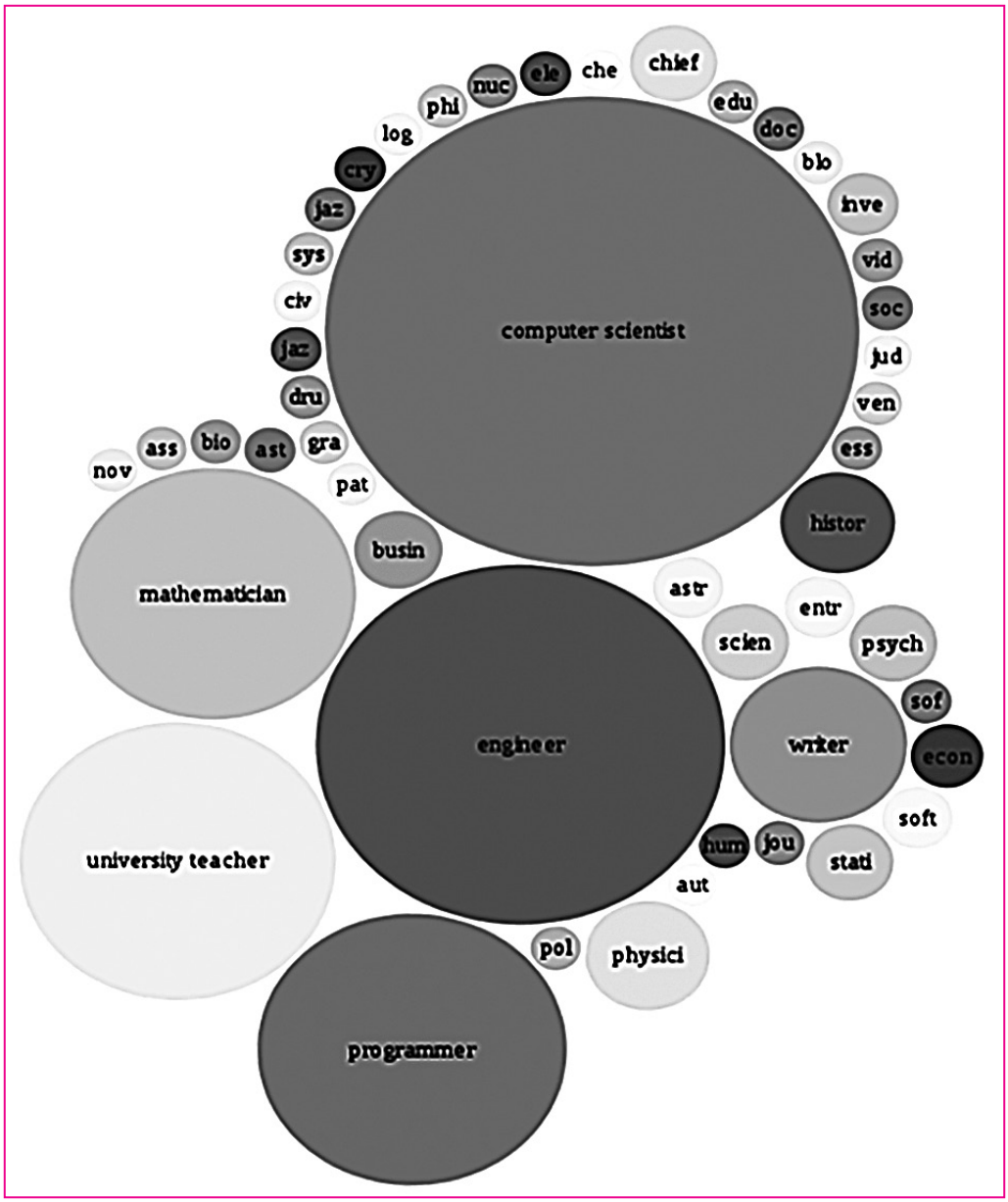


Figure 10.11: Bubble chart: the proportions of professions of people who generate programming languages (Source: Wikipedia)

(ix) Histogram

Histograms illustrate the distribution of the data among various groups. Histograms divide data into discrete categories (sometimes known as "bins") and provide a bar proportionate to the number of entries inside each category. This chart type might be used to show data such as number of items. Figure 10.12 is showing the sample histogram chart showing the frequency of something in terms of age.

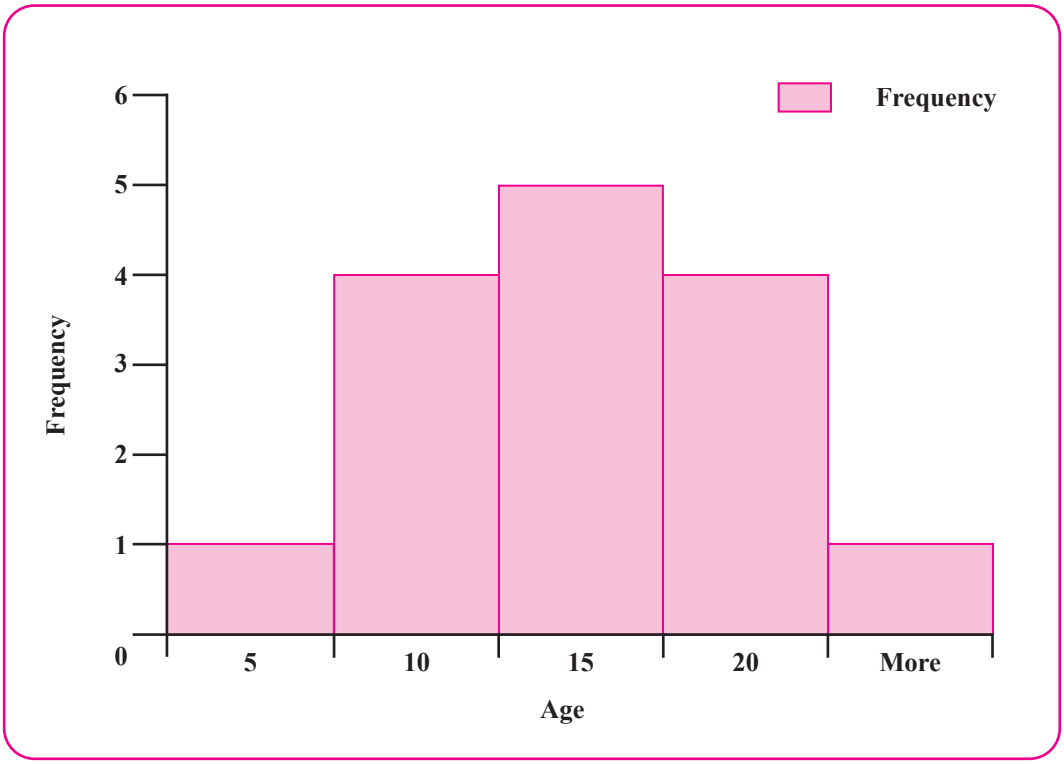


Figure 10.12: Histogram

10.4.3 Tables

Tables, often known as "crosstabs" or "matrices," emphasise individual values above aesthetic formatting. They are one of the most prevalent methods for showing data and, thus, one of the most essential methods for analysing data. While their focus is not intrinsically visual, as reading numbers is a linguistic exercise, visual features may be added to tables to make them more effective and simpler to assimilate.

Tables are most frequently encountered on websites, as part of restaurant menus, and within Microsoft Excel. It is crucial to know how to interpret tables and make the most of the information they provide since they are ubiquitous. It is also crucial for analysts and knowledge workers to learn how to make information easier for their audience to comprehend.

How to use a table?

Similar to most graphs, a table arranges data along one axis. The x-axis is the rows, while the y-axis is the columns. Because tables are read, it is customary to display categories along the x-axis. The y-axis depicts the values within each metric, with clearly labelled columns indicating their significance. In contrast to the majority of charts, tables may arrange qualitative data and show their linkages.

Analysts typically utilise tables to view specific values. They facilitate the identification of measurements or dimensions across a set of intervals (e.g., what was the company's profit in November 2018) (Ex. How many sales did each person close in 2019). A summary table may also efficiently summarise a huge data collection by providing subtotals and grand totals for each interval or dimension. The problem with tables is that they scale poorly. More than ten to fifteen rows and five columns make the table difficult to read, comprehend, and get insight from. This is because a table engages the brain's linguistic systems whereas data visualisation excites the brain's visual systems.

Adding visual features to the table will allow users to obtain understanding from the data more quickly than with a simple table. Gradients of colour and size aid in identifying trends and outliers. Icons assist the observer in recognising a shift in proportions. Using different markings will highlight relationships more effectively than a table of raw data.

Tables and crosstabs are handy for doing comparative analysis between certain data points. They are simple to construct and may effectively convey a single essential message. Before including a crosstab into a data visualisation, one should assess whether it serves the project's aims. Figure 10.13 shows a sample Visualisation of tabular data.

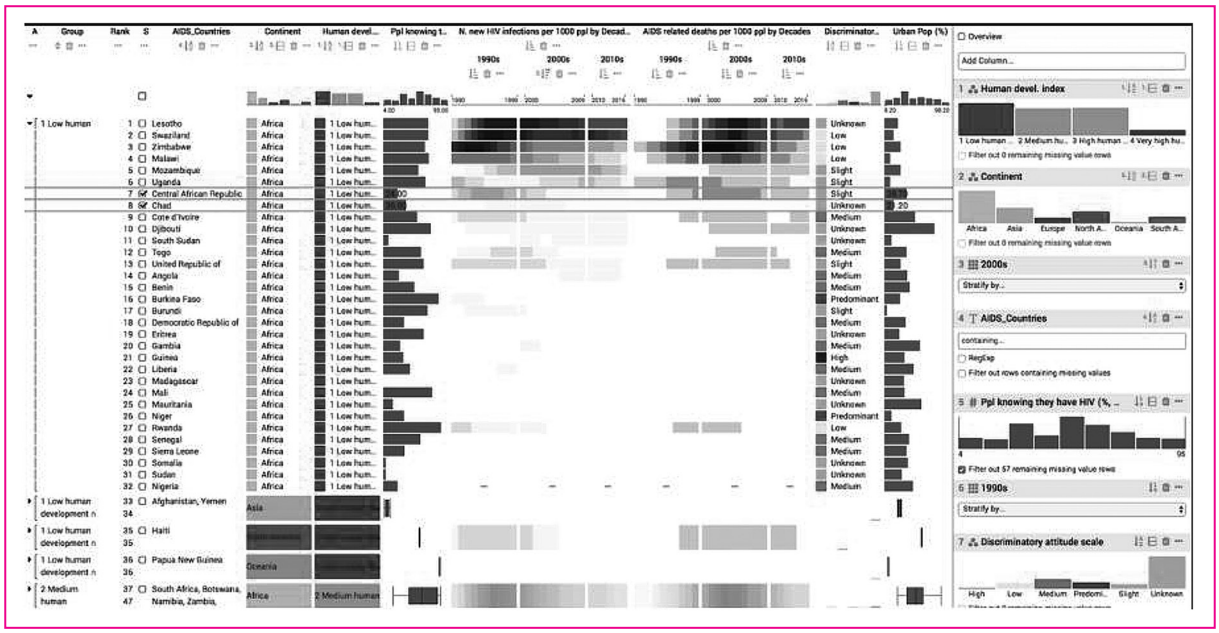


Figure 10.13: Visualisation of a tabular data (Source: https://vdl.sci.utah.edu)

10.4.4 Report design using data Visualisation

After producing a report, the last thing one anticipates is for someone to actually read it. Whether conveying ideas or seeking help, the information must leave an impression. To do this, one must present the report in a style that is both attractive and simple to comprehend. This is especially accurate if your report layout includes numbers.

How to use data Visualisation in report design?

There are few strategic steps to include data Visualisation in report design, as mentioned below:

- **Find a story in the data**

  Data-driven storytelling is a powerful tool. Finding a story that connects with the reader can help to create an effective report. It's also not that hard as it looks. In order to locate the story, one must arrange the data, identify any missing numbers, and then check for outliers. One may then view the data and examine the link between factors.

- **Create a narrative**

  When some individuals hear the term "data storytelling," they believe that it consists of a few statistics and that the task is complete. This is a frequent misconception that is false. Strong data storytelling comprises an engaging narrative that takes the audience through the facts and aids in their comprehension. Moreover, an explanation of the significance of these ideas is essential. To compose an excellent story, one must:

  (i) Engage the viewer with a catchy title and subheadings.

  (ii) Incorporate context into the data.

  (iii) Create a consistent and logical flow.

  (iv) Highlight significant discoveries and insights from the data.

- **Choose the most suitable data Visualisation**

  Data Visualisation is not limited to the creation of charts and graphs. It involves presenting the facts in the most comprehensible chart possible. Applying basic design principles and utilising features like as form, size, colour, and labelling may have a significant impact on how people comprehend the data. For instance, deciding the optimal number of slices for a pie chart or the space between bars in a bar graph. Knowing these tips may greatly improve the data visualisations.

- **Follow the visual language**

  The report design may be for internal or external consumption. Despite this, one should develop material consistent with the company's style guide. It is essential to adhere to data visualisation principles in order to achieve both uniformity and comprehension. A strategic methodology assists in implementation.

- **Publicize the report**

  Some reports are not intended for public consumption. However, since they include so much essential information, they may contain knowledge that is of interest to individuals or media outside of the business.

Tools and Techniques of Visualisation and Graphical Presentation

10.5

We will now examine some of the most successful data visualisation tools for data scientists and how they may boost their productivity. Here are four popular data visualisation tools that may assist data scientists in making more compelling presentations.

(i) Tableau

Tableau is a data visualisation application for creating interactive graphs, charts, and maps. It enables one to connect to many data sources and generate visualisations in minutes.

Tableau Desktop is the first product of its kind. It is designed to produce static visualisations that may be published on one or more web pages, but it is incapable of producing interactive maps.

Tableau Public is a free version of Tableau Desktop with some restrictions.

It takes time and effort to understand Tableau, but there are several tools available to assist doing it. As a data scientist, Tableau must be the most important tool one should understand and employ on a daily basis.

The application may be accessed through https://www.tableau.com/ (Figure 10.14)

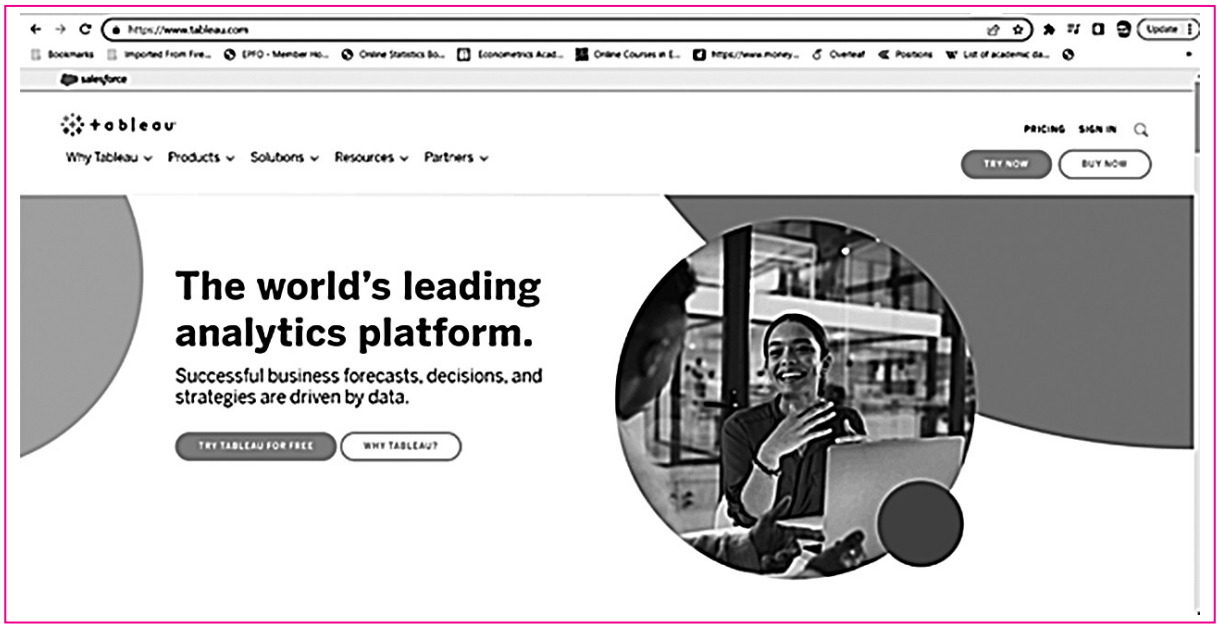
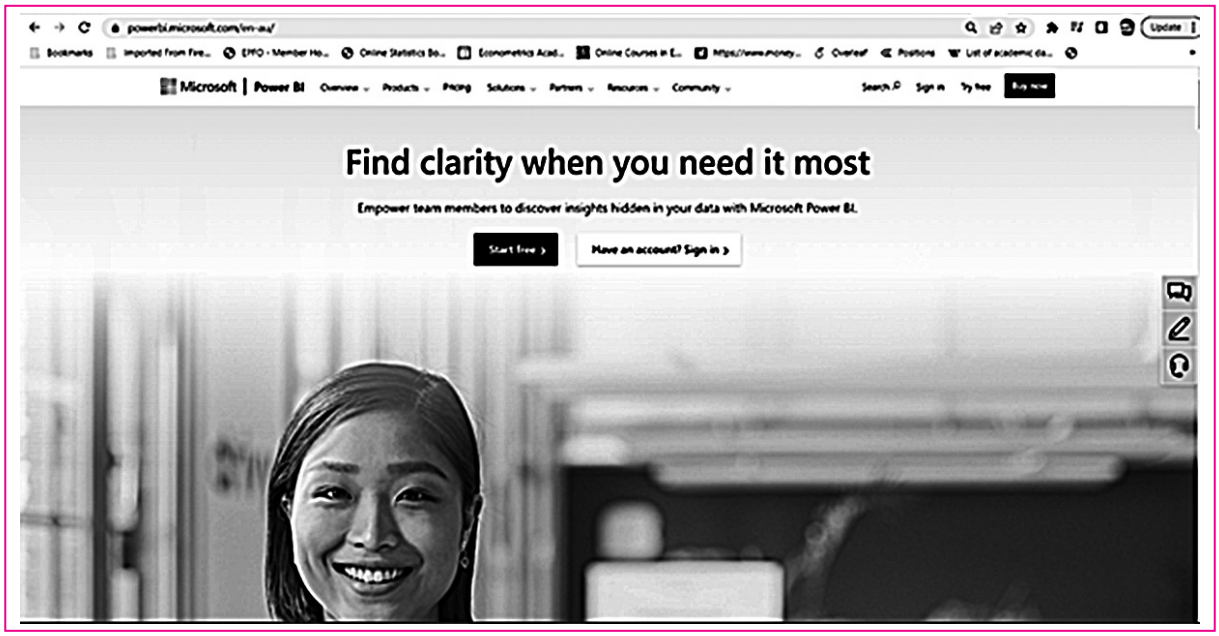


Tableau website - https://www.tableau.com/

Figure 10.14

(ii) Microsoft Power BI

Microsoft Power BI is a data visualisation tool for business intelligence data. Reporting, self-service analytics, and predictive analytics are supported. In addition, it provides a platform for end users to generate reports and share insights with others inside their business. It serves as a centralized repository for all of the business data, which all of the business users can access. Through such linkages, the prepared reports may be shared inside the organisation, making it a crucial tool for businesses seeking a consolidated data reporting system. The application may be accessed through https://powerbi.microsoft.com/en-au/ (Figure 10.15)



Microsoft Power BI website - https://powerbi.microsoft.com/en-au/

Figure 10.15

(iii) Microsoft Excel

Microsoft Excel is a data Visualisation tool with an intuitive interface, so it is not necessarily difficult to use.

Excel provides several options for viewing data, such as, scatter plot, bar chart, histogram, pie chart, line chart, and treemap etc. Using these techniques, one may illustrate the relationship between two or more datasets that is wished to compare. Also one may examine the relationships between variables to discover if they are connected or not.

Numerous data analysts utilize techniques in MS Excel to examine statistical, scientific, medical, and economic data for market research and financial planning, among other applications.

The application may be accessed through https://www.microsoft.com/en-in/microsoft-365/excel (Figure 10.16)

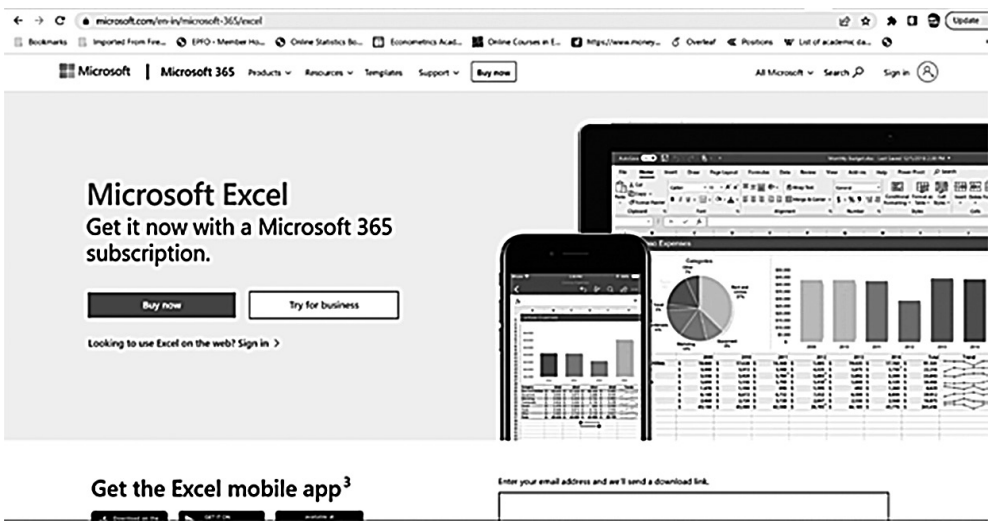


Figure 10.16: Microsoft Excel website - https://www.microsoft.com/en-in/microsoft-365/excel

(iv) QlikView

QlikView is a data discovery platform that enables users to make quicker, more informed choices by speeding analytics, uncovering new business insights, and enhancing the precision of outcomes.

An easy software development kit that has been utilized by enterprises worldwide for many years. It may mix diverse data sources with color-coded tables, bar graphs, line graphs, pie charts, and sliders.

It has been designed using a "drag and drop" Visualisation interface, allowing users to input data from a variety of sources, including databases and spreadsheets, without having to write code. These properties also make it a reasonably easy-to-learn and -understand instrument. The application may be accessed through https://www.qlik.com/us/products/qlikview (Figure 10.17)

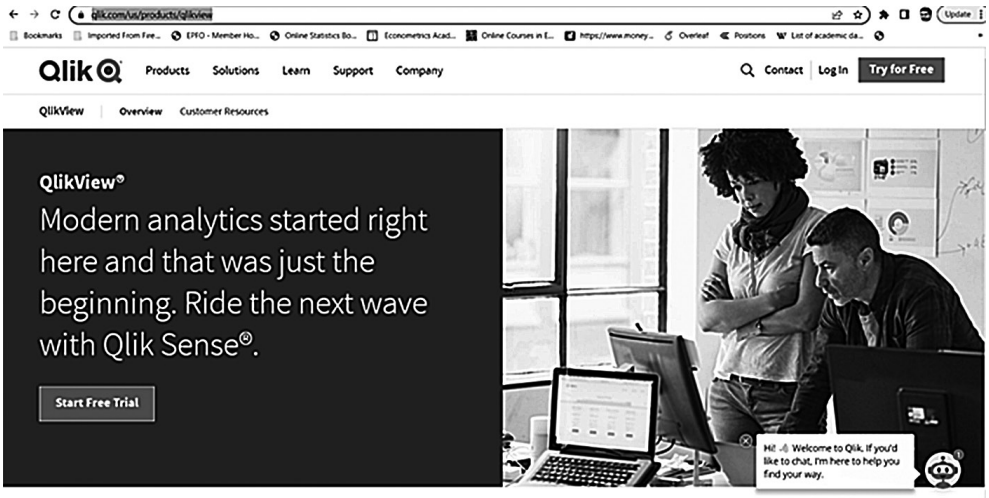


Figure 10.17: QlikView - https://www.qlik.com/us/products/qlikview

Solved Case 1

Sutapa is working as an analyst with SN Company Limited. She is entrusted with the responsibility of making a presentation before the senior management. She knows that data Visualisation is an important tool for presentation, and a good data Visualisation can make her presentation more effective. However, she is not very sure about the data visualisation tools, that are available.

What are the important data Visualisation tools available that Sutapa may use for an effective and impressive presentation.

Teaching note - outline for solution:

The instructor may initiate the discussions with explaining the importance of data Visualisation. She may also discuss the objectives of data Visualisation:

(i) Making a better data analysis:

(ii) Faster decision making

(iii) Analysing complicated data

For an effective data Visualisation, the presenter should keep certain important issues in mind:

(i) Know the objective

(ii) Always keep the audience in mind

(iii) Invest in the best technology

(iv) Improve the team's ability to visualise data

There are various tools available for data Visualisation. The instructor may extend the discussion with mentioning the following tools. He should also explain the suitability of each tool for visualising and presenting the data:

(i) Dashboards

(ii) Bar charts

(iii) Histogram

(iv) Pie chart

(v) Line chart

(vi) Maps

(vii) Gantt chart

(viii) Bubble Chart etc.

One of the major comforting factor is development of recent software that makes the process of data Visualisation less painful. The instructor may conclude the discussions with mention of few popular softwares, viz:

(i) Microsoft Power Bi

(ii) Tableau

(iii) Microsoft Excel etc

Exercise

A. Theoretical Questions:

⊙ Multiple Choice Questions

1. Following is a widely used graph for data Visualisation
   (a) Bar chart
   (b) Pie chart
   (c) Histogram
   (d) All of the above
2. Following are the objectives of data visualisation:
   (a) Making a better data analysis
   (b) Faster decision making
   (c) Analysing complicated data
   (d) All of the above
3. Following are the scope of DPA
   (a) Defining significant meaning (relevant information) required by each audience member in every scenario.
   (b) Obtaining the proper data (focus area, historic reach, extensiveness, level of detail, etc.)
   (c) Determining the needed frequency of data refreshes (the currency of the data)
   (d) All of the above
4. Maps may be used for displaying
   (a) Pincode
   (b) Country name
   (c) State abbreviation
   (d) All of the above
5. A scatter plot displays several unique data points:
   (a) on a single graph.
   (b) On two different graphs
   (c) On four different graphs
   (d) None of the above

Answer:

1	**d**	**2**	**d**	**3**	**d**	**4**	**d**	**5**	**a**

⊙ State True or False

1. Data visualisation enhances the effect of communications for the audiences and delivers the most convincing data analysis outcomes.
2. Visualisation allows to interpret large volumes of data more quickly and effectively at a glance.

3. Data presentation architecture (DPA) is a set of skills that aims to identify, find, modify, format, and present data in a manner that ideally conveys meaning and provides insight.
4. Scatter plots are a useful tool for examining the connection between many variables, revealing whether one variable is a good predictor of another or whether they tend to vary independently.
5. Gantt charts represent a project's timeline or activity changes across time.

Answer:

1	**T**	**2**	**T**	**3**	**T**	**4**	**T**	**5**	**T**

⊙ Fill in the blanks

1. Data and insights available to decision-makers facilitate _____ analysis.
2. Often confused with data Visualisation, data presentation architecture is a much _____ skill set.
3. A _____is a circular graphical representation of statistical data that is segmented to demonstrate numerical proportion.
4. If the data is related with geographic information, _____ are a simple and effective approach to illustrate the relationship.
5. _____ indicate patterns or relative concentrations that might otherwise be obscured by overlapping marks on a map, allowing to identify areas with a larger or lesser number of data points.

Answer:

1	**decision**	**2**	**broader**
3	**pie chart (or circle chart)**	**4**	**maps**
5	**Density maps**		

⊙ Short essay type questions

1. State the objectives of Data presentation architecture (DPA).
2. What are the scopes of Data presentation architecture (DPA).
3. Define the concept of data Visualisation dashboard.
4. Write a short note on bar chart
5. Write a short note on density map.

⊙ Essay type questions

1. Discuss the ways in which the finance professionals may be helped by data Visualisation in analysing and reporting information.
2. Discuss the objectives of data Visualisation.
3. How to use data Visualisation in report design?

4. Discuss the different tools for Visualisation and Graphical Presentation
5. Discuss the objectives and scope of data presentation architecture.

Unsolved Case(s)

1. Maitreyee works as a financial analyst with a bank. The departmental meeting with her managing director is going to happen very soon. Maitreyee is entrusted with the task of preparing a dashboard that will cover the performance of his department during the past quarter. She wants to prepare the dashboard in such a way, that it should not look cluttered, but at the same time, it covers all the available information in a visually pleasing manner.

   Discuss the different approaches Maitreyee may adopt to meet her objective.

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