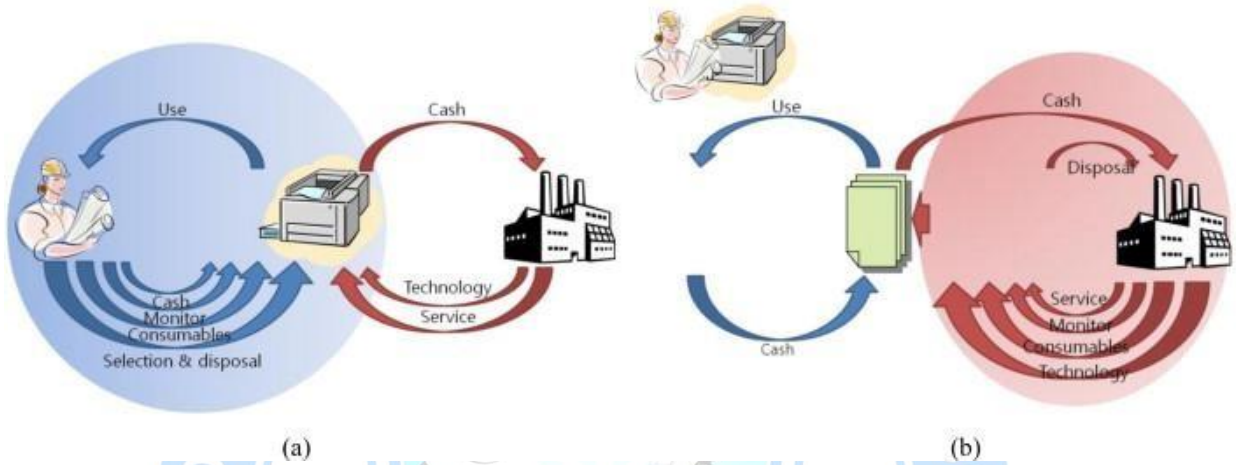
Planning and design methodology - Problem definition and planning - Data collection and analysis - Recommendations and implementation -Decision support systems



Systems development is systematic process which includes phases such as planning, analysis, design, deployment, and maintenance. Here, in this tutorial, we will primarily focus on −

- Systems analysis
- Systems design

Systems Analysis

It is a process of collecting and interpreting facts, identifying the problems, and decomposition of a system into its components.

System analysis is conducted for the purpose of studying a system or its parts in order to identify its objectives. It is a problem solving technique that improves the system and ensures that all the components of the system work efficiently to accomplish their purpose.

Analysis specifies what the system should do.

Systems Design

It is a process of planning a new business system or replacing an existing system by defining its components or modules to satisfy the specific requirements. Before planning, you need to understand the old system thoroughly and determine how computers can best be used in order to operate efficiently.

System Design focuses on how to accomplish the objective of the system. System Analysis and Design (SAD) mainly focuses on −

- Systems

- Processes
- Technology

What is a System?

The word System is derived from Greek word Systema, which means an organized relationship between any set of components to achieve some common cause or objective.

A system is "an orderly grouping of interdependent components linked together according to a plan to achieve a specific goal.

Constraints of a System

A system must have three basic constraints −

- A system must have some structure and behavior which is designed to achieve a predefined objective.
- Interconnectivity and interdependence must exist among the system components.
- The objectives of the organization have a higher priority than the objectives of its subsystems.

For example, traffic management system, payroll system, automatic library system, human resources information system.

Properties of a System

A system has the following properties − Organization

Organization implies structure and order. It is the arrangement of components that helps to achieve predetermined objectives.

- **Interaction**

It is defined by the manner in which the components operate with each other.

For example, in an organization, purchasing department must interact with production department and payroll with personnel department.

- **Interdependence**

Interdependence means how the components of a system depend on one another. For proper functioning, the components are coordinated and linked together according to a specified plan. The output of one subsystem is the required by other subsystem as input.

- **Integration**

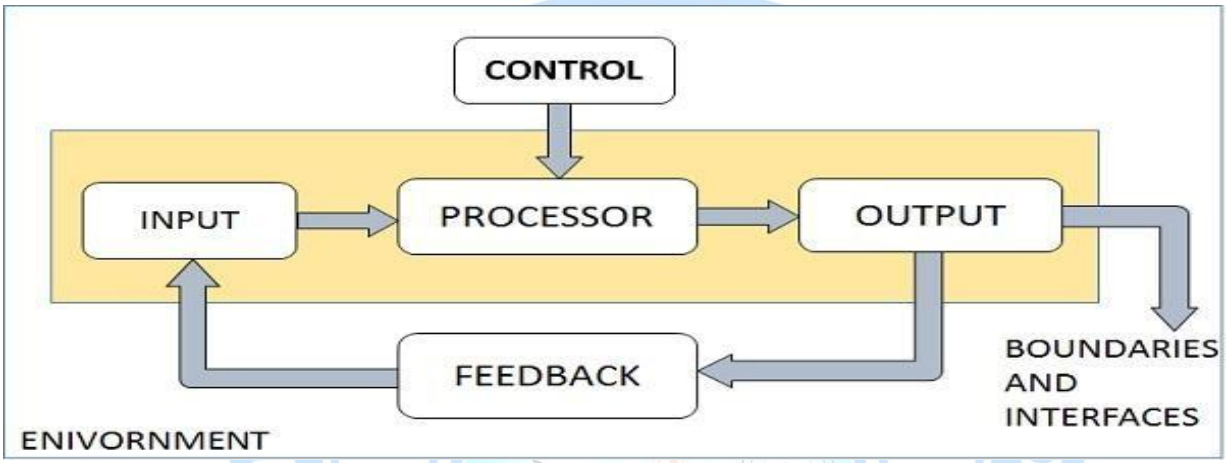
Integration is concerned with how a system components are connected together. It means that the parts of the system work together within the system even if each part performs a unique function.

- **Central Objective**

The objective of system must be central. It may be real or stated. It is not uncommon for an organization to state an objective and operate to achieve another.The users must know the main objective of a computer application early in the analysis for a successful design and conversion.

Elements of a System

The following diagram shows the elements of a system −



Outputs and Inputs

- The main aim of a system is to produce an output which is useful for its user.
- Inputs are the information that enters into the system for processing.
- Output is the outcome of processing. Processor(s)
- The processor is the element of a system that involves the actual transformation of input into output.
- It is the operational component of a system. Processors may modify the input either totally or partially, depending on the output specification.
- As the output specifications change, so does the processing. In some cases, input is also modified to enable the processor for handling the transformation.

Control

- The control element guides the system.
- It is the decision–making subsystem that controls the pattern of activities governing input, processing, and output.
- The behavior of a computer System is controlled by the Operating System and software. In order to keep system in balance, what and how much input is needed is determined by Output Specifications.

Feedback

- Feedback provides the control in a dynamic system.
- Positive feedback is routine in nature that encourages the performance of the system.
- Negative feedback is informational in nature that provides the controller with information for action.

Environment

- The environment is the "supersystem" within which an organization operates.
- It is the source of external elements that strike on the system.
- It determines how a system must function. For example, vendors and competitors of organization's environment, may provide constraints that affect the actual performance of the business.

Boundaries and Interface

- A system should be defined by its boundaries. Boundaries are the limits that identify its components, processes, and interrelationship when it interfaces with another system.
- Each system has boundaries that determine its sphere of influence and control.
- The knowledge of the boundaries of a given system is crucial in determining the nature of its interface with other systems for successful design.

Types of Systems

The systems can be divided into the following types −

Physical or Abstract Systems

- Physical systems are tangible entities. We can touch and feel them.
- Physical System may be static or dynamic in nature. For example, desks and chairs are the physical parts of computer center which are static. A programmed computer is a dynamic system in which programs, data, and applications can change according to the user's needs.
- Abstract systems are non-physical entities or conceptual that may be formulas, representation or model of a real system.

Open or Closed Systems

- An open system must interact with its environment. It receives inputs from and delivers outputs to the outside of the system. For example, an information system which must adapt to the changing environmental conditions.
- A closed system does not interact with its environment. It is isolated from environmental influences. A completely closed system is rare in reality.

Adaptive and Non Adaptive System

 Adaptive System responds to the change in the environment in a way to improve their performance and to survive. For example, human beings, animals.

 Non Adaptive System is the system which does not respond to the environment. For example, machines.

Permanent or Temporary System

 Permanent System persists for long time. For example, business policies.

 Temporary System is made for specified time and after that they are demolished. For example, A DJ system is set up for a program and it is dissembled after the program.

Natural and Manufactured System

 Natural systems are created by the nature. For example, Solar system, seasonal system.

 Manufactured System is the man-made system. For example, Rockets, dams, trains. Deterministic or Probabilistic System

 Deterministic system operates in a predictable manner and the interaction between system components is known with certainty. For example, two molecules of hydrogen and one molecule of oxygen makes water.

 Probabilistic System shows uncertain behavior. The exact output is not known. For example,Weather forecasting, mail delivery. Social, Human-Machine, Machine System

 Social System is made up of people. For example, social clubs, societies.

 In Human-Machine System, both human and machines are involved to perform a particular task. For example, Computer programming.

 Machine System is where human interference is neglected. All the tasks are performed by the machine. For example, an autonomous robot.

Man–Made Information Systems

 It is an interconnected set of information resources to manage data for particular organization, under Direct Management Control (DMC).

 This system includes hardware, software, communication, data, and application for producing information according to the need of an organization.

Man-made information systems are divided into three types −

 Formal Information System − It is based on the flow of information in the form of memos, instructions, etc., from top level to lower levels of management.

 Informal Information System − This is employee based system which solves the day to day work related problems.

 Computer Based System − This system is directly dependent on the computer for managing business applications. For example, automatic library system, railway reservation system, banking system, etc.

Systems Models

Schematic Models

 A schematic model is a 2-D chart that shows system elements and their linkages.

 Different arrows are used to show information flow, material flow, and information feedback. Flow System Models

 A flow system model shows the orderly flow of the material, energy, and information that hold the system together.

 Program Evaluation and Review Technique (PERT), for example, is used to abstract a real world system in model form.

Static System Models

 They represent one pair of relationships such as activity–time or cost–quantity.

 The Gantt chart, for example, gives a static picture of an activity-time relationship.

Dynamic System Models

 Business organizations are dynamic systems. A dynamic model approximates the type of organization or application that analysts deal with.

 It shows an ongoing, constantly changing status of the system. It consists of −

o Inputs that enter the system

o The processor through which transformation takes place

o The program(s) required for processing

o The output(s) that result from processing.

Categories of Information

There are three categories of information related to managerial levels and the decision managers make.

Volume of Information	Type of Information	Information Level	Management Level	System Support
Low Consensed	Unstructured	Strategic Information	Upper	DSS
Medium Moderately Processed	Moderately Structured	Management Control Information	Middle	MIS

YSTEMS

Strategic Information

 This information is required by topmost management for long range planning policies for next few years. For example, trends in revenues, financial investment, and human resources, and population growth.

 This type of information is achieved with the aid of Decision Support System (DSS). Managerial Information

 This type of Information is required by middle management for short and intermediate range planning which is in terms of months. For example, sales analysis, cash flow projection, and annual financial statements.

 It is achieved with the aid of Management Information Systems (MIS). Operational information

 This type of information is required by low management for daily and short term planning to enforce day-to-day operational activities. For example, keeping employee attendance records, overdue purchase orders, and current stocks available.

 It is achieved with the aid of Data Processing Systems (DPS).

Integration of Information Systems Planning With Overall Business Planning!

The critical factor in planning for IT infrastructure is the impact of IT on business operations. Thus, it is necessary to link IT planning with business planning. One of the common mistakes in planning IT infrastructure is neglecting the linkage of IT infrastructure plan-ning with the overall business planning.

While identifying the areas of applications and deciding about the roles and priorities of different applications, it must be recognized that IT infrastructure can have impact on basic aspects of business; namely, the product, productivity and management. It is essential to shift the focus of IT infrastructure planning from automation of operations to the thrust of business.

This shift can be effected with the help of integration of information system plan with the business planning at all levels of planning.

Following steps are involved in the process of integration of information systems planning with overall business planning1. Identify objectives and challenges:

First step in planning of IT infrastructure is to identify the objectives and the challenges involved in the business in general and information systems in par-ticular. This is achieved by enlisting the broad objectives, business functions and processes, business resource requirements, etc.

In the light of these business objectives and requirements, information systems issues may be identified after careful assessment of exist-ing IT infrastructure. In the process, a status report

The second step is to review the business planning process in the light of changing business scenario and identify the business functions that need greater support from information systems.

Objectives of the IT in-frastructure may be defined keeping in view the functions to be automated. Linking the information system issues with strategic inputs is essential element of this step.

Thus, the objectives of the information system should focus on the strategic inputs to various business processes. Bucklandsuggests that a correlation analysis may be conducted between the information system issues and stra-tegic inputs.

For example, the information issues like which busi-ness function must be supported by information systems may be correlated with business strategic inputs, such as technology fore-cast, strategic assumptions and business plan analysis. In addition to the broad strategic inputs, both for the business process and in-formation systems, critical success factors for each information sys-tem project should be identified and agreed upon.

3. Identifying alternatives:

Once the objectives of the information systems are defined, the alternative strategies for IT solutions need to be identified. These alternatives may require identifying alternatives re-garding the organisation structure, computer hardware, software and networking strategies for achieving the objectives set forth earlier.

4. Determine priorities:

The next step would be to evaluate each alternative strategy defined in the preceding step with the help of an established criterion.

The evaluation process shall help in determining the resource requirement for each information system project. The priority ranking may have to be changed later in view of the new options that might have been opened. The ranking may be based on priority by the business needs or the estimated impact on the bottom- line. On the basis of the ranking, recommendations may be made for funds allocation.

5. Draw operational plan:

Once the fund allocation recommendations have been accepted the operational plans need to drawn in detail. These operational plans may include identifying the hard-ware needs, planning for system development life cycle, and other IT resources needed for the accepted information system projects.

What is Data Collection: A Definition

Before we define what is data collection, it’s essential to ask the question, “What is data?” The

abridged answer is, data is various kinds of information formatted in a particular way. Therefore, data collection is the process of gathering, measuring, and analyzing accurate data from a variety of relevant sources to find answers to research problems, answer questions, evaluate outcomes, and forecast trends and probabilities.

Our society is highly dependent on data, which underscores the importance of collecting it. Accurate data collection is necessary to make informed business decisions, ensure quality assurance, and keep research integrity.

During data collection, the researchers must identify the data types, the sources of data, and what methods are being used. We will soon see that there are many different data collection methods. There is heavy reliance on data collection in research, commercial, and government fields.

Before an analyst begins collecting data, they must answer three questions first:

- What's the goal or purpose of this research?
- What kinds of data are they planning on gathering?
- What methods and procedures will be used to collect, store, and process the information?

Additionally, we can break up data into qualitative and quantitative types. Qualitative data covers descriptions such as color, size, quality, and appearance. Quantitative data, unsurprisingly, deals with numbers, such as statistics, poll numbers, percentages, etc.

Why Do We Need Data Collection?

Before a judge makes a ruling in a court case or a general creates a plan of attack, they must have as many relevant facts as possible. The best courses of action come from informed decisions, and information and data are synonymous.

The concept of data collection isn't a new one, as we'll see later, but the world has changed. There is far more data available today, and it exists in forms that were unheard of a century ago. The data collection process has had to change and grow with the times, keeping pace with technology.

Whether you're in the world of academia, trying to conduct research, or part of the commercial sector, thinking of how to promote a new product, you need data collection to help you make better choices.

Now that you know what is data collection and why we need it, let's take a look at the different methods of data collection. While the phrase "data collection" may sound all high-tech and digital, it doesn't necessarily entail things like computers, big data, and the internet. Data collection could mean a telephone survey, a mail-in comment card, or even some guy with a clipboard asking passersby some questions. But let's see if we can sort the different data collection methods into a semblance of organized categories.

What Are the Different Methods of Data Collection?

The Following are seven primary methods of collecting data in business analytics.

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

Data collection breaks down into two methods. As a side note, many terms, such as techniques, methods, and types, are interchangeable and depending on who uses them. One source may call data collection techniques "methods," for instance. But whatever labels we use, the general concepts and breakdowns apply across the board whether we're talking about marketing analysis or a scientific research project.

The two methods are:

Primary

As the name implies, this is original, first-hand data collected by the data researchers. This process is the initial information gathering step, performed before anyone carries out any further or related research. Primary data results are highly accurate provided the researcher collects the information. However, there's a downside, as first-hand research is potentially time-consuming and expensive.

Secondary

Secondary data is second-hand data collected by other parties and already having undergone statistical analysis. This data is either information that the researcher has tasked other people to collect or information the researcher has looked up. Simply put, it's second-hand information. Although it's easier and cheaper to obtain than primary information, secondary information raises concerns regarding accuracy and authenticity. Quantitative data makes up a majority of secondary data.

Specific Data Collection Techniques

Let's get into specifics. Using the primary/secondary methods mentioned above, here is a breakdown of specific techniques.

Primary Data Collection

Interviews

The researcher asks questions of a large sampling of people, either by direct interviews or means of mass communication such as by phone or mail. This method is by far the most common means of data gathering.

Projective Data Gathering

Projective data gathering is an indirect interview, used when potential respondents know why they're being asked questions and hesitate to answer. For instance, someone may be reluctant to answer questions about their phone service if a cell phone carrier representative poses the questions. With projective data gathering, the interviewees get an incomplete question, and they must fill in the rest, using their opinions, feelings, and attitudes.

Delphi Technique

The Oracle at Delphi, according to Greek mythology, was the high priestess of Apollo's temple, who gave advice, prophecies, and counsel. In the realm of data collection, researchers use the Delphi technique by gathering information from a panel of experts. Each expert answers questions in their field of specialty, and the replies are consolidated into a single opinion.

Focus Groups

Focus groups, like interviews, are a commonly used technique. The group consists of anywhere from a half- dozen to a dozen people, led by a moderator, brought together to discuss the issue.

Questionnaires

Questionnaires are a simple, straightforward data collection method. Respondents get a series of questions, either open or close-ended, related to the matter at hand.

Secondary Data Collection

Unlike primary data collection, there are no specific collection methods. Instead, since the information has already been collected, the researcher consults various data sources, such as:

- Financial Statements
- Sales Reports
- Retailer/Distributor/Deal Feedback
- Customer Personal Information (e.g., name, address, age, contact info)
- Business Journals
- Government Records (e.g., census, tax records, Social Security info)
- Trade/Business Magazines
- The internet

Data Collection Tools

*Word Association: The researcher gives the respondent a set of words and asks them what comes to mind when they hear each word.

*Sentence Completion: Researchers use sentence completion to understand what kind of ideas the respondent has. This tool involves giving an incomplete sentence and seeing how the interviewee finishes it.

*Role-Playing: Respondents are presented with an imaginary situation and asked how they would act or react if it was real.

*In-Person Surveys: The researcher asks questions in person.

*Online/Web Surveys: These surveys are easy to accomplish, but some users may be unwilling to answer truthfully, if at all.

These surveys take advantage of the increasing proliferation of mobile technology. Mobile collection surveys rely on mobile devices like tablets or smartphones to conduct surveys via SMS or mobile apps.

*Phone Surveys:

No researcher can call thousands of people at once, so they need a third party to handle the chore. However, many people have call screening and won't answer.

*Observation:

Sometimes, the simplest method is the best. Researchers who make direct observations collect data quickly and easily, with little intrusion or third-party bias. Naturally, it's only effective in small-scale situations.

What are Common Challenges in Data Collection?

There are some prevalent challenges faced while collecting data, let us explore a few of them to understand them better and avoid them.

Data Quality Issues: The main threat to the broad and successful application of machine learning is poor data quality. Data quality must be your top priority if you want to make technologies like machine learning work for you. Let's talk about some of the most prevalent data quality problems in this blog article and how to fix them.

Inconsistent Data:

When working with various data sources, it's conceivable that the same information will have discrepancies between sources. The differences could be in formats, units, or occasionally spellings. The introduction of inconsistent data might also occur during firm mergers or relocations. Inconsistencies in data have a tendency to accumulate and reduce the value of data if they are not continually resolved. Organizations that have heavily focused on data consistency do so because they only want reliable data to support their analytics.

Data Downtime

Data is the driving force behind the decisions and operations of data-driven businesses. However, there may be brief periods when their data is unreliable or not prepared. Customer complaints and subpar analytical outcomes are only two ways that this data unavailability can have a significant impact on businesses. A data engineer spends about 80% of their time updating, maintaining, and guaranteeing the integrity of the data pipeline. In order to ask the next business question, there is a high marginal cost due to the lengthy operational lead time from data capture to insight.

Schema modifications and migration problems are just two examples of the causes of data downtime. Data pipelines can be difficult due to their size and complexity. Data downtime must be continuously monitored, and it must be reduced through automation.

Ambiguous Data:

Even with thorough oversight, some errors can still occur in massive databases or data lakes. For data streaming at a fast speed, the issue becomes more overwhelming. Spelling mistakes can go unnoticed, formatting difficulties can occur, and column heads might be deceptive. This unclear data might cause a number of problems for reporting and analytics.

Duplicate Data:

Streaming data, local databases, and cloud data lakes are just a few of the sources of data that modern enterprises must contend with. They might also have application and system silos. These sources are likely to duplicate and overlap each other quite a bit. For instance, duplicate contact information has a substantial impact on customer experience. If certain prospects are ignored while others are engaged repeatedly, marketing campaigns suffer. The likelihood of biased analytical outcomes increases when duplicate data are present. It can also result in ML models with biased training data.

Too Much Data:

While we emphasize data-driven analytics and its advantages, a data quality problem with excessive data exists. There is a risk of getting lost in an abundance of data when searching for information pertinent to your analytical efforts. Data scientists, data analysts, and business users devote 80% of their work to finding and organizing the appropriate data. With an increase in data volume, other problems with data quality become more serious, particularly when dealing with streaming data and big files or databases.

Inaccurate Data

For highly regulated businesses like healthcare, data accuracy is crucial. Given the current experience, it is more important than ever to increase the data quality for COVID-19 and later pandemics. Inaccurate information does not provide you with a true picture of the situation and cannot be used to plan the best course of action. Personalized customer experiences and marketing strategies underperform if your customer data is inaccurate.

Data inaccuracies can be attributed to a number of things, including data degradation, human mistake, and data drift. Worldwide data decay occurs at a rate of about 3% per month, which is quite concerning. Data integrity can be compromised while being transferred between different systems, and data quality might deteriorate with time.

Hidden Data

The majority of businesses only utilize a portion of their data, with the remainder sometimes being lost in data silos or discarded in data graveyards. For instance, the customer service team might not receive client data from sales, missing an opportunity to build more precise and comprehensive customer profiles. Missing out on possibilities to develop novel products, enhance services, and streamline procedures is caused by hidden data.

Finding Relevant Data

Finding relevant data is not so easy. There are several factors that we need to consider while trying to find relevant data, which include -

- Relevant Domain
- Relevant demographics
- Relevant Time period and so many more factors that we need to consider while trying to find relevant data.

Data that is not relevant to our study in any of the factors render it obsolete and we cannot effectively proceed with its analysis. This could lead to incomplete research or analysis, re-collecting data again and again, or shutting down the study.

Deciding the Data to Collect

Determining what data to collect is one of the most important factors while collecting data and should be one of the first factors while collecting data. We must choose the subjects the data will cover, the sources we will be used to gather it, and the quantity of information we will require. Our responses to these queries will depend on our aims, or what we expect to achieve utilizing your data. As an illustration, we may choose to gather information on the categories of articles that website visitors between the ages of 20 and 50 most frequently access. We can also decide to compile data on the typical age of all the clients who made a purchase from your business over the previous month.

Not addressing this could lead to double work and collection of irrelevant data or ruining your study as a whole.

Dealing With Big Data

Big data refers to exceedingly massive data sets with more intricate and diversified structures. These traits typically result in increased challenges while storing, analyzing, and using additional methods of extracting results. Big data refers especially to data sets that are quite enormous or intricate that conventional data processing tools are insufficient. The overwhelming amount of data, both unstructured and structured, that a business faces on a daily basis.

The amount of data produced by healthcare applications, the internet, social networking sites social, sensor networks, and many other businesses are rapidly growing as a result of recent technological advancements. Big data refers to the vast volume of data created from numerous sources in a variety of formats at extremely fast rates. Dealing with this kind of data is one of the many challenges of Data Collection and is a crucial step toward collecting effective data.

Low Response and Other Research Issues

Poor design and low response rates were shown to be two issues with data collecting, particularly in health surveys that used questionnaires. This might lead to an insufficient or inadequate supply of data for the study. Creating an incentivized data collection program might be beneficial in this case to get more responses.

What are the Key Steps in the Data Collection Process?

In the Data Collection Process, there are 5 key steps. They are explained briefly below -

1. Decide What Data You Want to Gather

The first thing that we need to do is decide what information we want to gather. We must choose the subjects the data will cover, the sources we will use to gather it, and the quantity of information that we would require. For instance, we may choose to gather information on the categories of products that an average e-commerce website visitor between the ages of 30 and 45 most frequently searches for.

2. Establish a Deadline for Data Collection

The process of creating a strategy for data collection can now begin. We should set a deadline for our data collection at the outset of our planning phase. Some forms of data we might want to continuously collect. We might want to build up a technique for tracking transactional data and website visitor statistics over the long term, for instance. However, we will track the data throughout a certain time frame if we are tracking it for a particular campaign. In these situations, we will have a schedule for when we will begin and finish gathering data.

3. Select a Data Collection Approach

We will select the data collection technique that will serve as the foundation of our data gathering plan at this stage. We must take into account the type of information that we wish to gather, the time period during which we will receive it, and the other factors we decide on to choose the best gathering strategy.

4. Gather Information

Once our plan is complete, we can put our data collection plan into action and begin gathering data. In our DMP, we can store and arrange our data. We need to be careful to follow our plan and keep an eye on how it's doing. Especially if we are collecting data regularly, setting up a timetable for when we will be checking in on how our data gathering is going may be helpful. As circumstances alter and we learn new details, we might need to amend our plan.

5. Examine the Information and Apply Your Findings

It's time to examine our data and arrange our findings after we have gathered all of our information. The analysis stage is essential because it transforms unprocessed data into insightful knowledge that can be applied to better our marketing plans, goods, and business judgments. The analytics tools included in our DMP can be used to assist with this phase. We can put the discoveries to use to enhance our business once we have discovered the patterns and insights in our data.

Data Collection Considerations and Best Practices:

We must carefully plan before spending time and money traveling to the field to gather data. While saving time and resources, effective data collection strategies can help us collect richer, more

accurate, and richer data.

Below, we will be discussing some of the best practices that we can follow for the best results -

1. Take Into Account the Price of Each Extra Data Point

Once we have decided on the data we want to gather, we need to make sure to take the expense of doing so into account. Our surveyors and respondents will incur additional costs for each additional data point or survey question.

2. Plan How to Gather Each Data Piece

There is a dearth of freely accessible data. Sometimes the data is there, but we may not have access to it. For instance, unless we have a compelling cause, we cannot openly view another person's medical information. It could be challenging to measure several types of information.

Consider how time-consuming and difficult it will be to gather each piece of information while deciding what data to acquire.

3. Think About Your Choices for Data Collecting Using Mobile Devices

Mobile-based data collecting can be divided into three categories -

- IVRS (interactive voice response technology) - Will call the respondents and ask them questions that have already been recorded.
- SMS data collection - Will send a text message to the respondent, who can then respond to questions by text on their phone.
- Field surveyors - Can directly enter data into an interactive questionnaire while speaking to each respondent, thanks to smartphone apps.

We need to make sure to select the appropriate tool for our survey and responders because each one has its own disadvantages and advantages.

4. Carefully Consider the Data You Need to Gather

It's all too easy to get information about anything and everything, but it's crucial to only gather the information that we require.

It is helpful to consider these 3 questions:

What details will be helpful?

What details are available?

What specific details do you require?

5. Remember to Consider Identifiers

Identifiers, or details describing the context and source of a survey response, are just as crucial as the information about the subject or program that we are actually researching.

In general, adding more identifiers will enable us to pinpoint our program's successes and failures with greater accuracy, but moderation is the key.

6. Data Collecting Through Mobile Devices is the Way to Go

Although collecting data on paper is still common, modern technology relies heavily on mobile devices. They enable us to gather many various types of data at relatively lower prices and are accurate as well as quick. There aren't many reasons not to pick mobile-based data collecting with the boom of low-cost Android devices that are available nowadays.