INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Class: MSc

Subject : Research Methodology

Research Methodology

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Data

Collection of facts

Information

Organised data

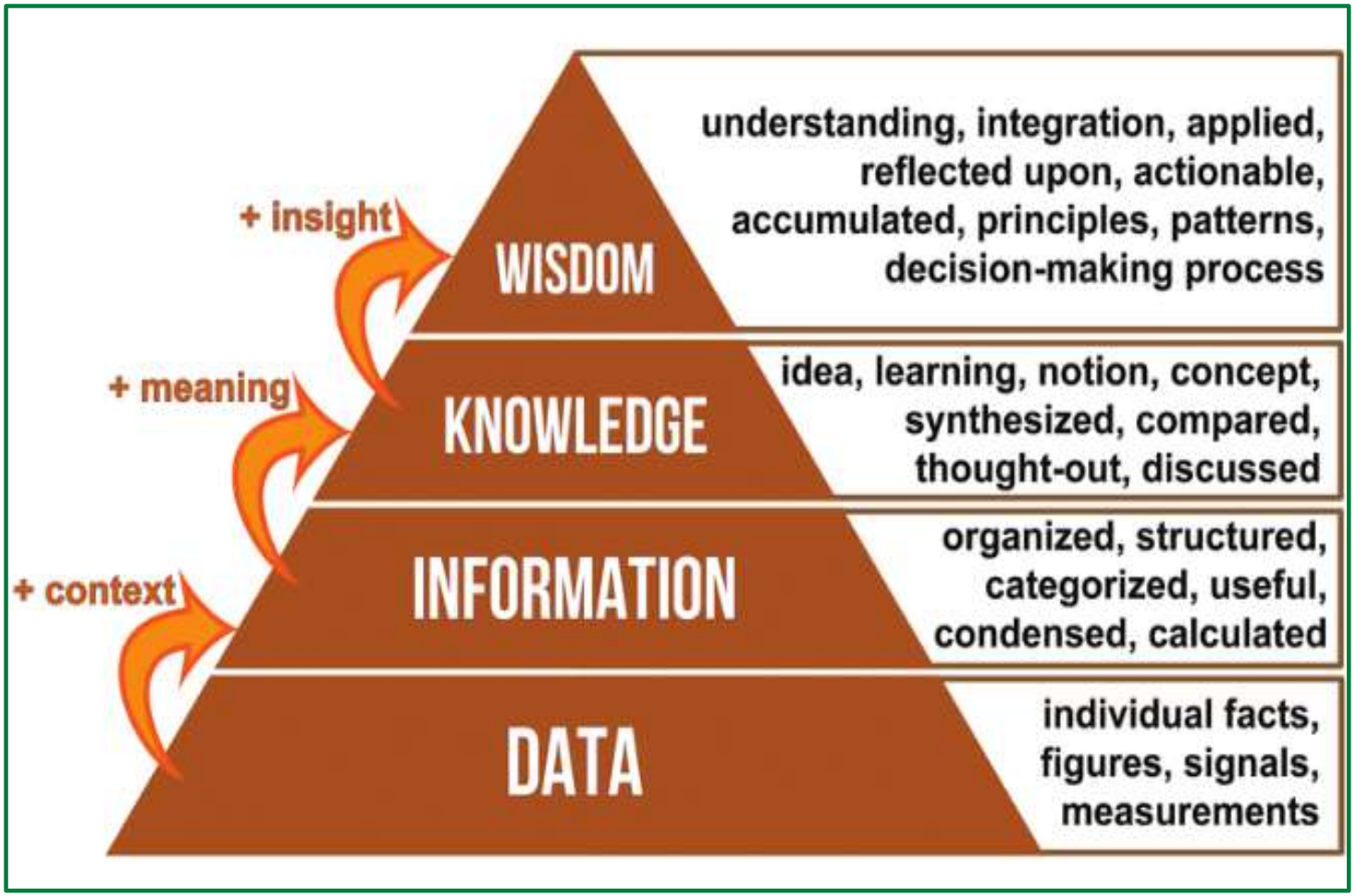
Knowledge

Understanding of relevant information with experience and intuition

Wisdom

Ability to draw conclusions or make judgements on the basis of knowledge gained.

DIKW Hierarchy



To quench the thirst for knowledge, human beings constantly carry out search and re-search.

Research

A careful, systematic and scientific enquiry or investigation to seek pertinent information about any domain of knowledge pertaining to some phenomenon, individual, event, subject or object.

Research is a movement from the unknown to the known.

Why is Research done?

1. To solve a problem
2. To face a challenge
3. To get Intellectual Joy
4. To gain respectability
5. To acquire higher qualifications

Objectives of Research

1. To find out real facts through observations and experiments
2. To achieve new thoughts
3. To improve the understanding
4. To establish causal relationship

Qualities of Researchers

- Analytical mind
- Systematic
- Intelligence
- Curiosity
- Quick thinker
- Commitment
- Communication skills – Oral and written
- Sympathetic
- Ability to stay calm

Benefits of Research

Good research –

- Results in technological advancement
- Provides the basis for framing government and corporate policies
- Helps managers in business and industries in decision making
- Helps in seeking answers to various social problems

Examples of Research

- Market research helps to determine the demand for certain product and accordingly policies for purchasing raw material, producing goods and marketing the product can be framed.
- Clinical research helps in determining the efficacy of certain drugs
- Relationship between advertisement expenses and volume of sales.

Types of Research on the basis of Objectives

1. Exploratory Research
2. Descriptive Research
3. Explanatory Research

Exploratory Research

To gain familiarity with a phenomenon, object or subject that has not been studied in depth before or to achieve new insight into it through critical assessment.

It results into discovery of ideas, proposing some concept or identifying some problem.

Descriptive Research

To portray accurately the characteristics, features or attributes of particular a phenomenon, object, subject, situation, individuals or a group through the process of observing and then recording the facts or observations.

Explanatory Research

To establish or verify the nature of relationships between two or more characteristics or attributes of some phenomenon, subject, object, individual, or event, and further to identify the extent and nature of cause-and-effect (causal) relationship amongst them.

Comparative Analysis: In context of Marketing

Research	Exploratory	Descriptive	Explanatory
Research Approach	Unstructured	Structured	Highly Structured
Research conducted through	Asking research questions	Asking research questions	Analysing observed facts
When is it conducted	Early stages of decision making	Later stages of decision making	Later stages of decision making
Example	What kinds of new products are fast-food consumers interested in?	What product features are the most important to our customers?	Which of two advertising campaigns will be more effective?

Types of Research on the basis of Application

- Applied Research – Aims is to find a solution for immediate problem faced by society, industry or business.
- Fundamental or Pure Research – Aims at gathering knowledge and generalizations and formulations of a theories or policies.

Types of Research on the basis of nature of Data collected

- Qualitative research
- Quantitative research

Qualitative Research

Qualitative research methods conclude "why" a particular theory exists along with "what" respondents/observers have to say about it.

It involves collecting and analysing non-numerical data like text, video, or audio.

Quantitative Research

Quantitative research methods measure the facts and record them quantitatively. Further the data is observed and analysed using statistical methods.

Types of Quantitative Research

- Non-Experimental research
- Experimental research

Non-Experimental Research

- Aims to establish or verify the nature of relationships between values of two or more characteristics recorded through observation without having any control over manipulating those values of characteristics.

Experimental Research

- Aims to establish cause and effect relationships between two or more characteristics
- Involves manipulation of values of one characteristic to study the effect on another under controlled conditions
- Performed under controlled environment

Categories of Research on the basis of place of Research

1. Library Research: Analysis of historical records and documents - Statistical compilation, references, abstracts.

2. Field Research: Observation, questionnaires, personal, Group or telephonic interviews, case study.

3. Laboratory Research: Experiments conducted to draw conclusions.

Some Research Methods

1 Survey: This is used to obtain data about practices, situation views at one point in time through questionnaire or interviews

2. Case Study: This involves an attempt to describe relationships which exist in reality

3. Simulations: This involves copying the behaviour of a system and is used in situations where it is difficult to solve problems analytically.

Some Research Methods

4. Subjective/argumentative research: This is used for generating new theories and ideas which can subsequently be tested. It is subject to research bias. It is unstructured form of research.

5. Experimentation: This is the most useful form of research. It involves application in which the researcher attempts to develop results or obtain solutions of practical value to the people with whom the researcher is working and at the same time developing theoretical knowledge.

Research Process

Research Process

Set of sequentially arranged activities necessary to carry out research effectively.

1. Identifying the research problem
2. Reviewing literature available
3. Framing the research problem statement
4. Preparing the research design
5. Deciding the sample design
6. Collecting the data
7. Processing and analyzing the data
8. Hypotheses Testing
9. Generalizations and interpretation
10. Writing the report or thesis

Research Process

Research Process: An Iterative Process

The key to a successful research project ultimately lies in iteration: the process of returning again and again to the identification of the research problems, methodology, data collection, etc. which lead to new ideas, revisions and improvements.

1. Identifying Research Problem

- ✓ A condition to be improved,
- ✓ a difficulty to be eliminated,
- ✓ a troubling question,
- ✓ a gap in existing knowledge, or
- ✓ some area of concern,

that exists in theory or in practice

and needs for meaningful understanding and deliberate investigation

can be identified as research problem.

2. Reviewing Literature Available

A review of relevant literature available is an integral part of the research process.

- It helps the researcher to understand

  - what concepts and theories are relevant to his area of investigation.

  - the specific aspects to his area of investigation that have not been researched so far.

- It helps the researcher to become familiar with the types of methodology followed by others.
- It avoids duplication of the work that has been done in the recent past.

3.Framing Research Problem Statement

After extensive literature survey, researcher should state in clear terms the objectives of research – what he is looking for and scope and framework of his study.

The problem statement serves this purpose by outlining the problem that the research will address in analytical or operational terms.

In some research projects, a hypothesis is used to state research objective.

Hypothesis is an unproven statement or a proposition which can be put to a test to determine its validity.

4. Preparing the Research Design

Research Design gives

- A plan that specifies the sources and types of information relevant to the research problem.

- A strategy specifying which approach to be used for gathering and analyzing the data.

- An estimation of time required for and costs of study.

The type of research problem determines the research design and not vice-versa.

5. Deciding the Sample Design

Sampling is the process of inferring something about a large group of elements or totality on the basis of information collected about part of it and analyzed for understanding any aspect of the totality.

Sample design is a definite plan for obtaining a sample from totality.

A sample needs to be selected carefully because it should be representative of the general population.

Sampling is required because study of totality is time consuming and incurs huge costs.

6. Collecting Data

- The approach selected for gathering data depends up on the objectives of the study, the research design, and the availability of time, money, and personnel.
- The method of data collection also varies with the variation in the type of data to be collected.
- Methods like surveys, interviews, and experiments are used for collecting data.

7. Processing and Analyzing the Data

It involves actions and methods performed on data that help describe facts, detect patterns, give reasoning and explanations and test hypotheses. This includes data quality assurance, statistical data analysis, modelling, and interpretation of results.

8. Hypothesis-testing

After analyzing data, the researcher tests the hypotheses, he has formulated earlier.

- Do the facts support the hypotheses or they happen to be contrary?

This question needs to be answered while testing hypotheses.

9. Generalizations and Interpretation

- Once a hypothesis is tested and upheld several times, the researcher arrives at generalization, i.e., builds a theory.
- If the researcher had no hypothesis to start with, he explains his findings on the basis of some theory. It is known as interpretation.
- The real value of research lies in its ability to arrive at certain generalizations or to provide logical interpretations.

10. Writing the Report or Thesis

- The purpose of the research is not well served unless the findings are made known to the others.
- Hence, the researcher has to prepare the report of what has been done by him and present it in the form of thesis.

Research Methodology and Research Methods

Research Methodology

- Science of studying how research is to be carried out.
- Way to systematically solve the research problem.
- General research strategy that outlines the methods used for undertaking the research work in particular field and theoretical analysis of those methods to justify their use.

Research Methodology

1) Why a particular research study has been undertaken?
2) How the Research problem has been defined?
3) What way and why the hypothesis (basic idea) has been formulated?
4) Why a particular technique of analyzing data is used? (or) How the data were collected?
5) How the collected data were interpreted?
6) What deletion was made?
7) What was the conclusion?

Research Methods

The methods and techniques used by a researcher while carrying out the research work

such as theoretical procedures, schemes, steps, algorithms, numerical techniques, experimental set-up, statistical methods

to observe and record the facts and further to analyse them to arrive at conclusions.

They are essentially planned, scientific and value-neutral (without personal bias).

Please note -

Research Methodology and Research Method are two distinct terms and are not interchangeable.

Research methodology refers to the research methods along with the logic behind using the methods in context of the research. It also refers to the explanation for why a particular technique or method is being used.

References

- Kothari, C.R.; Garg Gaurav, *Research Methodology;* New age international publishers; 2020.

- Sekaran, Uma, *Research Methods*, John Wiley & Sons, Inc., 2006.

Thanks!!!