RM Module - 4

Steps in business research process - 3

Data Preparation

Data preparation is the <mark>process of cleaning and transforming raw data</mark> prior to processing and analysis. It is an important step prior to processing and often <mark>involves reformatting data, making corrections to data</mark> and the combining of data sets to enrich data.

Data preparation is often a <mark>lengthy</mark> undertaking for data professionals or business users, but it is essential as a prerequisite to put data in context in order to turn it into insights and eliminate bias resulting from poor data quality

Steps in data preparation process

● **Data collection**

There are many sources of business data within any organization. Examples include endpoint data, <mark>customer data, marketing data,</mark> and all their associated repositories. This first essential data preparation step involves identifying the necessary data and its repositories. This is not simply identifying all possible data sources and repositories, but identifying all that are applicable to the desired analysis. This means that there <mark>must first be a plan that includes the specific questions to be answered by the data analysis.</mark>

● **Cleanse and validate data**

Cleaning up the data is traditionally the most time consuming part of the data preparation process, but it's <mark>crucial for removing faulty data and filling in gaps</mark>. Important tasks here include:

- Removing extraneous data and outliers.

- Filling in missing values.
- Conforming data to a standardized pattern.
- Masking (to cover) private or sensitive data entries.

Validity exists when the data actually measure what they are suppose to measure. If they fail to, they are misleading and should not be accepted.

One of the most serious concerns is errors in survey data.When secondary data are involved, they may be ancient or unimportant.With primary data also, this review is important.

● **Transform and enrich data**

Transforming data is the process of updating the format or value entries in order to reach a well-defined outcome, or to make the data more easily understood by a wider audience. Enriching data refers to adding and connecting data with other related information to provide deeper insights.

When the data set has been cleansed and formatted, it may be transformed by merging, splitting, or joining the input sets. Once the combining step is complete, the data is ready to be moved to the data warehouse staging area. Once data is loaded into the staging area, there is a second opportunity for validation.

● **Analyze**

Once the analysis has begun, changes to the data set should only be made with careful consideration. During analysis, algorithms are often adjusted and compared to other results. Changes to the data can skew analysis results and make it impossible to determine whether the different results are caused by changes to the data or the algorithms.

1. **Preliminary questionnaire**

In this fieldwork, it is important to re-check the questionnaire. If the researcher has taken the service of any field work agency then it is the responsibility of the concerned agency to take care of these problems during the fieldwork itself. There is a possibility that the questionnaire is technically complete, but there may be few issues that should be addressed by the research designer. Checking of the questionnaire is important, because there is a possibility that few pages of the questionnaire may be missing. Another possibility occurs in terms of irrational consistency in filling the answer on a rating scale. For example, on a 1to 5-point rating scale, a respondent has chosen the rating point 3 for all the questions. This indicates that the respondent is not serious, and this must be taken care. During the preliminary screening of the questionnaire, the researcher can also identify the understanding of the respondent. This can be done by analyzing the answer pattern to different questions. If there is a continuous skipping of some questions or if there is un-rationale selection of rating point as the answer to some questions, this is an indication of lack of understanding of the respondent. If these problems are serious in nature, the research designer can conduct the additional interviews to handle the situation. It is always advisable to take care of all the discussed issues during the fieldwork to avoid additional interview. Practically, some problems do appear even after considering all the precautions. This is the stage of research where the researcher finally addresses all these problems.

2. **Data Editing:**

Editing is actually checking of the questionnaire for suspicious, inconsistent, illegible and incomplete answers visible from careful study

of the questionnaire. Information gathered during data collection may lack uniformity. Example:

Data collected through questionnaire and schedules may have answers which may not be ticked at proper places or some questions may be left unanswered. Sometimes information may be given in a form which needs reconstruction in a category designed for analysis, e.g., converting daily/monthly income in annual income and so on. The researcher has to take a decision as to how to edit it. Editing also needs that data are relevant and appropriate and errors are modified occasionally, the investigator makes a mistake and records and impossible answer. "How many red chilis do you use in a month" The answer is written as "4 kilos". Can a family of three members use four kilo chilies in a month? The correct answer could be "0.4 kilo". Care should be taken in editing (re-arranging) answers to open-ended questions. Example: Sometimes "don't know" answer is edited as "no response". This is wrong. "Don't know" means that the respondent is not sure and is in a double mind about his reaction or considers the questions personal and does not want to answer it. "No response" means that the respondent is not familiar with the situation/object/event/individual about which he is asked.

The editing can be done at two stages:

1. Field Editing, and 2. Central Editing.

Field Editing : The field editing consists of review of the reporting forms by the investigator for completing or translating what the latter has written in abbreviated form at the time of interviewing the respondent. This form of editing is necessary in view of the writing of individuals, which vary from individual to individual and sometimes difficult for the tabulator to understand. This sort of editing should be done as soon as possible after the interview, as it may be necessary sometimes to recall the memory. While doing so, care should be taken so that the investigator

does not correct the errors of omission by simply guessing what the respondent would have answered if the question was put to him

Central Editing: Central editing should be carried out when all the forms of schedules have been completed and returned to the headquarters. This type of editing requires that all the forms are thoroughly edited by a single person (editor) in a small field study or a small group of persons in case of a large field study, The editor may correct the obvious errors, such as an entry in a wrong place, entry recorded in daily terms whereas it should have been recorded in weeks/months, etc. Sometimes, inappropriate or missing replies can also be recorded by the editor by reviewing the other information recorded in the schedule. If necessary, the respondent may be contacted for clarification. All the incorrect replies, which are quite obvious, must be deleted from the schedules.

3. Coding

Coding is the process of assigning some symbols (either) alphabetical or numerals or (both) to the answers so that the responses can be recorded into a limited number of classes or categories. The classes should be appropriate to the research problem being studied.

The coding is necessary for the efficient analysis of data. The coding decisions should usually be taken at the designing stage of the questionnaire itself so that the likely responses to questions are pre-coded. This simplifies computer tabulation of the data for further analysis. It may be noted that any errors in coding should be eliminated altogether or at least be reduced to the minimum possible level. Coding for an open-ended question is more tedious than the closed ended question. For a closed ended or structured question, the coding scheme is very simple and designed prior to the field work.

For example, consider the following question. • • • − − − − What is your sex? Male or Female We may assign a code of `0' to male and `1' to female respondent. These codes may be specified prior to the field work and if the codes are written on all questions of a questionnaire, it is said to be wholly precoded.

4. Data Entry:

At this stage, the data are entered in the spreadsheet. This is crucial stage and is usually done by the computer typist. A careful supervision of the data entry is essentially required by the researcher. A re-check of the entire process is also important. A manual-recheck of the data entry process can be done for a small set of data, where as it is difficult and time consuming for the large. Differences in entries can be easily pointed out and must be corrected with the help of originally filed questionnaire. After the data entry, the researcher has to launch data cleaning exercise. Data cleaning exercise is undertaken by any researcher to deal with problem of missing data and illogical and inconsistent entries. there are using different software such as SPSS(statistical package for social science), MS excel, etc

5. Data Analysis :

Data analysis is a body of methods that help to describe facts, detect patterns, develop explanations and test hypotheses. It is used in all of the sciences. It is used in business, In administration and in policy. The numerical results provided by a data analysis are usually simple'

It finds the number that describes a typical value and it finds differences among numbers. Data analysis finds averages, like the average income or the average temperature and it find differences like the difference in income from group to group or the differences in average temperature from year to year. Fundamentally, the numerical answers provided by

data analysis are that simple. But data analysis is not about numbers it uses them. Data analysis is about the world, asking, always asking, "How does it work?" And that's where data analysis gets tricky

Analysis of data is a process of ==inspecting, cleaning, transforming,== and modeling data with the goal of highlighting useful information, suggesting conclusions, and ==supporting decision making==. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science and social science domains.

Research Proposal Writing

A research proposal is a document written by a researcher that provides a detailed description of the proposed program, it is like an outline of the entire research process that gives a reader a summary of the information discussed in a project.

Types of research proposal

1. Internal research

● **Academic :**

An academic proposal is the first step in producing a thesis or major project. Its intent is to convince a supervisor or academic committee that your topic and approach is sound.

- **Non-academic:**

This one is not for degree requirement that is submitted by a university or a college teacher to some research organization.

2. External research

- **Solicited:**

Solicited proposals are those that are written and submitted in response to the issuance of a "Request for Proposals" (RFP), a document that identifies a specific research problem of interest to the funding agency for which they are specifically seeking a solution.

Interested investigator then submits a "concept" or "white paper" briefly outlining their proposed solution to the problem. If the funding agency or company is interested, they may then request that the investigator submit a full proposal for consideration of funding.

- **Unsolicited :**

Unsolicited proposals are those proposals that are submitted by an investigator in response to a "general call" for proposals that is issued by a funding agency or company in a field or area of study.

Content of research proposal

1. Title

This is just a tentative title for your intended research. You will be able to revise your title during the course of your research if you are accepted for admission.

2. Abstract

The proposal should include a concise statement of your intended research of no more than 100 words. This may be a couple of sentences setting out the problem that you want to examine or the central question that you wish to address.

3. Research Context

You should explain the broad background against which you will conduct your research. You should include a brief overview of the general area of study within which your proposed research falls, summarizing the current state of knowledge and recent debates on the topic. This will allow you to demonstrate a familiarity with the relevant field as well as the ability to communicate clearly and concisely.

4. Research Questions

The proposal should set out the central aims and questions that will guide your research. Before writing your proposal, you should take time to reflect on the key questions that you are seeking to answer. Many research proposals are too broad, so reflecting on your key research questions is a good way to make sure that your project is sufficiently narrow and feasible.

You might find it helpful to prioritize one or two main questions, from which you can then derive a number of secondary research questions. The proposal should also explain your intended approach to answering the questions: will your approach be empirical, doctrinal or theoretical etc?

5. Research Methods

The proposal should outline your research methods, explaining how you are going to conduct your research. Your methods may include visiting particular libraries or archives, field work or interviews. Most research is

library-based. If your proposed research is library-based, you should explain where your key resources (e.g. law reports, journal articles) are located (in the Law School's library, Westlaw etc). If you plan to conduct field work or collect empirical data, you should provide details about this (e.g. if you plan interviews, who will you interview? How many interviews will you conduct? Will there be problems of access?). This section should also explain how you are going to analyse your research findings.

6. Significance of Research

The proposal should demonstrate the originality of your intended research. You should therefore explain why your research is important (for example, by explaining how your research builds on and adds to the current state of knowledge in the field or by setting out reasons why it is timely to research your proposed topic).

7. Bibliography

The proposal should include a short bibliography identifying the most relevant works for your topic.

OTHER RESEARCH PROPOSAL PROCESS

1. Introduction

In the real world of higher education, a research proposal is most often written by scholars seeking grant funding for a research project or it's the first step in getting approval to write a doctoral dissertation. Even if this is just a course assignment, treat your introduction as the initial pitch of an idea or a thorough examination of the significance of a research problem. After reading the introduction, your readers should not only have an understanding of what you want to do, but they should also be able to gain a sense of your passion for the topic

and to be excited about the study's possible outcomes. Note that most proposals do not include an abstract [summary] before the introduction.

Think about your introduction as a narrative written in two to four paragraphs that succinctly answers the following four questions:

1.   What is the central research problem?

2.   What is the topic of study related to that research problem?

3.   What methods should be used to analyze the research problem?

4.   Why is this important research, what is its significance, and why should someone reading the proposal care about the outcomes of the proposed study?

2.   Background and Significance

This is where you explain the context of your proposal and describe in detail why it's important. It can be melded into your introduction or you can create a separate section to help with the organization and narrative flow of your proposal. Approach writing this section with the thought that you can't assume your readers will know as much about the research problem as you do. Note that this section is not an essay going over everything you have learned about the topic; instead, you must choose what is most relevant in explaining the aims of your research.

3.   Literature Review

Connected to the background and significance of your study is a section of your proposal devoted to a more deliberate review and synthesis of prior studies related to the research problem under

investigation. <mark>The purpose here is to place your project within the larger whole of what is currently being explored</mark>, while demonstrating to your readers that your work is original and innovative. Think about what questions other researchers have asked, what methods they have used, and what is your understanding of their findings and, when stated, their recommendations.

4. Research Design and Methods

This section <u>must</u> be well-written and logically organized because you are not actually doing the research, yet, your reader must have confidence that it is worth pursuing. The reader will never have a study outcome from which to evaluate <mark>whether your methodological choices were the correct ones</mark>. Thus, the objective here is to convince the reader that your overall research design and proposed methods of analysis will correctly address the problem and that the methods will provide the means to effectively interpret the potential results. Your design and methods should be unmistakably tied to the specific aims of your study.

<mark>Describe the overall research design by building upon and drawing examples from your review of the literature</mark>. Consider not only methods that other researchers have used but methods of data gathering that have not been used but perhaps could be. Be specific about the methodological approaches you plan to undertake to obtain information, the techniques you would use to analyze the data, and the tests of external validity to which you commit yourself [i.e., the trustworthiness by which you can generalize from your study to other people, places, events, and/or periods of time].

5. Preliminary Suppositions and Implications

The purpose of this section is to argue how and in what ways you believe your research will refine, revise, or extend existing knowledge in the subject area under investigation. Depending on the aims and objectives of your study, describe how the anticipated results will impact future scholarly research, theory, practice, forms of interventions, or policymaking. Note that such discussions may have either substantive [a potential new policy], theoretical [a potential new understanding], or methodological [a potential new way of analyzing] significance.

6. Conclusion

This section should be only one or two paragraphs long, emphasizing why the research problem is worth investigating, why your research study is unique, and how it should advance existing knowledge.

7. Reference

As with any scholarly research paper, you must cite the sources you used. In a standard research proposal, this section can take two forms, so consult with your professor about which one is preferred.

1. **Citation --** lists only the literature that you actually used or cited in your proposal.
2. **Bibliography --** lists everything you used or cited in your proposal, with additional citations to any key sources relevant to understanding the research problem.

    In either case, this section should testify to the fact that you did enough preparatory work to ensure the project will complement and not just duplicate the efforts of other researchers. Start a new

page and use the heading "References" or "Bibliography" centered at the top of the page. Cited works should always use a standard format that follows the writing style advised by the discipline of your course or that is preferred by your professor.

Report writing

A research report is a ==well-crafted document that outlines the processes, data, and findings of a systematic investigation.== It is an important document that serves as a first-hand account of the research process, and it is typically considered as an objective and accurate source of information.

In many ways, a research report can be considered as a summary of the research process that clearly ==highlights findings, recommendations, and other important details.== Reading a well-written research report should provide you with all the information you need about the core areas of the research process.

Types of research report

1. Formal or Informal Reports:

Formal reports are carefully ==structured; they stress objectivity== and organization, contain much detail, and are ==written in a style== that tends to eliminate such elements as personal pronouns. Informal reports are usually short messages with natural, casual use of language. The internal memorandum can generally be described as an informal report.

2. Short or Long Reports:

This is a confusing classification. A one-page memorandum is obviously short, and a twenty page report is clearly long. But where is the dividing

line? Bear in mind that as a report becomes longer (or what you determine as long), it takes on more characteristics of formal reports.

3. Informational or Analytical Reports:

Informational reports (annual reports, monthly financial reports, and reports on personnel absenteeism) carry objective information from one area of an organization to another. Analytical reports (scientific research, feasibility reports, and real-estate appraisals) present attempts to solve problems.

4. Proposal Report:

The proposal is a variation of problem-solving reports. A proposal is a document prepared to describe how one organization can meet the needs of another. Most governmental agencies advertise their needs by issuing "requests for proposal" or RFPs. The RFP specifies a need and potential suppliers prepare proposal reports telling how they can meet that need.

5. Vertical or Lateral Reports:

This classification refers to the direction a report travels. Reports that more upward or downward the hierarchy are referred to as vertical reports; such reports contribute to management control. Lateral reports, on the other hand, assist in coordination in the organization. A report traveling between units of the same organization level (production and finance departments) is lateral.

6. Internal or External Reports:

Internal reports travel within the organization. External reports, such as annual reports of companies, are prepared for distribution outside the organization.

7. Periodic Reports:

Periodic reports are issued on regularly scheduled dates. They are generally upward directed and serve management control. Preprinted forms and computer-generated data contribute to uniformity of periodic reports.

Structure of report writing

1. **Title Page:**

A title page includes, Title of the study Name and Affiliation of the researcher .The month and year of the study .The name of the client for whom the report is being prepared

2. **Letter Of Authorization:**

A letter of authorization is issued by the research sponsoring agency to the research conducting agency before the actual start of Research. It is a formal letter that authorizes the research conducting agency to conduct the research.

3. **Table Of Contents:**

It includes the index with page numbers of whole report. The title page, letter of authorization and table of contents are generally numbered with Roman numericals such as, I, II, III, IV, V, etc. The table of contents presents the list of topics included in the research report and the corresponding page numbers. It helps the researchers in locating the required information through relevant page numbers.

4. **Abstract**

An abstract is an overview that highlights all important aspects of the research including the research method, data collection process, and

research findings. Think of an abstract as a summary of your research report that presents pertinent information in a concise manner.

5. Introduction

The introduction is a relatively easy part of the report that can best be written after a first draft of the findings has been made. It should certainly contain some relevant (environmental/ administrative/ economic/ social) background data and information about the topic on which you are carrying out research for example if you are doing research on primary education, then a brief about the status of primary education, such as their number, state-wise break up, expenditure on primary education, etc., need to be described

After conducting any research, the researcher needs to draft the work. There is no universally accepted format for the written report.

6. Literature Review

A literature review is a written survey of existing knowledge in the field of study. In other words, it is the section where you provide an overview and analysis of different research works that are relevant to your systematic investigation.

It highlights existing research knowledge and areas needing further investigation, which your research has sought to fill. At this stage, you can also hint at your research hypothesis and its possible implications for the existing body of knowledge in your field of study.

7. Research Methodology:

The research methodology contains a detailed discussion of sample, sample size, sample profile, sampling techniques, scaling techniques,

questionnaire, test statistic, and fieldwork. This section focuses on the sample group and how these samples should be selected. Chapters provide the details of sample and sampling techniques, the sample size and its rationale, and the sample size profile. In this connection, the questionnaire and its format are also discussed. The test statistics, which are used to test the hypotheses and the rationale of using it to test the hypotheses, is dealt with. This section also incorporates some discussion about the fieldwork, that is, the manner in which respondents are contacted and difficulties are overcome to get the questionnaire filled. The type of research, that is, exploratory, descriptive, or conclusive and the type of data used in the study, that is, whether only primary or secondary data are to be used or a combination of both are to be used are also discussed in this section. Secondary data sources are also mentioned.

8. Research Findings

A detailed presentation of the findings of the study with supporting data in the form of tables and charts, together with a validation of the results is the next step in writing the main text of the report. The result section of the study should contain the statistical summaries and reductions of data, rather than raw data. All the results should be presented in a logical sequence and split into readily identifiable sections. The systematic presentation of your findings in relation to the research objectives is the crucial part of your report.

9. Conclusions and Recommendations:

The conclusion is derived from the acceptance or rejection of the hypothesis. As discussed in the results and findings section, statistical tests are performed to test the hypothesis. The researcher may either accept the null hypothesis or he or she may reject me null hypothesis and

accept the alternative hypothesis. The conclusions are supported by some previous research or existing studies and are made with direct reference to the research objective

Recommendations are slightly different from that of conclusions. The recommendations are ==generated from the critical thinking of the researcher.== The researcher examines every conclusion and suggests the actual course of action to address the problem or opportunity at hand. The conclusions happen in the form of non-action statements, whereas the recommendations are action statements and guide the research sponsor agency to take action to solve the problem or to take action to explore the untapped opportunity.

10. References and Appendices

This section contains a list of all the primary and secondary research sources. There is no fixed universally accepted rule regarding the information, which should be included in the appendix, rather it is the researcher's discretion, what he or she feels is important to be included in the appendix In general, the appendix includes copies of data collection forms, statistical output details, general tables which are not included in the body, bibliography, and other required support material.

One word question answer Module - 4		
Sr. No.	Question	Answer
1	What is the process of cleaning and transforming raw data prior to processing and analysis?	data preparation
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3	_____involves reformatting data, making corrections to data and the combining of data sets to enrich data.	data preparation
4	Which is the first step in data preparation?	data collection
5	removing faulty data and filling in gaps comes under which step?	cleansing & validating data
6	_____ is the process of updating the format or value entries in order to reach a well-defined outcome, or to make the data more easily understood by a wider audience.	transforming data
7	_____ refers to adding and connecting data with other related information to provide deeper insights.	Enriching data
8	During which algorithms are often adjusted and compared to other results?	analysis
9	Why it is important to re-check the questionnaire?	because of possibility of error
10	What is data editing?	checking of the questionnaire
11	_____is actually checking of the questionnaire for suspicious, inconsistent, illegible and incomplete answers visible from careful study of the questionnaire. Information gathered during data collection may lack uniformity.	data editing
12	How many types of editing are there?	2
13	Names the types of data editing?	field and central editing
14	_____ consists of review of the reporting forms by the investigator for completing or translating what the latter has written in abbreviated form at the time of interviewing the respondent.	field editing

15	Which editing should be done as soon as possible after the interview, as it may be necessary sometimes to recall the memory?	field editing
16	_____ should be carried out when all the forms of schedules have been completed and returned to the headquarters.	central editing
17	Which editing requires forms are thoroughly edited by a single person (editor) in a small field study or a small group of persons in case of a large field study?	central editing
18	What is coding?	process of assigning some symbols (either) alphabetical or numerals or (both)
19	_____process of assigning some symbols (either) alphabetical or numerals or (both).	coding
20	At which stage data are entered in the spreadsheet?	data enty
21	Data entry is done by _____	computer typist.
22	_____ exercise is undertaken by any researcher to deal with problem of missing data and illogical and inconsistent entries.	data cleansing
23	SPSS stands for _____	statistical package for social science
24	_____ is a process of inspecting, cleaning, transforming, and modeling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making.	data analysis
25	Who write research proposal?	researcher
26	How many types of research proposal are there?	2
27	Name the types o research proposal.	Internal & external
28	_____intent is to convince a supervisor or academic committee that your topic and approach is sound.	academic proposal

29	Which proposal are written and submitted in response to the issuance of a "Request for Proposals" (RFP)?	solicited
30	_____are those proposals that are submitted by an investigator in response to a "general call" for proposals that is issued by a funding agency or company in a field or area of study.	Unsolicited proposals
31	In abstract proposal should include a concise statement of your intended research of _____words.	no more than 100
32	In which step of content of research proposal brief overview of the general area of study within which your proposed research falls, summarizing the current state of knowledge and recent debates on the topic?	research context
33	What is reference in proposal?	bibliography and citation
34	What is is a well-crafted document that outlines the processes, data, and findings of a systematic investigation?	report writing
35	_____ can be considered as a summary of the research process that clearly highlights findings, recommendations, and other important details.	research report
36	Which report are carefully structured; they stress objectivity and organization, contain much detail, and are written in a style?	formal report
37	_____are usually short messages with natural, casual use of language.	informal report
38	Which type of report can be considered as short report?	1 page report
39	Which report considered as long report?	which covers most of the features of formal report
40	A _____ report covers most of the features of formal report.	long report
41	Annual reports, monthly financial reports, and reports on personnel absenteeism etc are example of _____	informational report

42	Which report is a document prepared to describe how one organization can meet the needs of another?	proposal report
43	Reports that more upward or downward the hierarchy are referred to as _____	vertical reports
44	_____ assist in coordination in the organization.	Lateral reports
45	Report travelling from HR department to account department is an example of _____	Lateral reports
46	Which reports travel within the organization?	internal report
47	Which type of report are prepared for distribution outside the organization?	external report
48	_____ reports are issued on regularly scheduled dates. They are generally upward directed and serve management control.	periodic
49	What does title page include in report writing?	study Name and Affiliation of the researcher
50	From whom the letter of authorization is issued to researcher?	research sponsoring agency