

## RESEARCH ONION: A SYSTEMATIC APPROACH TO DESIGNING RESEARCH METHODOLOGY



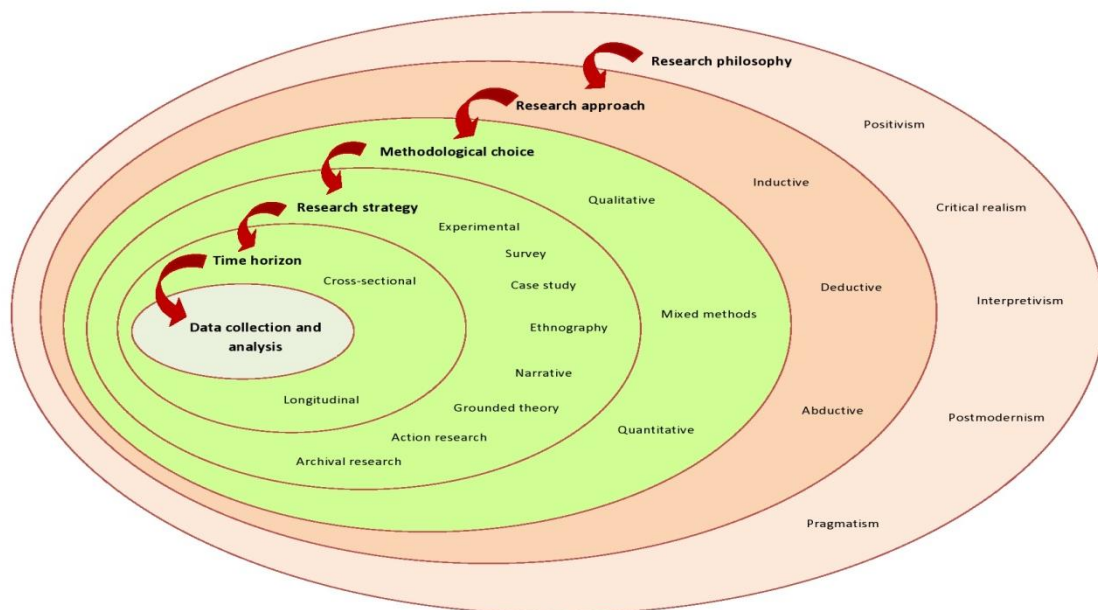
*Developing a good research design is important while undertaking quality social science research, and in this blog Dr Mahesh BT illustrates the different stages in designing a research methodology using the Research Onion framework.*

### BACKGROUND

When I joined for my PhD, as many of you, I too was curious about research. Along with the curiosity came seriousness, but only after one of my mentors said: “Your thesis is your brainchild and indeed a reflection of you”. I am here now to share a few of the specifics that I learnt during my PhD journey. I will be discussing how to design and present a robust research methodology. Why do I find this concept very crucial? It is because these answers to research questions are valid and reliable – if they are answered through a systematic method(s). Often we find dissertations with a poorly explained research methodology chapter, which is required to be crystal clear in every step, so I was in search of something that can explain things clearly. During my desk research, I came across various ways and means to design research methodology; one of the most crucial revelations for me was a research vegetable called ‘Research onion’. Let us first see what this research onion is all about.

### WHAT IS ‘RESEARCH ONION’?

Saunders et al. (2012) proposed the research onion framework (Figure 1), which explains pictorially the various aspects of the research to be examined and planned in order to come up with a sound research design. In other words, the research onion guides the researcher through all the steps that need to be taken when developing a research methodology.



**Figure 1: Research onion**

Source: Developed from Saunders et al. (2012)

Saunders et al. (2019), divided the research onion into three levels of decisions: 1. First two outer rings, i.e., Research philosophy and Research approach; 2. Research design which constitutes (a) methodological choices, (b) research strategy and (c) time horizon; and (3) tactics, i.e., the inner core of the research onion, which includes data collection and analysis aspects.

Before we strip the research onion let us do an activity. Take an onion and try to peel it from the inside without using a knife. You tried but could not peel it, the systematic way is to peel it from the outside to inside, and this is what we have to do with the research onion as well.

To develop a sound research methodology scholarly research starts with the research question(s), the objectives followed by the series of decisions on choice of research philosophy, approach to research, then the research design, i.e., methodological choices, research strategy, the time horizon, and the last inner core – data collection and data analysis. All the layers of research onion are interrelated and interdependent. In other words, the choice of philosophy influences the approach, which in turn influences the selection of methodological choice, strategy, time horizon, data collection and analysis.

## PEELING OUT THE RESEARCH ONION

### 1. RESEARCH PHILOSOPHY

Knowingly or unknowingly a researcher will be making numerous assumptions while embarking on research (Burrell and Morgan 2016).

These assumptions are of three types:

- *Ontological assumptions* - Assumptions regarding the reality faced in the research or what makes something a reality, and how a researcher can understand existence.
- *Epistemological assumptions*- Assumptions associated with human knowledge or what forms valid knowledge, whether it can be known, and how a researcher can get it and transfer it.
- *Axiological assumptions* -These are assumptions about the level of influence of the researcher's values on the research process or what is essential and valuable in the research.

Further, these assumptions help a researcher to design the research questions, choose appropriate methods, and influence the interpretation of findings (Crotty 1998). These assumptions altogether form the research philosophy of the study. According to Saunders et al. (2012), the term research philosophy refers to 'a system of beliefs and assumptions about the development of knowledge'.

The **ontological assumption** is the assumption made by a researcher regarding the nature of reality. Here reality means the study area or a subject domain, such as agricultural extension. The extension fraternity has various assumptions regarding the subject of extension, we assume it to be a study of human (farmers) behaviour, and others say it is the transfer of technology, and so on and so forth. These ontological assumptions may also be with regard to a specific research area in the subject domain. For instance, we study farmers' adoption of agro-technology, in most adoption studies the researchers presumed that a lower level of adoption (a reality) of technology is the reason for lower crop production. Therefore, the focus was on studying the level of adoption by farmers and how to increase it. On the other hand, some researchers assume technology adoption as a mental process and see that there is low level of adoption everywhere, and so they try to understand why there is a low level of adoption and what are the factors determining the adoption. From this, it is clear that your assumption about the nature of reality (ontology) decides how you view the subject domain (Agricultural Extension) or the research area, which in turn influences what you want to research (what research questions to ask or what research objectives to study).

The **epistemological assumption** is an assumption made by a researcher regarding knowledge. What forms valid and reliable knowledge? How do we acquire and communicate it? We know that the subject matter of agricultural extension is derived from different disciplines. Therefore, the nature of knowledge will be diverse; it may constitute numerical data (e.g., number of women FPOs) to textual data (results of in-depth interview or focused group discussion), or even visual data (social map, resource map, sociogram). In extension research, facts, opinions, narratives and stories constitute valid knowledge, provided it follows a systematic process of enquiry. You will come across various research studies in extension where the researcher has used different epistemology in their research, research purely based on case studies, and some dealing only with factual stuff.

The **axiological assumption** is an assumption made by a researcher regarding the influence of values and beliefs on the research. The researcher tries to be free from values and beliefs intruding into the research or positively considers and acknowledges values and beliefs influencing the research process and the conclusions. Sometimes we need to decide on whether the values and beliefs of the research respondents should be considered or not. Researchers argue, as reported by Saunders et al. (2019), that it is very tough to keep ourselves free from the influence of values and beliefs. For instance, as a researcher you might have come across your advisor saying "parametric test is stronger than non-parametric", "qualitative data gives in-depth understanding about a phenomenon than quantitative data". What are these assumptions? They are the aspects of research your advisor values more.

At this juncture, you might have questioned yourself – why should I be making assumptions and know the different research philosophies when I can directly collect data, analyse and report the results? There are several aspects for which these assumptions are essential they are listed below.

1. Assumptions are your research tour guide; they tell you how to conduct the research, what should be your role – whether you should maintain objectivity or can subjectivity be expressed. They tell you what methods you can follow.
2. The researcher has to defend his/her work at various levels. As a student researcher, we get suggestions from the advisory committee or institutional review board to strictly go for quantitative methods with probability sampling, and try to avoid qualitative methods. This is due to the difference in the assumptions or more specifically, the research philosophy they follow. The most challenging is to convince the journal reviewers and editors, there are chances of your paper getting rejected because your philosophy is different from what they follow. Therefore, to show that your overall approach to research is justifiable, you should state your assumptions (research philosophy) very clearly.
3. Another issue we come across is sweeping apologies in our dissertation, for instance, a researcher apologises for not interviewing a large number of respondents in qualitative research; and the other one is failing to get an in-depth understanding due to the quantitative nature of research. No! You need not apologise, all that you need to do is follow the standard methods and procedure that suits your research philosophy. Therefore it is very important to understand the various research philosophies.

According to Saunders et al. (2019), there are five research philosophies: (1) positivism; (2) critical realism; (3) interpretivism; (4) postmodernism; and (5) pragmatism. The detailed explanation of these five research philosophies is presented in Tables 1 to 5.

## **2. THE RESEARCH APPROACH OR APPROACH TO THEORY DEVELOPMENT**

The second ring in the research onion contains the research approach. If we critically think on what a researcher does in research, we can classify them into three aspects – theory testing, theory building, and theory modification. The point I am trying to make here is that the research we undertake involves the use of theory which we may or may not name in our research design. You will find the essence of theory in the conclusions of research findings. The selection of a particular philosophy that was discussed in the first section will determine the approach you choose for the development of the theory or for the reasoning behind your findings. Further, the approach you select will influence the choice of research design and methods (Babbie 2010).

Table 1: Positivism philosophy- explains what we see

Ontological assumption (nature of reality )	Epistemological assumption (what constitutes acceptable knowledge)	Axiological assumption (role of values)	What methods do you follow to undertake such a study?
<ul style="list-style-type: none"> <li>Any aspect under study Eg. The social agency is seen as any other physical object and interactions as a natural phenomenon</li> <li>There is only one true reality about the aspect being studied</li> <li>The reality is ordered</li> </ul> <p><b>For example:</b> if we were to study farmers' community in a given village from a positivist perspective, we would assume "farmers community" as a physical entity like natural science.</p>	<p>It tells you that if you adopt positivist philosophy, the knowledge you contribute out of your research project will be as listed below ;</p> <ul style="list-style-type: none"> <li>Facts that are observable and measurable</li> <li>Law-like generalizations</li> <li>Numbers</li> <li>Causal explanation and predictions- Eg. factors influencing the dependent variable</li> </ul>	<ul style="list-style-type: none"> <li>No scope for influence of researcher's value in the research</li> <li>Strictly follow objectivity</li> <li>As a researcher you will be studying the aspect as it occurs, you keep yourself quite neutral and detached from what is researched and the results</li> </ul>	<ul style="list-style-type: none"> <li>If you follow the deductive research approach since you will be testing theories, i.e. developing a research hypothesis based on some existing theory</li> <li><b>Note:</b> Earlier positivist even adopted the inductive approach (theory building)</li> <li>Demands a structured approach for easy replication of the study for further validation by another researcher, value-free data collection mainly quantitative data with a higher level of measurement (Interval and above) and quantitative analysis</li> <li>Require a large sample size</li> </ul>

Source: Developed from Saunders et al. (2019)

**Note:** Application of positivist philosophy in social science research is a matter of scholarly debate. However, a researcher can apply some of the assumptions and methods with caution and rationality. **Suggested reading:** Thomas Houghton, Does positivism really 'work' in the social sciences? Link: <https://www.e-ir.info/2011/09/26/does-positivism-really-%E2%80%98work%E2%80%99-in-the-social-sciences/>

Table 2: Critical realism philosophy- explains what we see and experience

Ontological assumption (nature of reality )	Epistemological assumption (what constitutes acceptable knowledge)	Axiological assumption (role of values)	What methods do you follow to undertake such a study?
<ul style="list-style-type: none"> <li>• Reality is structured and layered, i.e. the empirical (events that we can observe and experience-, the tip of the iceberg), the actual (events and non-events created by the real, may or may not be seen- iceberg inside the water) and the real (casual structures, mechanism and properties- the process taking place inside the iceberg and all things responsible for the things happening at empirical and actual level).</li> <li>• The reality is external and independent but not directly observable, the manifestations of reality can be seen and experienced</li> <li>• Casual mechanism</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge is the product of its time, i.e. historically situated</li> <li>• Social facts are social constructions approved and accepted by the people</li> <li>• Historical causal explanations</li> <li>• Experiential verbal explanations</li> </ul>	<ul style="list-style-type: none"> <li>• The values of the researcher and that of the social unit under study is present in the research, i.e. value-laden research</li> <li>• Researcher acknowledge all forms of biases arising out of different views and experiences</li> <li>• The researcher tries to reduce bias and errors as much as possible</li> <li>• Objectivity is valued with some scope for subjectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Research approach you follow is abduction (Retroductive)</li> <li>• Range of research strategy and methods are used</li> <li>• Both qualitative and quantitative research methods are applied</li> <li>• Whatever method suits your research question is adopted</li> </ul>

Source: Developed from Saunders et al. (2019)

Suggested reading: Fletcher Amber J. Applying critical realism in qualitative research: Methodology meets method.

Link: <https://www.tandfonline.com/doi/abs/10.1080/13645579.2016.1144401?journalCode=tarm20>

**Table 3: Interpretivism philosophy- explains the meanings about the reality created by humans**

Ontological assumption (nature of reality )	Epistemological assumption (what constitutes acceptable knowledge)	Axiological assumption (role of values)	What methods do you follow to undertake such a study?
<ul style="list-style-type: none"> <li>• The reality is complex; it has multiple meanings,</li> <li>• Culture and language construct the reality</li> <li>• There is no one true reality</li> <li>• Reality is having diverse interpretations, experiences and practices</li> <li>• For instance, a reality “attitude towards GM crops” is not the same for all the farmers; it varies on the temporal, spatial, situation and personal aspects.</li> </ul>	<ul style="list-style-type: none"> <li>• Simple theories and concepts</li> <li>• What a respondent farmers narrate, his /her stories (success or failure), perception and interpretations constitute knowledge</li> <li>• New understanding or a worldview either expressed by a respondent farmer or interpreted by the researcher constitute knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Values of the respondents and the researcher is an important aspect required in the research – value-bound research</li> <li>• A researcher is a part of what is researched</li> <li>• Subjectivity is the essence of research</li> <li>• Researcher reflexive, which means as a researcher we examine ourselves that, how our assumptions, perceptions and conceptual understanding affect various decisions in the research process</li> </ul>	<ul style="list-style-type: none"> <li>• The inductive research approach is followed (Theory building)</li> <li>• Research strategies like case studies, ethnography, grounded theory are adopted</li> <li>• Small sample size</li> <li>• In-depth interviews, focused group discussions</li> <li>• Qualitative methods of analysis – qualitative content analysis, thematic analysis</li> <li>• Range of data (number, text, visuals, artefacts etc.) can be interpreted</li> </ul>

**Source:** Developed from Saunders et al. (2019)

**Suggested reading:** Chen Y Y, Shek D T L and Bu F F. 2011. Applications of interpretive and constructionist research methods in adolescent research: Philosophy, principles and examples. *International Journal of Adolescent Medicine and Health* 23(2). doi:10.1515/ijamh.2011.022

<https://pubmed.ncbi.nlm.nih.gov/21870675/>

**Table 4: Postmodernism philosophy- it seeks to challenge the existing school of thoughts and highlight the marginalized views**

Ontological assumption (nature of reality )	Epistemological assumption (what constitutes acceptable knowledge)	Axiological assumption (role of values)	What methods do you follow to undertake such a study?
<ul style="list-style-type: none"> <li>• Reality is nominal, which means the order and structure of social phenomenon (a reality) we study is not independent of us; instead, it is formed by us as a researcher and other social actors.</li> <li>• The reality is created by us using the language, power relations, perceptions</li> <li>• Multiple reality but some are dominated and silenced by different reality, and both are equally important</li> <li>• Reality is not a solid entity it's a flux of processes, transient</li> </ul>	<ul style="list-style-type: none"> <li>• Dominant ideologies, school of thoughts decide what truth and knowledge is</li> <li>• Here the knowledge constitutes the unpopular, suppressed and silenced meaning and interpretations of the other realities</li> <li>• Knowledge also constitute exposing power relations and challenge of the dominant view</li> </ul>	<ul style="list-style-type: none"> <li>• The research is value-constituted: the values of the researcher and the respondents forms the heart of the research</li> <li>• The researcher and the investigation is deeply involved in power relations (Challenging the power relationship)</li> <li>• The researcher is radically reflexive</li> </ul>	<ul style="list-style-type: none"> <li>• Do not subscribe to and apply structured methods, welcome flexible methods</li> <li>• Deconstructive- cut open and reach the core to expose the suppressed reality of a dominant thought, theory. Ideology</li> <li>• Extensive reading of text and realities</li> <li>• In-depth investigations of anomalies</li> <li>• Range of data is collected and subjected to mainly qualitative analysis (Eg. Discourse analysis)</li> </ul>

**Source:** Developed from Saunders et al. (2019)

**Suggested reading:** Rosenau P V. Postmodernism: Methodology. <https://doi.org/10.1016/B0-08-043076-7/00692-6>

**Link:** <https://www.sciencedirect.com/science/article/pii/B0080430767006926>



**Table 5: Pragmatism philosophy- it seeks to improve practice by the application of concepts**

Ontological assumption (nature of reality )	Epistemological assumption (what constitutes acceptable knowledge)	Axiological assumption (role of values)	What methods do you follow to undertake such a study?
<ul style="list-style-type: none"> <li>• The reality is complex, external and practice emerging out of an idea</li> <li>• The reality also constitute a flow of processes, experiences and practices</li> <li>• There are multiple reality</li> </ul>	<ul style="list-style-type: none"> <li>• Here the research contribute one or more of the following aspects as a knowledge;</li> <li>• Practical knowhow</li> <li>• The knowledge that turns into practice in a given context</li> <li>• Knowledge is something that enables actions, solve a problem, improve practice and process</li> </ul>	<ul style="list-style-type: none"> <li>• Here the values of the researcher and the respondents drive the research- value-driven research</li> <li>• The research process get started with the problem that is most valued by the researcher or the affected social unit</li> <li>• Researcher is reflexive</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple research approach and methods appropriate to answer the research question(s) and find practical solutions to research problem are used</li> <li>• Range of methods; qualitative, quantitative, mixed, multiple and action research</li> </ul>

**Source:** Developed from Saunders et al. (2019)

**Suggested reading:** Crist J D, Parsons M L, Warner-Robbins C, Mullins M V and Espinosa Y M. 2009. Pragmatic action research with 2 vulnerable populations. Family & Community Health 32(4):320–329. doi:10.1097/fch.0b013e3181b9

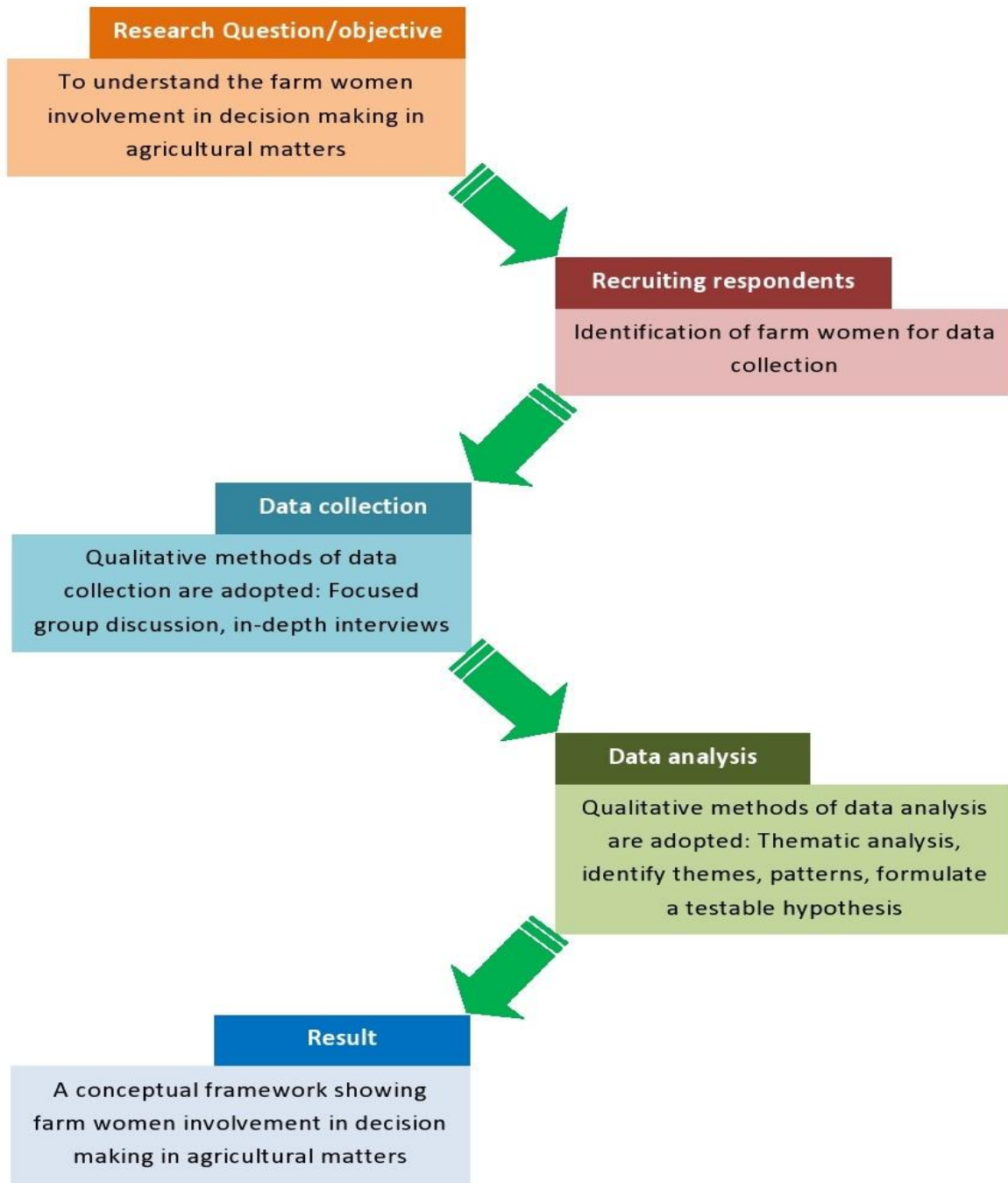
According to Saunders et al. (2012), there are three research approaches viz., induction, deduction, and abduction. A brief overview of the research approaches is presented in Table 6.

Table 6. Comparison of research approaches			
	Induction approach	Deduction approach	Abduction approach
Logic	Here, a researcher use premises developed from observations to draw untested conclusions	Here, when premises based on an existing theory are true then the conclusions are also true	Here, a known premises (Generally some surprising or incomplete conclusions) are used to generate testable conclusions
Generalization process	From specific to general	From general to specific	Interaction between the specific and the general
Generalizability	The findings cannot be	The findings can be generalised to the research settings or the context the theory is applied	The findings can be generalised to the research settings or the context the theory is applied
Use of data	Researcher collects data to identify patterns, themes and come up with a conceptual framework as conclusion	Data is collected to test hypothesis related to an existing theory	Researcher collects data to identify patterns, themes and come up with a conceptual framework and to test hypothesis (from the conceptual framework) with subsequent data collection
Theory	Theory is built (note: theory cannot be verified by inductive research approach)	Theory is falsified or verified	Theory is generated or modified; mixing existing theories to build new theory or modify existing theory
When to apply?	When your research question is to answer; Why something happens? Lack of theory to explain the phenomena	When your research question is to describe; What is happening?	When your research question is to describe and test some surprising or incomplete conclusions.

Source : Adopted from Saunders et al. (2019)

2.1 In this section I have graphically explained all the three research approaches using flowchart with hypothetical examples.

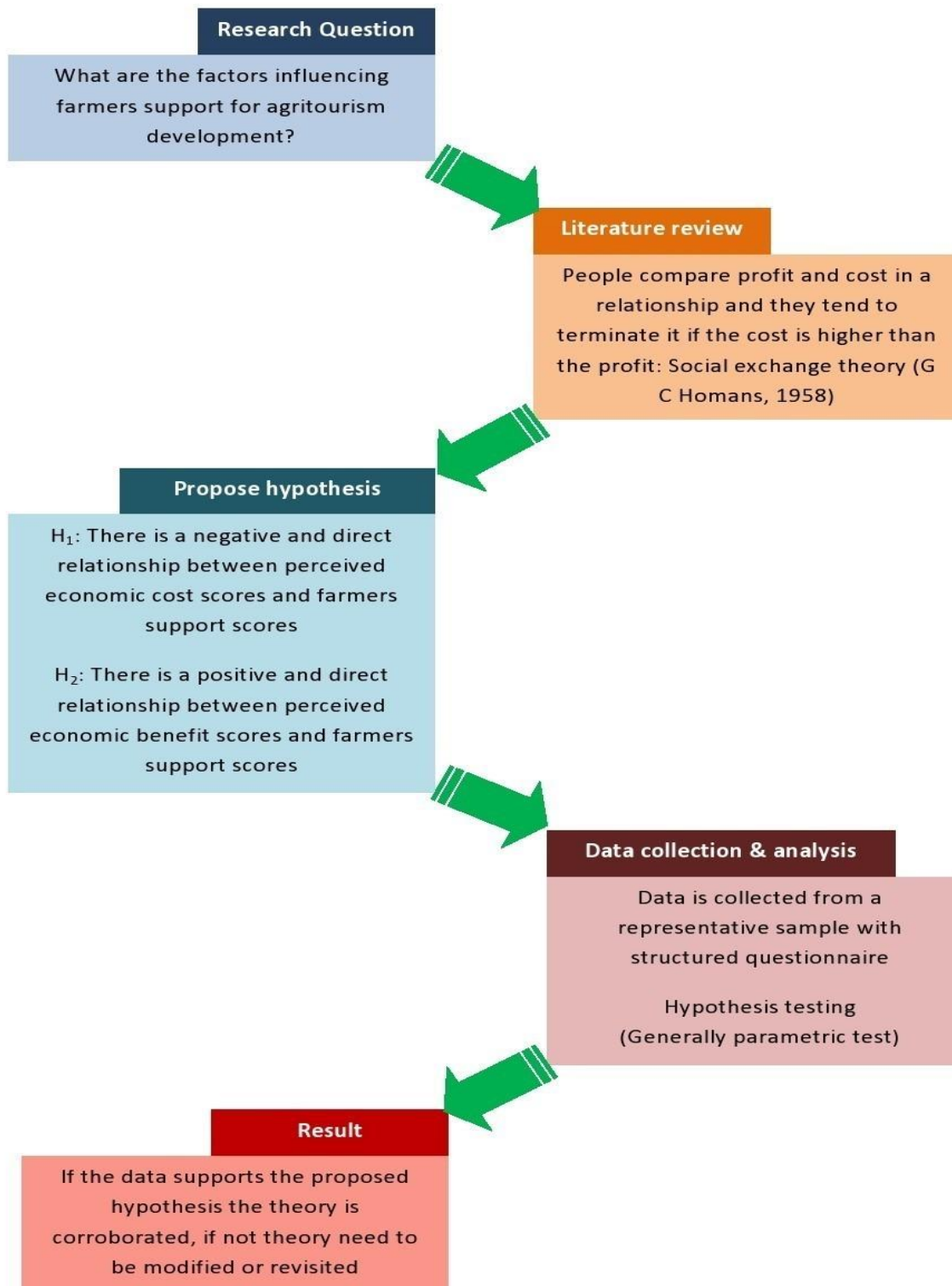
### 2.1.1 Inductive approach to research



**Figure 2: Schematic representation of inductive approach to research**  
Source: Developed from Saunders et al. (2019) and author's understanding

**Suggested reading:** Ferguson K M, Kim M A and McCoy S. 2011. Enhancing empowerment and leadership among homeless youth in agency and community settings: A grounded theory approach. Child and Adolescent Social Work Journal 28(1):1-22. <https://doi.org/10.1007/s10560-010-0217-6>

## 2.1.2 Deductive approach to research

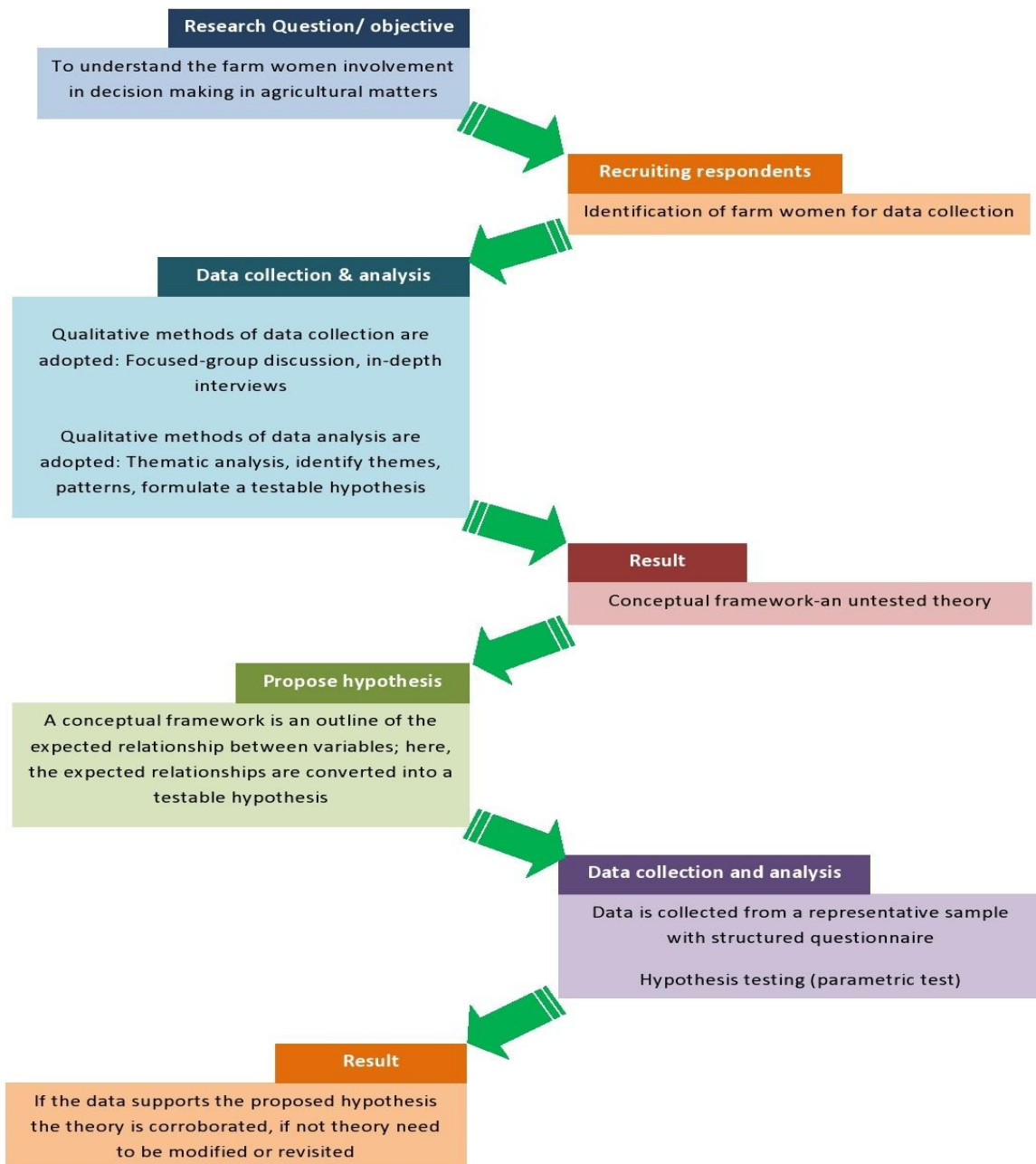


**Figure 3: Schematic representation of deductive approach to research**  
Source: Developed from Saunders et al. (2019) and author's understanding

**Suggested reading:** Chia-Pin Yu, Shu Tian Cole and Chancellor Charles. 2018. Resident support for tourism development in rural midwestern (USA) communities: Perceived tourism impacts and community quality of life perspective. Sustainability, MDPI, Open Access Journal 10(3):1-17.

### 2.1.3 Abductive approach to research

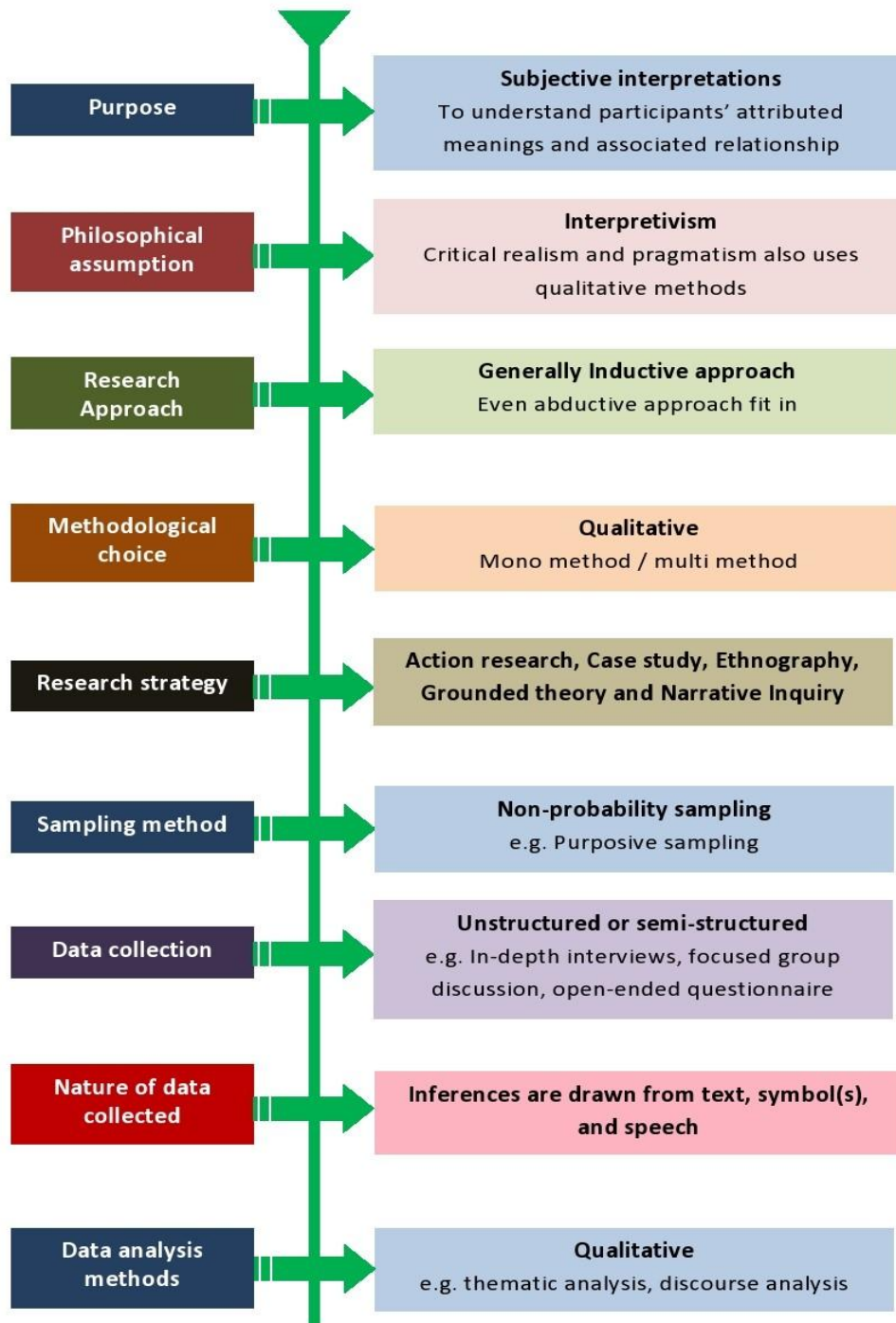
You may find some surprising or incomplete observations or conclusions regarding any social aspect; you wanted to study it both empirically as well as know the subjective opinions of people for better understanding. In this situation, you follow the abduction approach in which your research will combine the elements of both the inductive and deductive approaches. To put it in simple words, in abduction 'You build a theory and then go for its empirical testing'.



**Figure 3: Schematic representation of deductive approach to research**  
Source: Developed from Saunders et al. (2019) and author's understanding

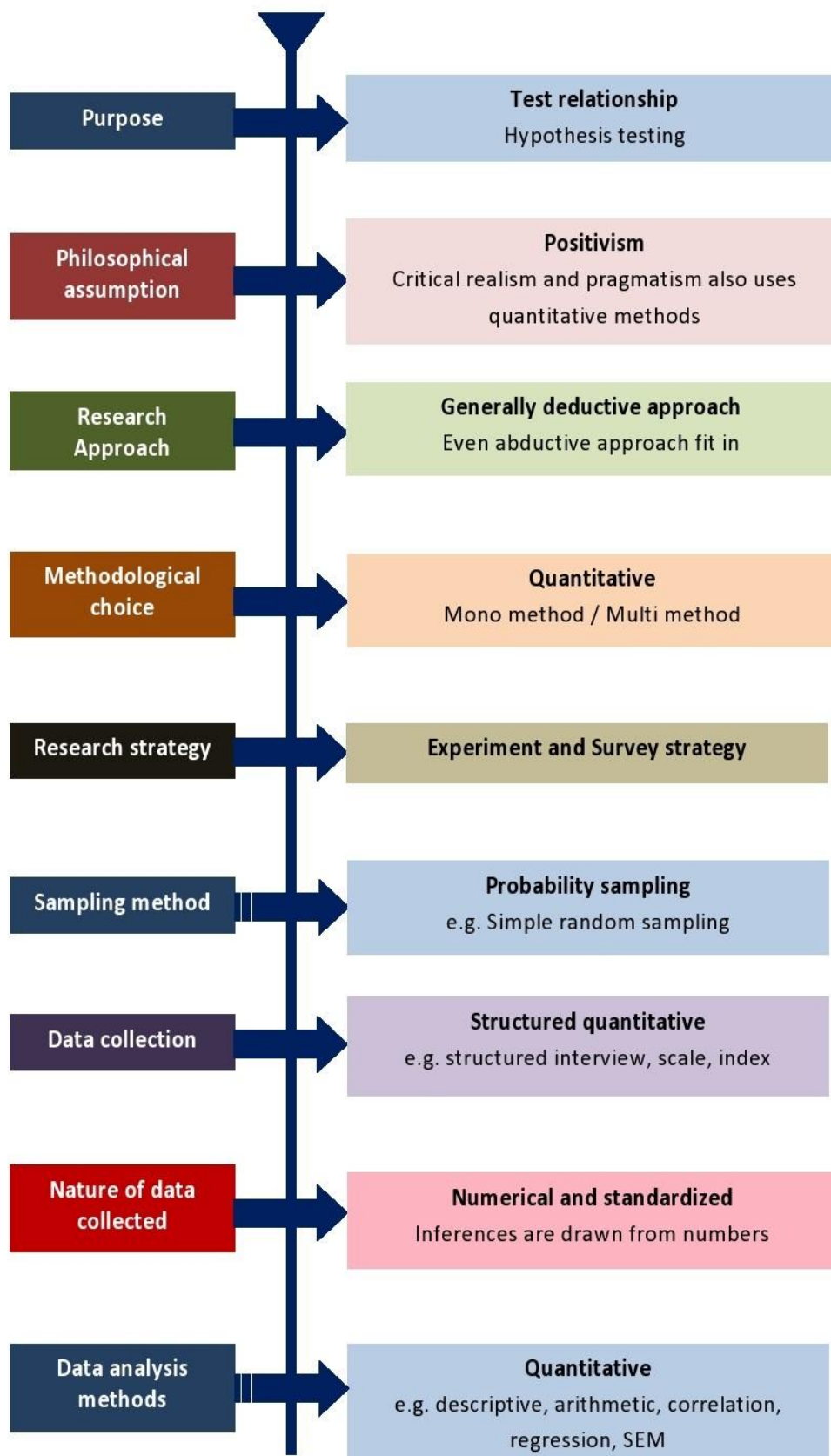
**Suggested reading:** Bristow A, Robinso S K and Ratle O. 2017. Being an early-career CMS academic in the context of insecurity and 'Excellence': The dialectics of resistance and compliance. *Organization Studies* 38(9):1185–1207.

**Research design:** It is the overall plan of a research project which involves three distinct but interrelated aspects. They are: methodological choice, research strategy and time horizon. Let us understand them separately. Sanders et al. (2019) classified research designs into three types: (1) quantitative research design; (2) qualitative research design; and (3) mixed methods research design. I have attempted to develop a schematic explanation for qualitative and quantitative research design (Figures 4 and 5, respectively) for better understanding.



**Figure 4: Schematic representation of qualitative research design**

Source: Developed from Saunders et al. (2019) and author's understanding (Made with Poster My Wall)



**Figure 5: Schematic Representation of Quantitative Research Design**  
 Source: Developed from Saunders et al. (2019) and author's understanding

### 3. METHODOLOGICAL CHOICE

Methodological Choice involves the selection and use of a quantitative, qualitative, or mixed methods research design. In the mono method, a single data collection technique is utilized, followed by corresponding qualitative or quantitative analysis procedures. In the multiple method design, more than one data collection techniques and analysis procedures are employed (Collis and Hussey 2013). Alternatively, a mixed-method approach utilizes both qualitative and quantitative data collection techniques and analysis procedures (Creswell 2013).

According to Saunders et al. (2019), mixed method research can be classified into three ways which are as follows:

- (1) Concurrent mixed methods research:** Here a researcher collects both qualitative and quantitative data and analyses them in a single phase study.
- (2) Sequential mixed methods research:** Here a researcher collects and analyses data in two phases, which can further be divided into two forms:
  - (a) sequential exploratory research design:** where a researcher collects and analyses qualitative data in the first phase, followed by quantitative data collection and analysis in the second phase;
  - (b) sequential explanatory research design:** Here a researcher collects and analyses quantitative data in the first phase followed by qualitative data collection and analysis in the second phase.
- (3) Sequential multi-phase:** In this a researcher collects and analyses data in more than two phases, in sequence. For example, qualitative followed by quantitative and then qualitative.

### 4. THE RESEARCH STRATEGY

The research strategy describes how the researcher aims to carry out the work (Saunders et al. 2007). There are several research strategies, viz., Experimental design, Survey design, Archival research, Case study, Ethnography, Action research, Grounded theory and Narrative inquiry (Saunders et al. 2012). Here we can include other research strategies appropriate to our study.

**a. Experimental design:** Here, a researcher tries to study a cause-effect relationship between two or more variables. He/she decides to systematically manipulate the independent variable to study the corresponding changes in the dependent variable.

**b. Survey design:** Here, a researcher tries to seek answers for 'what', 'who', 'where', 'how much' and 'how many' types of research questions. Data is collected and analyzed from a sample of individuals.

**c. Case study:** is an empirical inquiry of an individual social unit. Here the researcher tries to seek answers for 'how' and 'why' questions.

**d. Action research:** A systematic inquiry to address real-life practical problems. Here a researcher tries to find practical solutions for problems through participation and collaboration with members of a social unit.

**e. Grounded theory:** This is a systematic inductive method for conducting qualitative research to develop a theory.

**f. Ethnography:** is a research strategy adopted to explore cultures and societies. Here a researcher collects data through direct interaction and involvement so as to gain firsthand information from research subjects.

**g. Archival research:** A systematic inquiry wherein primary sources held in archives are studied for evidence collection or deep understanding. Here a researcher does not use secondary sources relevant to the research topic.



## 5. TIME HORIZON

Research can be grouped into two types based on time, i.e., longitudinal or successive independent samples; and cross-sectional (Bryman and Bell 2015). The longitudinal study refers to the study of a phenomenon or a population over a period of time (Caruana et al. 2015). A cross-sectional study is a 'snap-shot' study, it means a phenomenon or a cross-section of the population is studied for one time (Setia 2016). Please read the suggested reading given below to understand one of the longest researches in the history of social science research.

**Suggested reading:** Hastorf A H 1997. Lewis Terman's longitudinal study of the intellectually gifted: Early research, recent investigations and the future. *Gifted and Talented International* 12(1):3–7. doi:10.1080/15332276.1997.11672858

## 6. DATA COLLECTION AND ANALYSIS

The inner circle of research onion is made up of 'tactics' which refers to aspects about the finer details of data collection and analysis. In this section, the following aspects are described.

**A. Data collection tools and procedures:** Data collection tools such as scale, questionnaire, mail survey, etc., and procedures such as scale construction, interviews, focused group discussion, etc.

**B. Study Area** – A brief description about the study area and why you have selected this locale, supported by reliable data.

**C. Research population and sampling procedures:** Describe the following aspects in this section:

a. **Inclusion/exclusion** criteria;

b. **Sample** size;

c. **Sampling method**;

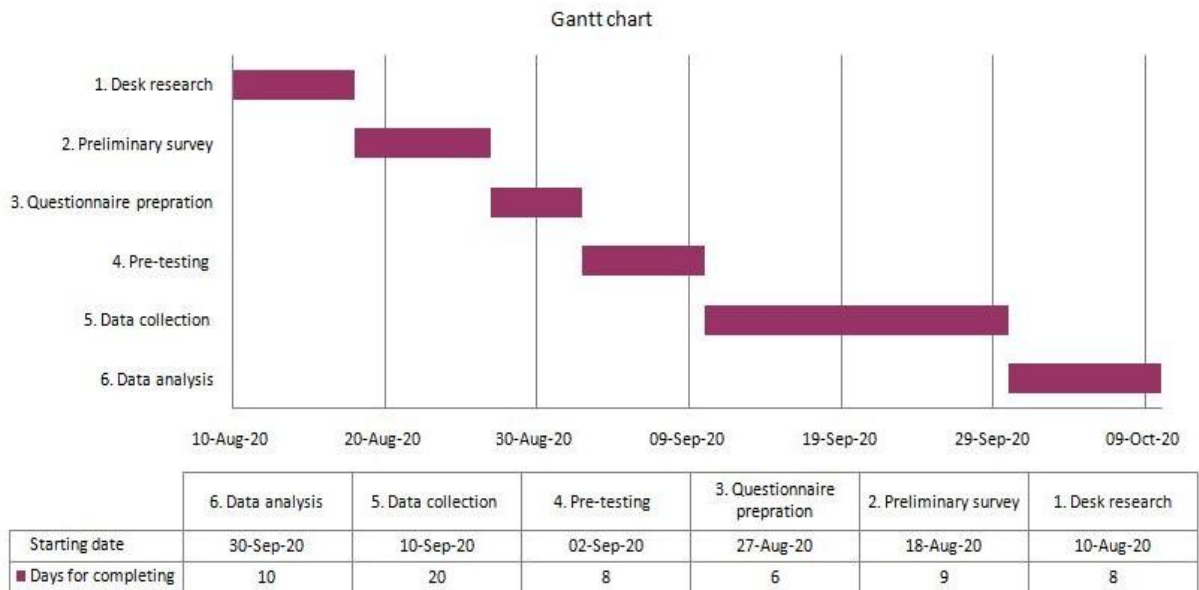
d. **Sampling plan** - Flow chart with a table indicating sample details;

e. **Sourcing samples:** Here the researcher has to describe the source of the study samples; it has the following three aspects:

- **Source population(N):** This is the group about which the researcher is going to draw inferences and to which the inclusion and exclusion criteria are applied (Example: women farmers of a district - say may be N=1000);
- **Study population (Np):** The group which fits the inclusion and exclusion criteria (Example: women farmer growing sunflower, with landholding more than 2 ha and five years of experience, say maybe Np=500);
- **Sample (n):** The group selected after following a suitable sampling method, and finally with whom you conduct your study (a representative sample of women sunflower growers sampled from the study population, say maybe n=120).

f. **Sample limitations**

**D. Study Phases:** describe in how many phases your study will be done (during planning-synopsis) / was done (while reporting in the thesis) if it was done in multiple phases. Explain the list of the tasks using a Gantt chart (Figure 6).



**Figure 6: Gantt chart illustrating a phase of research**

**E. Variables and their measurement:** Describe how the concepts, constructs and the variables were identified; this aspect is linked with the theoretical orientation. Provide the operational definition; it means how the variable is measured, mention the level of measurement also. A schematic table would suffice (for example, see Table 7).

**Table 7. List of variables their method of measurement and operational definition**

No.	Variable	Method of measurement	Operational definition
1	Dairy farmers' support	Ordinal	Dairy farmer's score on 'Dairy farmers' support' schedule.
2	Perceived negative impacts	Ordinal	Dairy farmer's score on 'Perceived negative impacts' schedule.

**F. Statistical analysis:** Mention all the statistics tools applied and software(s) used to analyse the research data (in thesis).

**G. Ethical considerations:** All the ethical aspects considered in the study need to be clearly planned and mentioned. Mention about respondent consent, how sensitive information (in synopsis) was elicited, if any. Report the approval of *Research ethics committees, if applicable.*

## CONCLUSION

The difference between a researcher and a non-researcher is, whatever a researcher does she/he does it systematically, justifies logically, subjects it to verification, is always open to criticism, ready for self-correction and explicitly expresses what was done, how it was done, why it was done and what was found. A researcher starts with a research problem, raises questions, and transforms it into workable objectives. To find answers to the research questions, we need a sound research methodology. Research onion is one such framework that helps in designing a robust research methodology; simply put, it will help you to make a series of decisions that allows systematic

research. We began with three assumptions, viz., ontological, epistemological and axiological, which constitute our research philosophy. Once we decide on the specific philosophy, an appropriate research approach can be adopted based on the research question and philosophy. The deductive approach is adopted for theory testing, inductive approach for theory building, and abductive approach for theory modification.

Further, these two crucial decisions will guide the next important aspect that is research design, which is made up of three important decisions: 1. Methodological choice – whether to follow a qualitative method, quantitative method or a mixed method; 2. Research strategy; and 3. Time horizon – cross-sectional or longitudinal research. Furthermore, the last decision is about very minute intricacies of research that is data collection, analysis and ethical statement.

### Authors' observation

It is often observed in academic discussions that various aspects of research are presented and (or) perceived to be competitive (quantitative versus qualitative, parametric versus non-parametric, probability sampling versus non-probability sampling, small sample size versus large sample size, experimental design versus non-experimental, cross-sectional versus longitudinal, and so on) rather than complimentary. Every aspect of research has got its own importance and relevance. A research scholar values every logical approach to research, and it is possible only after looking at it through all dimensions via the lenses of different questions (why, what, when, where, who, what).

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### Reference

- Babbie E. 2010. The practice of social research. 12th Edition. Belmont, USA: Wadsworth.
- Bristow A, Robinson S K and Ratle O. 2017. Being an early career CMS academic in the context of insecurity and 'Excellence': The dialectics of resistance and compliance'. *Organization Studies* 38(9):1185–1207.
- Bryman A and Bell E. 2015. *Business research methods* Oxford: Oxford University Press.
- Burrell G and Morgan G. 2016. *Sociological paradigms and organisational analysis*. Abingdon: Routledge (originally published by Heinemann 1979).
- Caruana E J, Marius Roman, Jules Hernández-Sánchez and Piergiorgio Soll. 2015. Longitudinal studies. *Journal of Thoracic Disease* 7(11):537–540. doi: 10.3978/j.issn.2072-1439.2015.10.63. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4669300/>
- Chen Y Y, Shek D T L and Bu F F. 2011. Applications of interpretive and constructionist research methods in adolescent research: Philosophy, principles and examples. *International Journal of Adolescent Medicine and Health* 23(2). doi:10.1515/ijamh.2011.022 <https://pubmed.ncbi.nlm.nih.gov/21870675/>
- Chia-Pin Yu, Shu Tian Cole and Charles Chancellor. 2018. Resident support for tourism development in rural midwestern (USA) communities: Perceived tourism impacts and community quality of life perspective. *Sustainability, MDPI, Open Access Journal* 10(3):1-17.

- Crist J D, Parsons M L, Warner-Robbins C, Mullins M V and Espinosa Y M. 2009. Pragmatic action research with 2 vulnerable populations. *Family & Community Health* 32(4):320–329. doi:10.1097/fch.0b013e3181b91f
- Crotty M. 1998. *The foundations of social research: Meaning and perspective in the research process*. London: Sage.
- Collis J and Hussey R. 2013. *Business research: A practical guide for undergraduate and postgraduate students*. Macmillan International Higher Education.
- Creswell J W. 2013. *Qualitative inquiry & research design; choosing among five approaches*. Third edition. Thousand Oaks, CA: Sage.
- Ferguson K M, Kim M A and McCoy S. 2011. Enhancing empowerment and leadership among homeless youth in agency and community settings: A grounded theory approach. *Child and Adolescent Social Work Journal* 28(1):1-22. <https://doi.org/10.1007/s10560-010-0217-6>
- Hastorf A H. 1997. Lewis Terman's longitudinal study of the intellectually gifted: Early research, recent investigations and the future. *Gifted and Talented International* 12(1):3–7. doi:10.1080/15332276.1997.11672858
- Saunders M, Lewis P and Thornhill A. 2007. *Research methods for business students*. (6th ed.) London: Pearson.
- Saunders M, Lewis P and Thornhill A. 2019. *Research methods for business students*. Eighth edition. London: Pearson.
- Setia M S. 2016. Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology* 61:261-4. Retrieved from <http://www.e-ijd.org/text.asp?2016/61/3/261/182410>
- Thomas Houghton. 2011. Does positivism really 'work' in the social sciences?  
Link: <https://www.e-ir.info/2011/09/26/does-positivism-really-%E2%80%98work%E2%80%99-in-the-social-sciences/>

*Mahesh Bhimashankar Tengli, PhD (NDRI), is an Assistant Professor (Agricultural Extension) at Multi-Technology Testing Centre & Vocational Training Centre, College of Fisheries, Lembucherra, Central Agricultural University (Imphal), Tripura India. [mahidxndri16@gmail.com](mailto:mahidxndri16@gmail.com)*

**AESA Secretariat: Centre for Research on Innovation and Science Policy (CRISP),  
Road No 10, Banjara Hills, Hyderabad 500034, India  
[www.aesanetwork.org](http://www.aesanetwork.org) Email: [aesanetwork@gmail.com](mailto:aesanetwork@gmail.com)**