Grounded Theory and Its Applications

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Abstract: *Grounded Theory is a qualitative research method. Its main purpose is to establish a theory based on empirical data, emphasizing the understanding of social interaction, social processes and social changes from the perspective of actors. Generally, there is no theoretical hypothesis before the start of the research. It starts from actual observation, summarizes experience from the original data, and then rises to the system theory. This is a method of establishing a substantive theory from the bottom up. On the basis of systematically collecting data, it seeks the core concepts that reflect the essence of things, and then constructs relevant social theories through the links between these concepts. Based on the literature analysis method and referring to the previous research results, this paper constructs the overall framework of Grounded Theory, and explains the steps of theoretical sampling, open coding, axial coding, selective coding and theoretical saturation test, which lays a foundation for the application of Grounded Theory in practice.*

Keywords: *Grounded Theory; Theoretical Sampling; Overall Framework; Open Coding; Axial Coding; Selective Coding*

1. Introduction

Grounded Theory is a qualitative research method, which is widely used in the field of social sciences. Researchers usually do not make assumptions, but directly start from reality, summarize and refine the original data, and develop theories from top to bottom through corpus analysis [1].The publication of *The Discovery of Grounded Theory* announced the birth of the Grounded Theory. The Grounded Theory method originated from a study conducted by Glaser and Strauss in the 1960s to observe on the spot how medical staff in hospitals handled dying patients. Its formation was influenced by American pragmatism and the thought of the Chicago School of sociology, which was formally proposed by Glaser and Strauss in 1967. The birth of Grounded Theory has solved the phenomenon that theoretical research and empirical research have been disconnected from each other for a long time, and built a bridge between theoretical research and empirical research. It is called one of the most scientific research methodologies in the field of qualitative research. The main purpose of Grounded Theory is to establish theory on the basis of empirical data in the research. It requires that people empty their minds before the research, do not make theoretical presupposition, and directly adopt a bottom-up approach from the original data to summarize concepts and establish theories. The theory can trace back to the original materials produced, and must be based on empirical facts. Therefore, the relationship between theory and experience is better solved.

There are three schools of Grounded Theory in the development process. First, the original version first proposed by Glaser and Strauss is called classic Grounded Theory. Second, Strauss and Corbin's Programming Grounded Theory. Third, Charmaz's Constructive Grounded Theory. These three schools correspond to the epistemology of positivism, hermeneutics and constructivism respectively. It is precisely because of the arguments among the three schools that the Grounded Theory is called one of the most misunderstood research methodologies in the field of social sciences. The differences among the three schools are reflected in the methodology, because different methodologies lead to differences in coding links. The Grounded Theory school requires that in the whole process of research, the "grounded spirit" of in-depth practice should be adhered to. Researchers must go deep into the situation and the scene to obtain first-hand information.

Grounded Theory can avoid the "stylized" limitations of empirical concepts or presupposition theories on data collection and conclusions under the empirical paradigm [2]. The main purpose of Grounded Theory is to establish a theory based on empirical data. Generally, there is no theoretical hypothesis before research. Concepts and examples are directly induced from the original data, and

then rise to theory. This is a top-down method of building a theory, that is, on the basis of systematically collecting information, looking for the core concepts that reflect social phenomena, and then forming a theory by establishing links between concepts. Before the Grounded Theory was put forward, there was a serious disconnect between theoretical research and empirical research in the social science research community, either indulging in pure theoretical research or staying in the description of empirical facts. Grounded Theory must be supported by empirical evidence, but its main feature is not empiricism, but abstracting new concepts and ideas from empirical facts.

2. The Overall Framework of Grounded Theory

In the process of using the Grounded Theory, the generation of research problems is rooted in the data, but it is not to carry out research without direction. But after the initial research questions are generated, with the continuous interaction with the data, the research questions become clearer after adjustment. From the perspective of operational procedures, grounded theoretical research is more reflected in the analysis of data. It induces information through open coding, axial coding and selective coding, forms concepts, establishes links between concepts, forms categories, further forms core categories, and finally establishes relationships and forms theories. In short, it is to use the operational process of Grounded Theory to obtain relevant concepts and categories, and establish the relationship between categories, main categories and core categories. The overall framework of the Grounded Theory is shown in Fig. 1 [3].
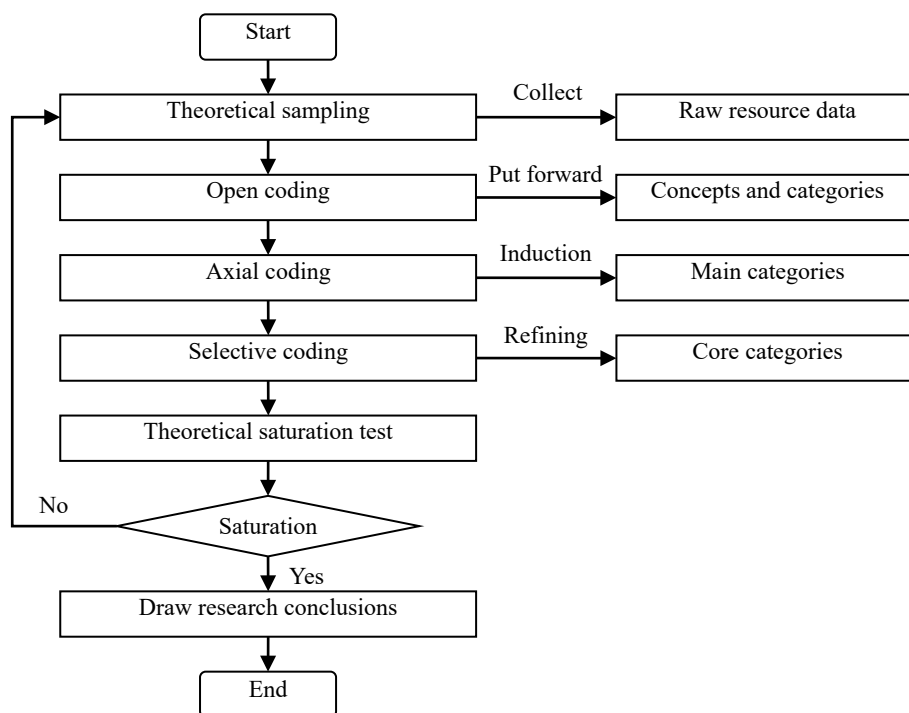

Figure 1: The overall framework of grounded theory

It can be seen from Fig. 1 that the bottom-up Grounded Theory is generally divided into three coding processes [4]. Open coding, which finds conceptual categories and categories from interview data. Axial coding, which is used to find out the main category from the initial category and show the various links between the parts of the interview data. Selective coding, which refine the main category from the induction, obtains the core category, and then perfects its relationship with other categories to form a theoretical framework.

3. Theoretical Sampling

Theoretical sampling is a data collection method based on concepts or themes, which also come from data. The purpose of theoretical sampling is to collect data from places, people and events,

maximize the formation of concepts from attributes and dimensions, reveal variables, and find the relationship between concepts. The basic logic of theoretical sampling is [5]: starting from the data, forming tentative ideas about the data, and testing these ideas by further empirical exploration, which is an inductive inference combining induction and deduction. After the initial case data collection and analysis, the inference is concluded, which provides a possible theoretical explanation for the case data. Then, follow-up research hypotheses are deduced according to this theoretical explanation. Return to the empirical world to collect more case data to test this hypothesis and find more detailed theories.

Theoretical sampling is concept driven, which can discover concepts related to the problem or group, and allows in-depth study of concepts. When studying new fields, theoretical sampling provides space for exploration and discovery. Theoretical sampling is cumulative, and every event extracted is based on the previous data collection and analysis, which in turn is conducive to the later data collection and analysis. Moreover, over time, the sampling becomes more specific. At first, data is collected in a very wide field. After having some concepts, samples can be taken around these concepts. In theoretical sampling, only a part of the data is collected for analysis, and then further data is collected until a species is "saturated". Theoretical sampling follows the path of analysis, guides research through analysis, raises questions, and then looks for the best data to answer these questions.

Grounded Theory also proposes three kinds of theoretical sampling as a supplement to the traditional in-depth interview sampling method [6]. First, open sampling, according to research questions, selects research objects that can provide the largest coverage of research questions for interviews, and finds out relevant concepts and categories needed to construct theory, which is usually used at the beginning of in-depth interviews. Second, relational and differential sampling, based on the real-time collation and analysis of interview data, selects interviewees more pertinently, sorts out the theoretical concepts and categories emerging from the interview data, and clarifies the relationship between different concepts and categories, which is usually used in the mid-term stage of in-depth interviews. Third, with the increase of interview data, differentiated sampling, on the basis of continuous induction and analysis, establishes theoretical assumptions and selects survey objects that are helpful to further revise or improve the theory for interviews, which is usually used in the later stage of in-depth interviews.

It is not easy for the data to reach saturation, which is generally understood as "no new genera or related themes appear", but saturation also refers to the formation and development of genera in their attributes and dimensions, including their forms of change and relationships with other concepts. Saturation can be considered only when each category or theme has been explored in a certain depth and various attributes or dimensions under different conditions have been found. After saturation, you cannot continue to collect data and add new attributes and dimensions to the category. Theoretical sampling starts from the first analysis and runs through the whole research process, only ends when the research process ends. Even at the end of the study, it is found that some genera are more fully developed than others, or that there is a logical break in the whole, which still requires further data collection.

4. Open Coding

Open coding is the initial step of data analysis rooted in the theory. Its purpose is to decompose the data, compare the process of events, and compare and find the similarity and difference of the initial patterns in the data, so as to complete the collection of data. Open coding requires reliable source of original data, detailed and complete content. On this basis, the original data are processed to give corresponding concepts to the data, and then similar concepts are summarized through comparative analysis and integration to extract more general research categories, so as to realize the conceptualization and categorization of research data [7].

In open coding, important words or phrases should be identified and marked from the original data to generate as many codes as possible. In open coding, we should have an open mind, abandon the inherent bias in our minds, and present all the data in their own state. It includes three stages: defining phenomena, defining concepts and categories naming.

(1) Defining phenomena. Using the method of micro analysis, the structure of the original data is disassembled and analyzed in detail. From the collected data, sentences related to the research topic and relatively independent and complete information are selected for annotation. Through sentence splitting, phrase splitting, vocabulary splitting and other different levels of segmentation methods, the original data is micro analyzed.

(2) Define concepts. Refine the data defined by the phenomenon again, and condense the concept through the detailed comparison between phenomena.

(3) Categories naming. The concept definition in the previous step is further summarized to obtain the upper category concept. The naming method of category concept can be created by researchers themselves or borrowed from existing research. It should be noted that the appropriate dimension and category names should not be determined by researchers before naming, but objectively "emerge" in the objective coding process.

5. Axial Coding

Axial coding is to discover and establish various relationships between various concepts and genera, so as to show the organic associations in text data. These associations can be causal, temporal, semantic, situational, similarity, difference, equivalence, type, structure, function, process, strategy, etc. On the basis of open coding, axial coding combs various concepts and their relationships, extracts abstract categories of higher-level research topics from existing categories by repeatedly analyzing the relationships between original concepts, and then returns to the original data to test whether the category extraction process is rigorous.

In axial coding, only one category is analyzed in depth at a time, and the correlation is found around one category. Therefore, it is also called "axis coding". With the deepening of the analysis, the relationship between various genera has become more and more specific and clear. When analyzing the relevance of conceptual genera, we should not only consider the relationship between them, but also explore the intentions and motivations of the researchers who express these conceptual genera. After the relationship between each group of conceptual genera is established, it is necessary to distinguish the major genera and minor genera. After different levels of genera are identified, the relationships between different genera are linked through comparison. After all the master-slave generic relationships have been established, the original data can be recombined in a new way.

6. Selective Coding

Selective coding is the process of selecting the core category, that is, the core category is systematically connected with other categories to verify the relationship between the core category and other categories. The core category plays an important role in outlining, which can combine all other categories with itself as the center, and analyze the internal relations through certain logical clues, so as to form a theory. The refining process of core category is similar to that of other categories, but the analysis level of core category is more abstract. The core category has become a guide for further data collection and theoretical sampling, with centrality, explanatory power, frequent reproducibility, easy to link with other variables, and significance [8]. Compared with other categories, the core category has a commanding nature, which can include most of the research results in a relatively broad theoretical range. The core category has the following characteristics.

(1) The core category occupies a central position in all categories, is more concentrated than all other categories, has a meaningful connection with most categories, and is most powerful to become the core of the data.

(2) The core category appears frequently in the data, or the content of this category must appear in the data as frequently as possible.

(3) The core category is easy to associate with other categories, which is not far fetched. The relationship with other categories is very rich in content. Because the core category is related to most categories and occurs repeatedly, it takes more time than other categories to reach theoretical saturation.

(4) Compared with other categories, core category is easier to develop into a general formal theory. Before becoming a theory, we need to carefully review the relevant data and test the core categories in as many substantive theoretical fields as possible.

(5) The core category allows for as much diversity as possible internally. By constantly coding the dimensions, attributes, conditions, consequences and strategies of the core category, its subordinate categories may become more complex.

7. Theoretical Saturation Test

The academic community has not formulated a unified standard for the indicators to measure theoretical saturation. At this stage, it relies more on subjective concept judgment, that is, researchers can ask the opinions of relevant expert leaders to evaluate whether the theory meets the standard and whether the data reaches saturation. Whether they are satisfied or not depends on their accumulated theoretical basis and experience and knowledge, and then judge whether the theory meets the standard of saturation.

In depth interview research, how many interviewees are needed to build a Grounded Theory? The sampling principle of Grounded Theory is "theory saturation principle". Grounded Theory believes that interview and analysis are mutually reinforcing and inseparable in in-depth interview research. After each interview, real-time data collation and analysis should be carried out to construct theoretical hypotheses on the basis of interview analysis, and then sample interviews should be continued according to theoretical hypotheses to further verify and improve theoretical hypotheses until researchers find that for clarifying concepts, determining categories and constructing theories, the information obtained from the interview began to repeat, and no new and important information appeared. At this time, it can be considered that we have reached the theoretical saturation, and there is no need to continue the interview.

8. Conclusions

Grounded Theory is the process of conceptualizing and theorizing the collected qualitative data through systematic analysis. In the research process, in order to obtain rich empirical data, in-depth interviews, on-site participation observation and text analysis were used. In the research of Grounded Theory, data plays a key role. How to collect data effectively and how to analyze the data and explain the significance are the core of Grounded Theory research method, which puts forward higher requirements for the theoretical level of researchers themselves. Moreover, using this method requires collecting data, writing memos, encoding data, and constantly interacting with data, all of which are time-consuming and laborious. In qualitative research, there are many different ways to construct theory. Researchers may adopt different approaches because of different schools of training, different ways of looking at problems, and different research situations. Therefore, we need to adopt an open and flexible attitude when considering the problem of theoretical construction. If there is a lack or omission in the process of data collection, it will lead to the loss of information and may eventually lead to the deviation in the induction of concepts and categories.

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