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Combining Narrative Analysis, Grounded Theory and Qualitative Data Analysis Software to Develop a Case Study Research

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Abstract

This paper outlines a triangulation approach to constructing theory that was employed in a case study research project. Analysis of evidence is one of the least developed and most difficult aspects of conducting case studies. This tends to be seen as a drawback by critics of the case study method. To overcome this obstacle, we bring in methods such as data saturation and analysis triangulation to strengthen our ability to interpret the findings. Meanwhile, the structure is systematically and logically presented with the assistance of analysis software.

Keywords: Analysis Triangulation, Research Objectivity, Grounded Theory, Narrative Analysis, Servitization

1. Introduction

Analysis of evidence is one of the least developed and most difficult aspects of doing case studies (Yin, 1994). As Flyvbjerg (2006, p.237) notes, case studies often contain a substantial element of narrative. Narratives may be difficult or impossible to summarize into neat scientific formulae, general propositions, and theories. This tends to be seen as a drawback by critics of the case study method.

Confronting these issues, this article discusses how a triangulation approach was applied to achieve validity and reliability in a case study research project (Nie, 2017). The research used data triangulation and saturation to ensure the objectivity of the data source, used the narrative analysis method for the story line and the grounded theory method for the theory line to ensure the analysis triangulation, and used the qualitative data analysis software MAXQDA to ensure the logical structure.

Triangulation is the combination of two or more data sources, investigators, methodological approaches, theoretical perspectives, or analytical methods within the same study (Thurmond, 2001). Creswell and Miller (2000) defined triangulation as a validity procedure in which researchers search for convergence among multiple and different sources of information to form themes or categories in a study. Wilson and Hutchison (1991) argued for the use of two qualitative approaches in the same study. They discussed the ways of knowing and data generation from each approach. Narrative analysis helped to generate rich narratives of the informants' truths, while grounded theory helped to generate information on concepts, constructs, and theories. The researchers concluded that the combined approaches provided the breadth and depth required in research.

Similarly, data objectivity concerns the triangulation of evidence rather than the ease of evidence gathering (Gerring, 2004). We used the comparison of primary data and secondary data to achieve the data triangulation. Furthermore, within the primary data set itself, we strengthened the triangulation by interviewing three parties: managers, employees and customers. Data saturation is another crucial issue to be considered. As Charmaz (2006) stated, data are saturated when gathering fresh data no longer sparks new theoretical insights or reveals new properties of core theoretical categories in grounded theory.

Structural principles and practical points are summarized in the paper to reveal how the above methods were applied in a recent case study research project (Nie, 2017).

2. The Structural Principles

This section discusses how to design research procedures, analysis structure and research objectivity to achieve validity and reliability in a case study research project.

2.1 Research procedures

Qualitative research focuses on how people or groups of people can have (somewhat) different ways of looking at reality (Hancock et al, 1998). However, researchers in the field of social science who are interested in studying human behavior have found it increasingly difficult to explain human behavior in quantifiable, measurable terms (Hancock et al., 1998;

Williamson, 2002). Grounded theory is a research approach by which theory is derived from data, systematically organized and analyzed through the research process. Data collection, analysis, and the final theory stand in close relationships to one another (Strauss and Corbin, 1998). The findings are extracted from the data to offer insight, enhance understanding, and provide a meaningful guide to action (Mays & Pope, 1995; Strauss, 1987).

We combined the flow of qualitative research and grounded theory procedures to form the analysis triangulation research procedure (Figure 1).

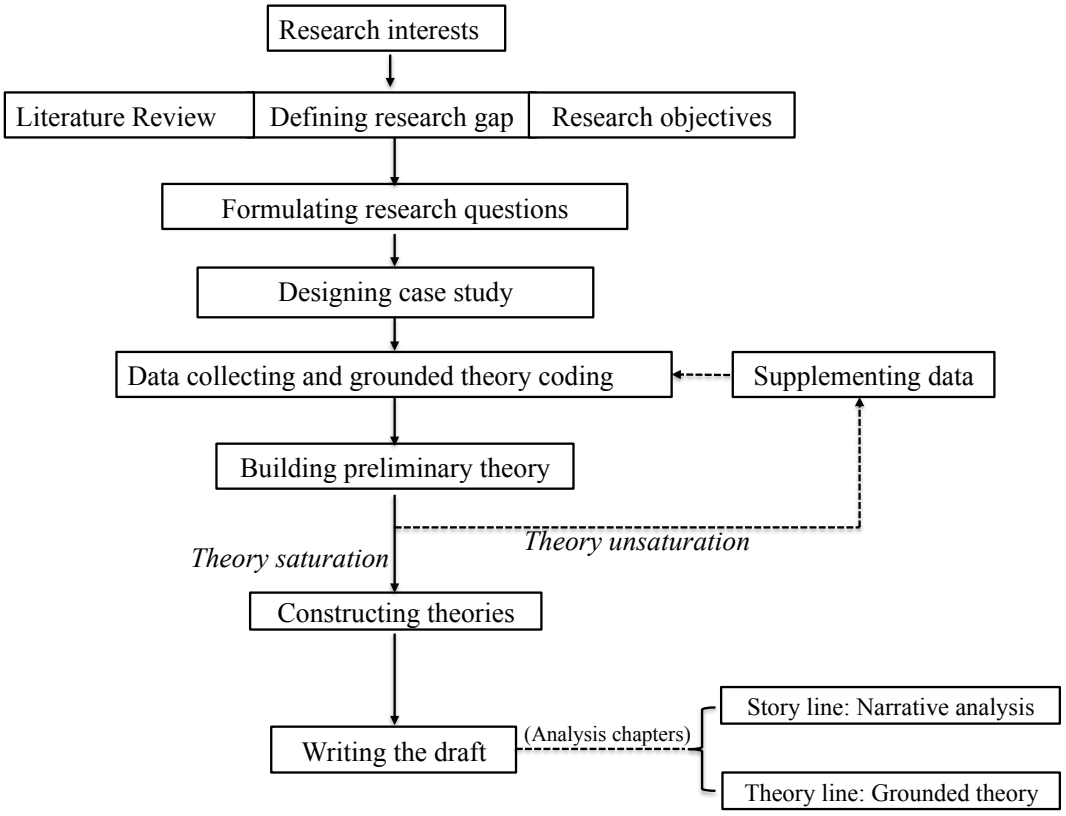


Figure 1. Qualitative research procedure with analysis triangulation

2.2 Analysis structure

Wilson and Hutchison (1991) argued for the use of two qualitative approaches in the same study to provide the breadth and depth required in research. We used narrative analysis and grounded theory to organize and analyze the data. To build a logical structure, MAXQDA software was used to assist the analysis process (Figure 2). The two analysis methods have different functions. Narrative texts contain a great deal of sociological information, and a great deal of our empirical evidence is in narrative form (Franzosi, 1998). Narrative analysis can provide a broad picture of the case. If there is no context, there will be no text. Narrative analysis can present both the text structure and its linguistic nuances. Grounded theory works in another way. It involves making discoveries about the data and pursuing these discoveries to construct an analysis (Charmaz, 2006).

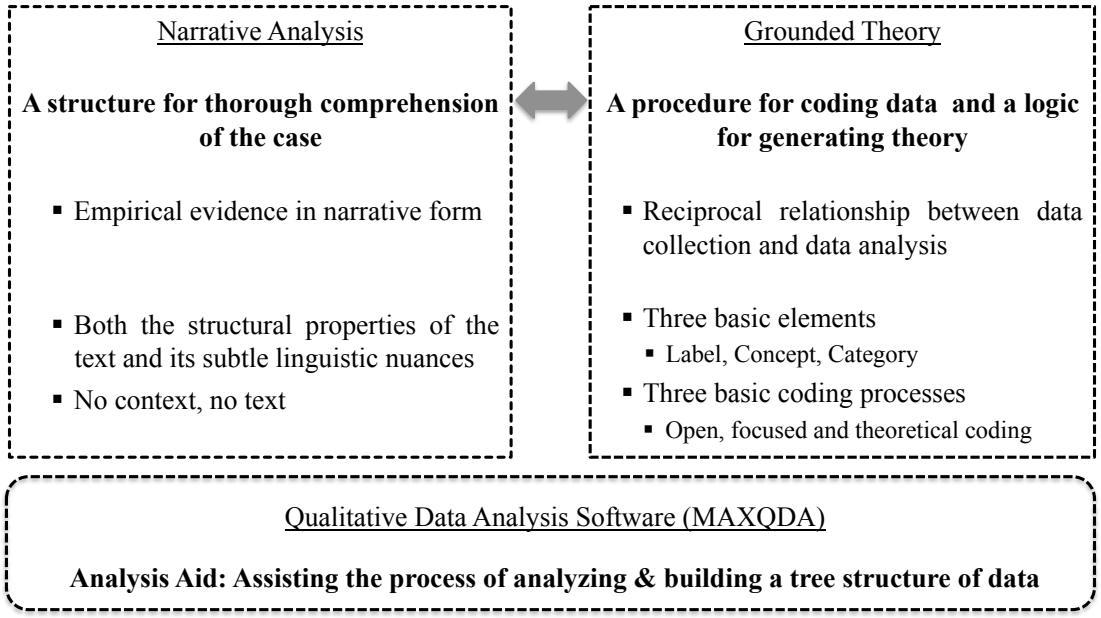


Figure 2: The combination methodology of Narrative Analysis and Grounded Theory

(1) Narrative analysis

Narrative analysis refers to a set of approaches to diverse kinds of texts that have in common a storied form (Riessman, 1993). Narrative analysis provides a holistic approach to discourse that preserves context and particularity. Advocates argue that narratives yield information that may not be available by other methods (Reis & Judd, 2000). A narrative can present a highly readable story that integrates and summarizes key information around a case study.

Riessman (1993) suggested several approaches. In practice, they are not mutually exclusive and can be combined.

- *Thematic analysis*

Emphasis is on the content of a text. This approach is useful for analyzing a number of cases and finding common thematic elements across participants and incidents.

- *Structural analysis*

Emphasis shifts to the telling by selecting particular narrative devices to make a story persuasive. The basic components of a narrative structure include the abstract, orientation (time, place, characters and situation), complicating action (the event sequence or plot), evaluation, resolution (the outcome of the plot) and a coda. Not all stories involve all the elements. The research situation constrains what can be narrated and shapes the way a story develops.

- *Interactional analysis*

Emphasis is on the dialogic process between the researcher and the interviewees. Attention to thematic content and narrative structure is not abandoned here, but the interest shifts to storytelling as a process of co-creation. The approach requires memos that include all participants in the conversation. This approach may be extended into performative analysis.

Narrative analysis is useful because researchers interpret the past rather than write it down as it was. They connect events and make them meaningful for audiences.

(2) Grounded theory

The research employed the methodology of grounded theory to construct and analyze the data. Grounded theory, introduced by Glaser and Strauss (1967), is a method of deriving theory from data that are systematically collected and analyzed through logic of research process. In the method, a researcher does not begin a study with a preconceived theory in mind. Instead, the research begins with an area of study and obtains the theory from the data. Data collection, analysis, and the final theory stand in close relationships to one another. The findings are extracted from the data to offer insight, enhance understanding, and provide a meaningful guide to action (Corbin and Strauss, 1990; Mays and Pope, 1995; Strauss, 1987).

One characteristic of grounded theory is the reciprocal relationship between data collection and data analysis. Data analysis does not start only when data collection is completed; instead, the two jobs are supposed to occur at the same time, which means collection leading to analysis and analysis leading to further collection. The constant comparative process, which is seen as the essence of grounded theory, presents this reciprocal relationship between data collection and analysis (Charmaz, 2006; Glaser & Strauss, 1967; Strauss, 1987).

The procedures of grounded theory are designed to develop a well-integrated set of concepts that provide a thorough theoretical explanation of the social phenomena under study (Corbin & Strauss, 1990). The main feature is the development of new theory by means of the narrowing-down process of data coding. The approach is phenomenological, but it goes beyond phenomenology because the explanations around the topic are used to develop new theories.

Through the grounded theory-based coding process, three basic elements, label, concept and category, are generated and used to build a rigorous and logical structure for the research data. The coding process includes open coding, focused coding and theoretical coding. The explanation of the three coding processes is presented in the second section with some application examples.

- *Label*

"Label" is a brief description given for the purpose of data identification. It is the preliminary level of abstracting used in the data analysis software.

- *Concept*

"Concept" is a conceptual label used as a potential indicator of phenomenon. Corbin and

Strauss (1990, p. 7) describe the "conceptualization of data" as follows:

Theories can't be built with actual incidents or activities as observed or reported; that is, from raw data. The incidents, events, happenings are taken as, or analyzed as, potential indicators of phenomena, which are thereby given conceptual labels. Only by comparing incidents and naming like phenomena with the same term can the theorist accumulate the basic units for theory.

- *Categories*

Corbin and Strauss (1990, p. 7) describe "categories" as follows:

Categories are higher in level and more abstract than the concepts they represent. They are generated through the same analytic process of making comparisons to highlight similarities and differences that are used to produce lower level concepts. Categories are the "cornerstones" of developing theory. They provide the means by which the theory can be integrated.

In this research, we employ the combinative approach of programmatic ground theory and constructivist grounded theory. That is, we understand the significance of the logic procedures defined by Strauss and Corbin (1998), but we take advantage of the co-constructive approach suggested in constructivist grounded theory (Charmaz, 2006).

(3) Qualitative data analysis software

Qualitative analysis involves conducting intensive study with extensive data. We can use computer-assisted data analysis to facilitate the research approaches described above. The advantage of software is that it allows for more efficient and effective work processes.

We selected MAXQDA to help with the organizational aspects of structuring research data. Although the case study specifically used the tools of MAXQDA, the same principles could be applied to other qualitative data analysis software.

The MAXQDA software serves to provide insights into qualitative data. Its tools for qualitative data and text analysis allow for the easy sorting, structuring, and analysis of large amounts of text or other data and facilitate the management of the resulting interpretations and evaluations. These tools assist the analyst in utilizing multiple strategies concurrently: reading, reflecting, memo writing, coding, linking and visualizing. Data interpretation and evaluation can be performed by sorting materials into groups, using a hierarchical coding system, defining variables, providing tabular overviews, and assigning colors and weights to text segments. Data can be repeatedly coded under trial and error until the theories are logically generated.

2.3 Research objectivity

Compared to quantitative research, qualitative research seems subjective. As some scholars have argued:

"*The use of quantitative criteria to evaluate qualitative research may create the impression that the latter is not academically rigorous.*" (Horsburgh, 2003, p. 307)

"*Qualitative methodology recognizes that the subjectivity of the researcher is intimately involved in scientific research.*" (Ratner, 2002, p. 3)

However, a key issue that arises with the recognition of subjectivity is how it affects objectivity (Ratner, 2002). Case study research comprises two major components: data collected from various sources and procedures to interpret and organize the data. Objective data and analysis triangulation are pursued to achieve the validity and reliability of the two components (Figure 3).

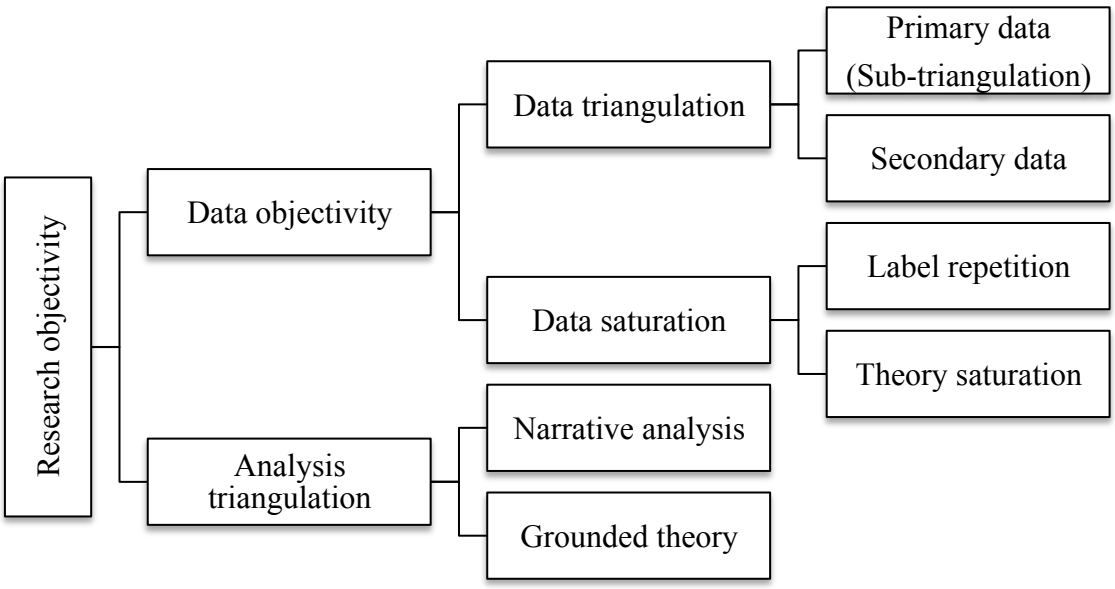


Figure 3. Measures for qualitative research objectivity

(1) Data objectivity

Data triangulation and data saturation are two important tactics used to ensure the objectivity of data.

- *Tactic 1: Data triangulation*

Data triangulation is used to ensure the objectivity of data sources. Its advantage is the nature and amount of data generated for interpretation (Thurmond, 2001). The comparison between primary data and secondary data provides a more comprehensive understanding of an issue. We collected the primary data from the Haier company from interviews, memos, annual internal meeting reports and documents (confidential-content-cut versions), management files,

pictures, videos and annual reports. Meanwhile, a great quantity of secondary data was collected from media coverage, books, and third-party data. We saved the two kinds of data separately in MAXQDA. This approach made it easier to examine coding specific to what the interviewees said about an event compared to the same topic in the secondary data.

Data objectivity concerns the triangulation of evidence rather than the ease of evidence gathering (Gerring, 2004). For example, in addition to the triangulation between the primary and secondary data, we interviewed not only managers but also employees and customers to realize triangulation within the primary data themselves.

Moreover, after we turned all the data (including audio records and SNS communications) into text format, we asked our colleagues to help check the data. Based on their comments, we supplemented the data by conducting interviews again. This approach decreased the potential for bias in collecting and analyzing data.

- *Tactic 2: Data saturation*

Data saturation includes data repetition and theory saturation.

The preliminary tactic is data (label) repetition. Any data related to customer interactions were collected until the data with similar meanings repeatedly appear to show that the related data are saturated. In the research, the data collection on the same type of event would be stopped only if data appeared repeatedly and nothing new occurred. Taking the screenshot from the MAXQDA analysis software as an example, the numbers in the red oval show the number of repetitions of the same events (see Figure 6 in the second section).

Theory saturation is more advanced. Grounded theory saturation is not the same as the repetition of the same events mentioned above. As we discussed above, theoretical saturation is a process of breaking down and analyzing data until no new theoretical insights are discerned from the data (Glaser and Strauss, 1967). The data should be collected and coded repeatedly by trial and error until they logically present the saturation theories. We stopped when gathering fresh data no longer sparked new theoretical insights.

(2) Analysis triangulation

Analysis triangulation is the combination of two or more methods of analyzing data. It is used to ensure the objectivity of analysis. Two kinds of methods, narrative analysis and data coding based on grounded theory, are employed to analyze the data. The relevant content has been discussed in detail in the section on the analysis structure.

The consistency of the findings from the two methods makes the research persuasive while keeping the narrative story interesting.

3. The practical points

The grounded theory-based triangulation approach above was applied in a case study research project (Nie, 2017). The research explored how manufacturers involve their customers to create knowledge and value via technological convergence. The study aimed to clarify the interactive infrastructure of customer interaction for driving the servitization of

manufacturing in the mobile Internet era.

With these objectives, the dissertation was structured as follows:

- Chapter 1 Introduction
- Chapter 2 Literature Review
- Chapter 3 Research Methodology and Implementation
- Chapter 4 Narrative Analysis and Discussion
- Chapter 5 Data Coding and Theoretical Proposition
- Chapter 6 Conclusions

The main points of chapters 3 and 4 have been discussed above. In this section, we mainly discuss the crucial practices relating to the contents of chapters 2 and 5.

3.1 Literature Review

Grounded theory views the role of literature differently than other methodologies. Glaser and Strauss (1967) urged novice grounded theorists to construct original theories and thus insisted on delaying the literature review to avoid seeing the world through the lens of extant theories. Dey (1999) similarly claimed that the researcher should begin to analyze data with as few predetermined ideas as possible to remain sensitive to the data and to achieve theoretical sensitivity.

However, this does not mean that the researcher should start with an empty head; instead, the researcher should keep an open mind. Through literature review, we aim to study achievements in current research, find the research gap and define the meaningful issues. Charmaz (2006) argued that the literature can also serve as a valuable source of comparison and analysis. Through comparison with other scholars' evidence and ideas, we may show where and how their ideas illuminate our theoretical categories and how our theory extends, transcends, or challenges dominant ideas.

To make the reviewed literature meaningful to the doctoral research, three kinds of work are developed. First, when we conduct a review, the literature should be classified based on our point of view. For example, the literature on service is classified under three perspectives, and servitization is organized in three stages. Second, we should create a summary of each kind of literature to express our understanding, which leads to finding the gap in the current research. Third, in the last section of the literature review, we should write a general summary to define the gap in the current literature and the objectives of our research. For example, in our research, we summarized with a table. Table 1 is one part of that table. We argue that the limitations and the gap in the current research bring us a new opportunity. Trying to find the answers to the following question is also a personal motivation for the research: product plus services is servitization or, in some conditions, competitive servitization (Nie and Kosaka, 2016). With this question in mind, we started the research.

Table 1. The example of summarizing the literature

Current research limitations	Opportunities
1.Technology Factor New IT is focused mainly on the interaction with machines that customers buy and little on interactions with customers.	? Products + Services = Servitization?
2. Human Factor Customer interaction is discussed mainly in regard to customer satisfaction, loyalty and needs tracing, etc., far from the issue of customer knowledge.	(New opportunities emerge through overcoming the limitations.)

3.2 Data Coding in Grounded Theory

Coding in grounded theory is a process of defining what is occurring in our data and beginning to analyze what it means to the research issues. It guides our thinking, and through theory, we begin to make sense of our data. To deepen the work of refining and downsizing, key words, memos, labels and concepts are gradually used to temporarily replace the raw data. Then, the task of analyzing the large amount of data is simplified into delving into these labels, concepts and categories, especially the intrinsic logic among them. Working with the data will become fast and smooth. As a consequence, contextual analyses of actions and events and generalizable theoretical statements are generated.

Charmaz (2006) suggested three main phases for the process: initial (or open) coding, focused coding and theoretical coding. During the initial coding, we name each word, line, or incident of data. We study the early data for analytic ideas to pursue in further data collection and analysis. Focused coding is a focused, selective phase to pinpoint and develop the most salient categories in large batches of data. Glaser (1978) introduced theoretical coding as conceptualizing the relationship of codes as hypotheses to be integrated into a theory.

To make the analysis process proceed logically and clearly, we submit the data to the qualitative analysis tool of MAXQDA software. All data are imported into the software. Data are interpreted and evaluated by sorting materials into labels, concepts, and categories and using a tree-structure coding system to analyze them.

Through the open and focused coding, the collected data are coded into concise units that are suitable for deep analysis. In this case, it is the process from the original data, through line-by-line coding, to generating 91 labels; further, 20 concepts; and much deeper, 9 categories (Figure 4). The three phases are analyzed as follows.

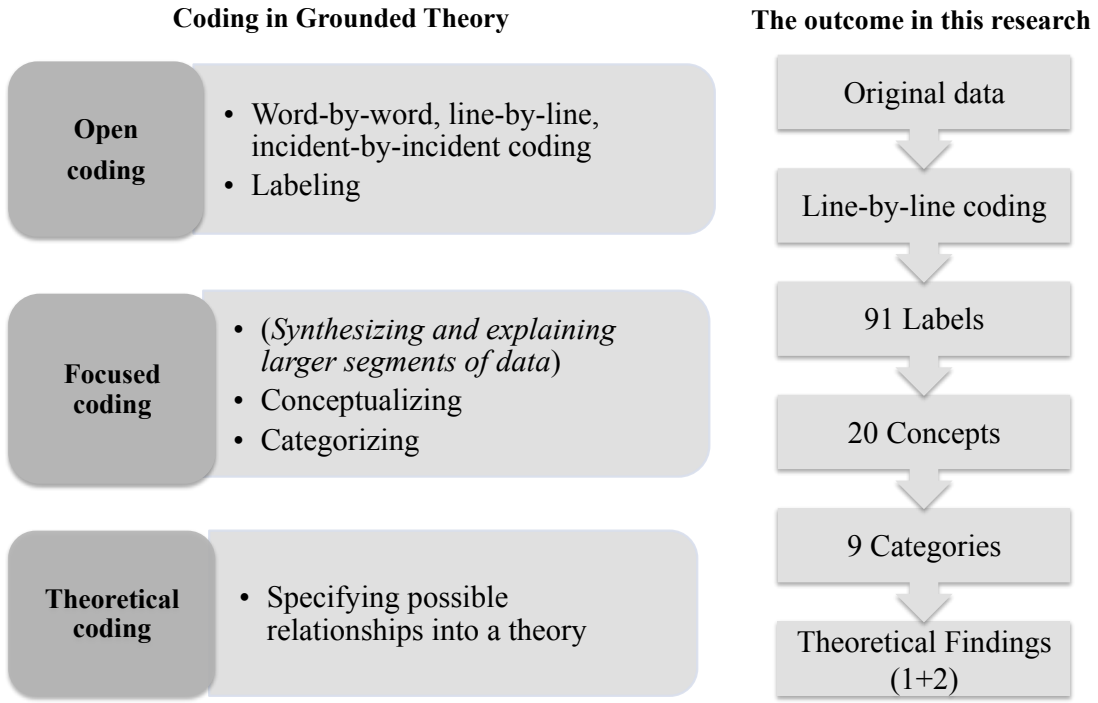


Figure 4: The outcomes of each coding process in Grounded Theory

(1) Open coding

Open coding should closely adhere to the data. We try to study and comprehend the true actions in each segment of data rather than applying preconceived concepts in the literature to the data. In team research, several members may code data separately and then compare and combine their different codes.

The following guidelines suggest how to perform open coding.

First step: making initial coding on a printed manuscript

As Charmaz (2006) suggested, the initial coding is made by word-by-word or line-by-line coding. Word-by-word coding means conducting nuanced coding and moving through research data word by word. Line-by-line coding means naming each line of the written data. Coding every line may seem to bean arbitrary exercise because not every line contains a complete sentence, and not every sentence may appear to be important. Nevertheless, it can be an enormously useful tool. Through coding each line of data, we gain insights into what kinds of data to collect next. For many grounded theorists, line-by-line coding is the first step in coding.

No matter which approach we use, it is sensible to make the initial coding on a printed manuscript. Otherwise, if we begin to use the analysis software with the phase of word-by-word or line-by-line coding, the data structure would become too complex and difficult to analyze in the later phases.

In this step, it is necessary to use as many in vivo codes as we can. “In vivo” refers to codes

based on the participants' special terms. These terms help us to preserve the participants' meanings of their views and actions in the coding itself.

Second step: Labeling data in the analysis software

Based on the understanding of our research data through word-by-word or line-by-line coding, we begin to label data in the qualitative data analysis software. A data label is a brief description given for purposes of identification. Labeling is a process of naming data more abstractly than word-by-word or line-by-line coding. However, labeling is not based on existing literature or theories. It is based solely on the meaning that emerges from the data.

In the research, the collected data were labeled with "a + Arabic numeral" and then named to define their meaning. We defined a total of 91 labels with the sequence a1 to a91. An example of naming the label"a2" is shown below.

An example of labeling:

1) *Labelling a text ("a2"):*

When it decided to make the latest innovation in corporate strategy in 2012, Haier had retained its place as the world's No.1 major appliances brand with an 8.6% retail volume share. Even holding such a great strength in marketing, Haier still decided to disrupt itself again because they thought the company would soon have many of the risks below if no innovative strategy were adopted (a2).

2) *Initializing a label with the essential meaning of its text ("a2: Having risk consciousness")*

The above text is mainly about Haier's risk consciousness because the innovation occurred when Haier was in the No.1 position, and its rivals had not yet started to enact such a disruptive reform.

Thus, we define the label "a2" with the meaning of "Having risk consciousness" in the MAXQDA analysis software (Figure 5).

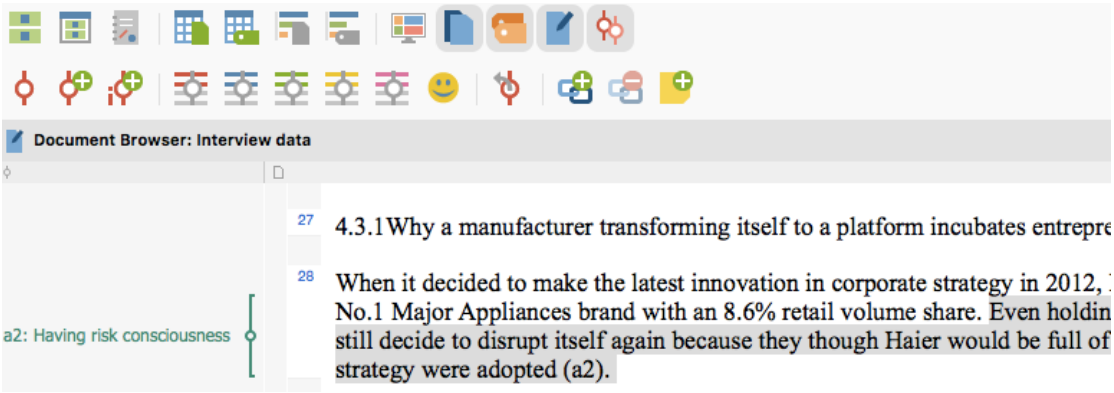


Figure 5. The labeling process in the MAXQDA software

With this kind of analysis, we built the connection between the raw data and the 91 labels:

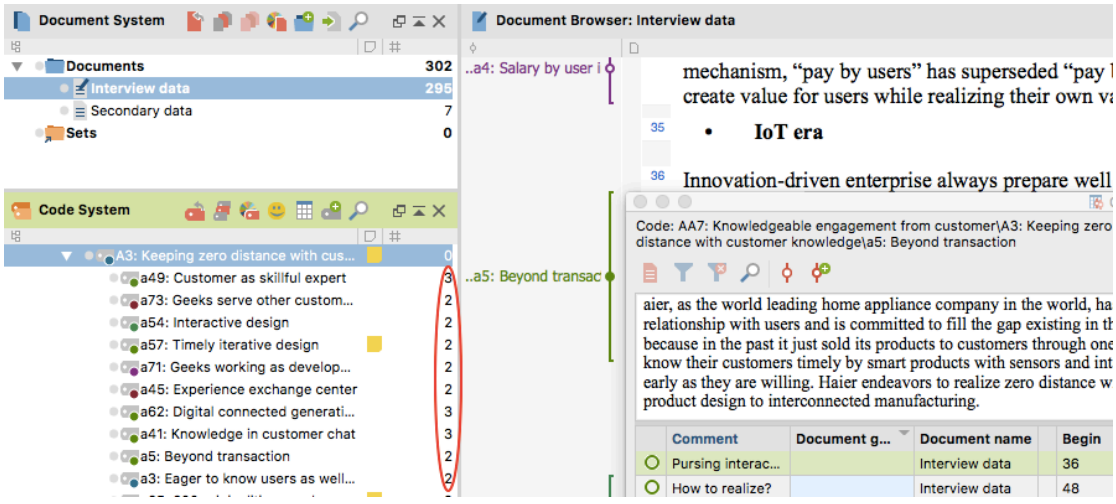
a1: Being capable of self-criticism; a2: Having risk consciousness; … a91: Motivating a positive circle of knowledge creation.

(2) Focused coding

Focused coding is the second major phase in coding. After we establish some strong analytic directions through open coding, we can begin focused coding to synthesize and explain larger segments of data. One goal is to create CONCEPT and CATEGORY to grasp the main points of the research. This means comparing labels with labels, sometimes even comparing labels with the initial codes or the raw data; analyzing their intrinsic relations; and synthesizing the highly related labels to define a new concept.

In the dissertation, on the basis of the above 91 labels, we further conceptualized these labels. We focus on analyzing the intrinsic relationship of all labels. The relevant labels are organized together temporarily to form a variety of groups. Then, we consider the meanings that each group reflects and the logic among them. If a label's meaning or logic is not suitable to be put in a certain group, then the label is removed from the group. The process is repeated until all groups have been given accurate meanings to form the corresponding concepts.

We defined 20 concepts. These concepts were respectively, respectively, marked with "A + Arabic numeral" from A1 to A20. For example, as illustrated in Figure 6, after repeated analysis, the group of labels including a65, a49, a73, a54, a57, a71, a45, a62, a41, a5, and a3 is defined as the concept "A3: Keeping zero distance from customer knowledge". The figure shows a snippet of the interview script on the right along with its associated concepts on the left. In the tree structure of A3, the out-of-sequence labels show the repeated process of analyzing.



* *The numbers in the red oval are the number of repetitions of the same events.*

Figure 6. The structure of a "concept" in the MAXQDA software

Concepts are the basic units of analysis (Corbinand Strauss, 1990). They play an important role in reflecting the main points of the data. It is indispensable to elaborate these concepts to

improve the readability of research. In the research, each concept contains three parts: a concise definition, correlative labels and a case-based explanation. An example is shown below.

Concept A3: Keeping zero distance with customer knowledge

1) Definition

Haier endeavors to realize zero distance from its customers and utilize their knowledge to differentiate customer experiences in the whole process of value creation.

2) Correlative labels

a65: 200 originalities per day; a49: Customer as skillful expert; a73: Geeks serve other customers; a54: Interactive design; a57: Timely iterative design; a71: Geeks working as developers; a45: Experience exchange center;a62: Digitally connected generation making timely iterations come true; a41: Knowledge in customer chat; a5: Beyond transaction; a3: Eager to know users as well as possible

3) Explanation: (Omitted)

On the basis of the 20 concepts, we created 9 categories in the MAXQDA software to further refine the data towards inducing the line of findings. These categories are marked with "AA + Arabic numeral" (Figure 7). Thus, the tree structure of the categories is completed in the qualitative analysis software. It is convenient to use the software to check the connections with the raw text, memos, audio recordings, pictures or other materials. The structure can be exported into Excel format.

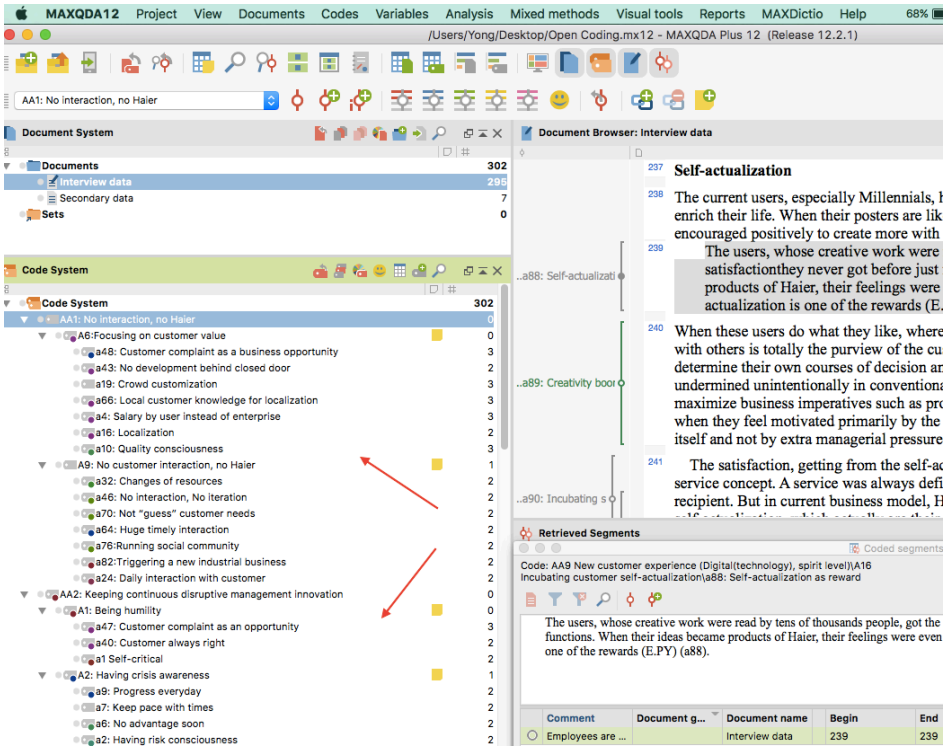


Figure 7. Using MAXQDA to create the tree structure of the data

Note also that it is a process of analyzing rather than merely hierarchically summarizing. The process of analyzing a code prompts a memo. Following up on ideas and questions that arise while one writes them will push the work forward (Charmaz, 2006, p.94). Writing memos should begin with the first coding sessions and continue to the end of the research (Corbin1and Strauss, 1990). In MAXQDA, we can write memos and attach them to any given data segment, media clip, table, image or code.

Moreover, the coding process is not a one-time event. Glaser and Strauss (1967) argued that analysis in grounded theory is the constant comparative method. To find the accurate concepts and category that reflect the essence of the case, it is necessary to repeatedly compare initial codes, labels, concepts and categories. In most cases, we need to implement new data to complete the process.

By this stage, the data are coded into concise units that are suitable for deep analysis. To deepen the work of refining and downsizing, labels, concepts and categories are gradually used to temporarily replace the raw data. Then, the task of analyzing the large amount of data is simplified into delving into the codes, especially the relationships and intrinsic logic among them.

(3) Theoretical coding

Charmaz (2006) argued that theoretical coding should be used to specify possible relationships among the categories developed in focused coding. Theoretical codes not only conceptualize how substantive codes are related but also move the analytic story in a theoretical direction.

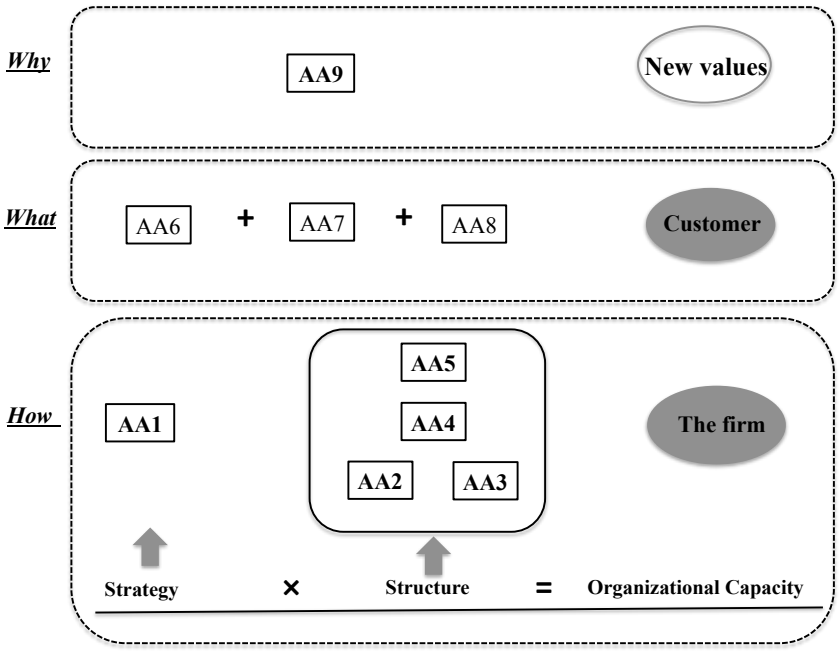


Figure 8. Analyzing the logical relationship of the categories

In the dissertation, through analysis of the logic among the nine categories, the categories were structured on How, What and Why levels (Figure 8). We further compared them and analyzed their associations with other codes until we could find the saturated theory to describe the information system infrastructure of customer interaction.

Finally, as Eisenhardt (1989, p.545) argued, tying the emergent theory to the existing literature enhances the internal validity, generalizability, and theoretical level of theory building from case study research. While linking results to the literature is important in most research, it is particularly crucial in theory-building research because the findings often rest on a very limited number of cases. In this situation, any further corroboration of internal validity or generalizability is an important improvement.

4. Conclusions

This paper discusses how a triangulation approach was applied to achieve validity and reliability in a case study research project (Nie, 2017). We combine the flow of qualitative research and grounded theory procedures to form the analysis triangulation research procedure. We use data triangulation and saturation to ensure the objectivity of the data source, use the narrative analysis method for the story line and the grounded theory method for the theory line to ensure the analysis triangulation, and use the qualitative data analysis software to ensure the logical structure.

The combination makes case study research persuasive while keeping its narrative story interesting.

5. Limitation and Reflection

This paper discusses the advantage of combining narrative analysis, grounded theory and qualitative data analysis software to achieve validity and reliability in a case study research. However, the combination further augments the workload since the process of grounded theory research alone is extremely time consuming.

Note that if the triangulation analysis method is used to develop research, some kind of qualitative data analysis software must be used to manage the various data and the analysis process. I was rescued from despair in the research when I began to utilize the software. It is worthwhile even though some researchers might need a long time to learn how to use the computer-assisted software.

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References

Charmaz, K. (2006). *Constructing grounded theory. A practical Guide Through Qualitative Analysis.* Sage: London, UK.

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative sociology*, *13*(1), 3-21. https://doi.org/10.1007/BF00988593

Creswell, J. W. & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice, 39*(3), 124-131. https://doi.org/10.1207/s15430421tip3903_2

Dey, I. (1999). *Grounding grounded theory: Guidelines for qualitative inquiry*. Academic Press. https://doi.org/10.1016/b978-012214640-4/50011-5

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of management review*, *14*(4), 532-550.

Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative inquiry*, *12*(2), 219-245. https://doi.org/10.1177/1077800405284363

Franzosi, R. (1998). Narrative analysis—or why (and how) sociologists should be interested in narrative. *Annual review of sociology*, *24*(1), 517-554. https://doi.org/10.1146/annurev.soc.24.1.517

Gerring, J. (2004). What is a case study and what is it good for?.*American political science review*, *98*(02), 341-354. https://doi.org/10.1017/S0003055404001182

Glaser, B. G. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Sociology Pr.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.

Hancock, B., Ockleford, E., & Windridge, K. (1998). *An introduction to qualitative research*. Nottingham: Trent focus group.

Horsburgh, D. (2003). Evaluation of qualitative research.*Journal of clinical nursing*, *12*(2), p.307. https://doi.org/10.1046/j.1365-2702.2003.00683.x

Mays, N., & Pope, C. (1995). Rigour and qualitative research.*BMJ: British Medical Journal*, *311*(6997), 109. https://doi.org/10.1136/bmj.311.6997.109

Nie, Y. (2017). *An IT system infrastructure promoting interaction with customers for manufacturing servitization: A case study of Haier.* Unpublished doctoral dissertation, Japan Advanced Institute of Science and Technology, Japan.

Nie, Y., & Kosaka, M. (2016). Customer self-service platform: the next practice for servitization of manufacturing. *International Journal of Services and Operations Management*, *25*(2), 259-273. https://doi.org/10.1504/IJSOM.2016.078896

Ratner, C. (2002). Subjectivity and objectivity in qualitative methodology. In Forum Qualitative Sozialforschung /Forum: *Qualitative Social Research, 3*(3).

Reis, H. T., & Judd, C. M. (2000). *Handbook of research methods in social and personality psychology*. Cambridge University Press.

Riessman, C. K. (1993). *Narrative analysis* (Vol. 30). Sage.

Strauss, A. (1987). *Qualitative analysis for social scientists*. New York: Cambridge University Press. https://doi.org/10.1017/CBO9780511557842

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications, Inc.

Thurmond, V. A. (2001). The point of triangulation.*Journal of nursing scholarship*, *33*(3), 253-258. https://doi.org/10.1111/j.1547-5069.2001.00253.x

Williamson, K. (2002). *Research methods for students, academics and professionals: Information management and systems*. Elsevier. https://doi.org/10.1533/9781780634203

Wilson, H.S., & Hutchinson, S.A. (1991). Triangulation of qualitative methods: Heideggerian hermeneutics and grounded theory. *Qualitative Health Research, 1*(2), 263-276. https://doi.org/10.1177/104973239100100206

Yin, R. K. (1994). *Case study research: design and methods.* Sage: London, UK.