

Chapter: Qualitative Data Analysis

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Abstract

Qualitative research involves establishing patterns observed in a data set as opposed to quantifying magnitudes. Qualitative research provides a platform for the formulation of ideas and consequently, such techniques within this realm are flexible to encourage the exploration of themes and topics. The aim of this chapter is to focus on the post data collection needs of a qualitative researcher. Therefore, it will provide a summary of common qualitative data collection methods, data sources, analytical techniques, coding processes, as well as a consideration of reliability and validity from a qualitative perspective. By providing insights into each of these stages, future qualitative researchers of supply chain management should feel comfortable and confident in their research processes.

1. Introduction

The power of qualitative research is significant as it allows us to delve deep into the human mind. We can explore people's opinions, attitudes, thoughts, and feelings and gain a richness of understanding that can't always be achieved through alternative approaches. Qualitative studies contrast to quantitative studies in that they aim to establish patterns observed in a data set as opposed to quantifying magnitudes (Bryman and Bell, 2015). Qualitative research allows the formulation of ideas, and consequently, such techniques within this realm are flexible to encourage the exploration of themes and topics (Creswell, 2012). Another useful aspect of qualitative approaches is the ability to capture both objective and subjective factors, which quantitative scales don't always allow (Tashakkori and Teddlie, 2003, Creswell, 2012).

The aim of this chapter is to focus on the post data collection needs of a qualitative researcher. Therefore, it will provide a summary of common qualitative data collection methods, data sources, coding processes, analytical techniques, as well as a consideration of reliability and validity from a qualitative perspective. It is worth highlighting at this stage that the concepts covered in this chapter are broad and therefore the purpose is to provide a useful overview of the fundamentals. Where necessary, we will signpost you to further texts and resources which will enable you to explore these in more depth. This chapter will provide a useful and practical guide to successful analysis and interpretation of qualitative data in your supply chain management research.

It is important to recognise that some of the terms related to research are used inconsistently, interchangeably, and sometimes incorrectly, therefore it is useful to take a critical approach when reading information from various sources (we do not exclude the current chapter in that!). Ultimately, in your own writing and research, consistency with the terminologies used and ensuring definitions are clear should allow you to mitigate any potential confusion. One of the main areas we foresee misunderstanding and inconsistencies is in distinguishing between methodology, methods (data collection), and analysis. Therefore, before we explore some of these from a qualitative perspective, we will aim to provide some clarity.

As far as the authors are concerned, the term 'methodology' is probably the most incorrectly and interchangeably used. It is often used to refer to both methodologies and specific data collection methods. Research methodology / methodologies are the broad approaches underpinning a study

which help provide justification and rationale for specific research methods (Collis and Hussey, 2013). Research methods are the specific procedural tools used to generate and collect data (Collis and Hussey, 2013). Consequently, one leads to another; your philosophical position (which includes considerations of axiology, ontology, and epistemology) and assumptions as a researcher will dictate your methodology and that will in turn dictate your chosen methods (Howell, 2012). Once those aspects are decided, you can then select appropriate data sources and analytical techniques. These distinctions and connections have been visualised in Figure 1.

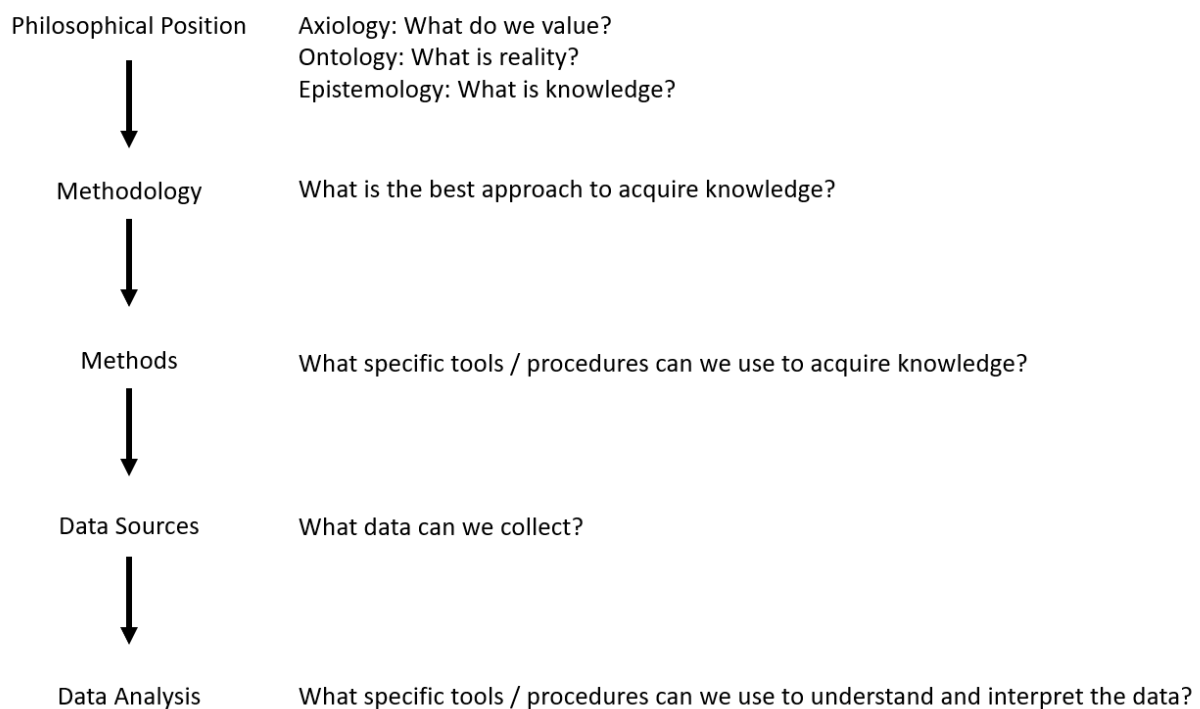


Figure 1: Distinguishing between essential research terms.

Created by the author, based on information from Bryman and Bell (2015) and Howell (2012).

Having clarified these terms, the remainder of the chapter will explore some of the stages outlined in Figure 1 in more detail, albeit from a qualitative perspective. It is beyond the scope of this chapter to consider all the stages, and indeed principles around philosophical position and methodologies are covered in other sections of this handbook, therefore the focus will be on the latter stages, i.e., data collection methods, data sources, and data analysis.

2. Typical Qualitative Data Collection Methods

In this section of the chapter, we will summarise the core qualitative data collection methods, as each stage of the research procedure impacts the next, and every choice made will shape the final outputs, analysis, interpretations, and conclusions. The specific methods for data collection that fall under a qualitative research approach don't allow for large groups of the population to be sampled. Instead, greater depth of insight is obtained from smaller groups and sometimes these processes can be used to develop ideas and hypotheses for quantitative research (Tashakkori and Teddlie, 2003). Whilst there are multiple qualitative data collection methods available, we will focus on the most typically used in the social sciences: interviews, focus groups, and participant observations (Creswell, 2012). In addition to the three core data collection methods, we will also briefly consider sampling approaches here too.

2.1 Interviews

A useful definition of an interview is a consultation, usually between two people, in which prepared questions are asked by an interviewer to a respondent who provides answers (Frey and Oishi, 1995). Interviews are the most widely employed method in qualitative research (Creswell, 2012, Bryman and Bell, 2015). The adaptable nature of the interview process encourages participant's opinions and thoughts to emerge naturally (Bryman and Bell, 2015). Interviews provide an exploratory platform for participants to discuss the main concepts, issues, and themes underpinning the research project, as well as offer them an opportunity to voice their opinions. Interviews are sometimes chosen as opposed to other methods, for example focus groups, to ensure participants responses can be kept confidential. This is particularly important if the topics under discussion are very personal or sensitive and helps to ensure participants feel comfortable and reassured during the process (Creswell, 2012). In addition, if your study and research objectives are built around exploring the opinions of individuals as opposed to understanding group dynamics or the interactions between people, then interviews can be a more suitable choice (Creswell, 2012). An example of how interviews can be used in supply chain management research is provided by Scala and Lindsay (2021) who investigated supply chain resilience during the Covid-19 pandemic using semi-structured interviews.

In terms of conducting interviews, the three main approaches are unstructured, semi-structured, or structured. Unstructured interviews involve questions which have not been pre-planned or prepared beforehand and tend to utilise open-ended questions. Semi-structured interviews may have some set / prepared questions that are asked to all participants, but the interviewer will also take a flexible approach and react to the responses given, potentially probing for further information and clarification. Structured interviews utilise fully planned and set questions, which are asked in the same way, to all participants (more akin to a questionnaire).

2.2 Focus Groups

A focus group can be defined as “a method for collecting data, whereby selected participants discuss their reactions and feelings about a product, service, situation or concept, under the guidance of a group leader (sometimes referred to as a moderator)” (Collis and Hussey, 2013, pg. 155). Whilst the origins of focus groups stem from social psychology and have been used to explore political propaganda and indeed been adopted by activists, they are probably more synonymous with marketing and product development research (Merton and Kendall, 1946). In contrast to individual interviews, focus groups can explore the ways in which people interact and collectively formulate opinions, ideas, and information. It is this element that can be seen as a core advantage of focus groups, they can generate a more naturalistic, even authentic understanding, as people discuss in a conversational manner, but can also be challenged over what they are saying (Bryman and Bell, 2015). In this case the very strength of the focus group approach can also be its disadvantage in that some people may be reluctant to share all their (sometimes intimate) thoughts due to the presence of others. In addition, as multiple people may be speaking at the same time, distinguishing each voice, and transcribing verbatim can be much more challenging for the researcher(s) in comparison to individual interviews. Although less commonly used, focus groups can still be useful in supply chain research when investigating common definitions of how companies operate or how they develop their relationships with suppliers. Dekkers et al (2020) provide an example using focus group for delineating relevant theories to supply chain finance.

To conduct focus groups, it is useful to have more than one person involved. You will need a ‘group leader’ or ‘moderator’ who will generally run the session and ask questions, but also a ‘facilitator’ who is responsible for the recording (audio and / or video) and note taking. In terms of the number of focus groups and size of groups, these are decisions you will need to consider carefully and

provide justification for. In terms of group size, the norm tends to be around 4 to 10 members (Krueger and Casey, 2009). The number of focus groups conducted is more varied and therefore you will need to find suitable sources to support your final choice.

2.3 Participant Observation

Unlike interviews or focus groups, definitions around participant observations are more ambiguous, however we can see it as “the immersion of a researcher in a group of people for an extended period of time, observing behaviour, listening to what is said in conversations, and asking questions” (Bryman and Bell, 2015, pg. 444). Observations can be conducted in a natural or contrived (often laboratory) setting, and this choice will often depend on your philosophical assumptions, research approach, and objectives. A key advantage of participant observation particularly in natural settings, is that it is probably the most authentic encapsulation of human behaviour, interactions, and conversations, therefore the richness of understanding can be significant and highly valuable. The disadvantage is that obtaining access to these settings can be difficult, costly, and timely. Observation becomes useful in many supply chain research projects, often in combination with other methods as exemplified by Adamides et al (2012).

When conducting participant observations, not only will you need to factor in potential access issues, but you will also need to consider choices around overt and covert observations, active and passive participation, and how you capture the data. For example, whether to use field notes, audio recordings, video recordings, or any combination of these. As you will realise, there are trade-offs at every point, but one of the key elements to good research practice is explaining and justifying these choices thoroughly, with high quality sources and evidence.

You may sometimes see participant observation being referred to as Ethnography, however, the authors would argue that this is the broader methodology as opposed to a specific data collection method. Indeed, Ethnography encompasses both the research process and the written outcome of the research.

2.4 Sampling

Unlike quantitative studies “there are no computations or power analyses that can be done in qualitative research to determine the minimum number of sampling units required” (Sandelowski, 1995, p. 179). Instead, the aim should be to ensure that the sample size is small enough to gain depth of understanding of the concepts, yet large enough to provide novelty to the issues being explored (Sandelowski, 1995). Reviews of academic articles and book chapters looking at sampling numbers in qualitative research usually make recommendations in the range of 5 to 50 participants as adequate (Mason, 2010). It is suggested that the size of a sample depends on the aim of the study, usage of established theory, and quality of the outputs (Mason, 2010). One approach is to continue to develop material and collect data (for instance further interviews) until nothing novel emerges, this is often referred to as data saturation. Therefore, to some extent sampling is guided by an element of subjectivity combined with researcher experience in that the data is assessed and analysed in relation to the aims and objectives of the research. Data collection consequently ceases when the researcher has established that no additional information or depth of understanding will arise (Sandelowski, 1995). Whilst the idea of reaching data saturation is commonly accepted amongst qualitative researchers, there is little guidance as to how this should be implemented practically. Ultimately, it is not possible to truly know when data saturation has been reached, instead a ‘feel’ that no further themes or ideas are emerging is required. Consequently, a degree of common sense, strong familiarisation of the data, and time / resource limits can be utilised to determine when data collection should conclude.

3. Typical Qualitative Data Sources

An important consideration in any piece of research is the source(s) of data. In qualitative approaches there are a wide range of data sources available. A full exploration of every potential data source is beyond the scope of this chapter; however, we will look at some of the more commonly utilised types. These include interview and focus group transcripts, individual / personal documents, public documents, organisational documents, media sources, visual images, and online platforms.

3.1 Interview / Focus Group Transcripts

As we have stated previously in this chapter, interviews and focus groups tend to be the more commonly used data collection methods and consequently, the resulting transcripts from these are some of the more commonly used data sources too. Good practice dictates that all interviews and focus groups should be recorded (at least the audio) and after completion, the researcher will need to transcribe the recordings. The words or phrases within the transcripts essentially then become the raw data, which will be used for the analysis stage. Transcribing and checking the accuracy of the outputs is time consuming, but essential to ensure precision, validity, and robustness. Thankfully, there are software packages which can help with the transcribing element, they do have varying degrees of precision and a final check through is always recommended and can aid with data immersion as well as better analysis, understanding, and interpretations.

3.2 Individual / Personal Documents

Diaries and letters are some common examples of personal documents that might be used in qualitative research. Participants may be asked to keep diaries over a certain time frame or write a letter for a specific purpose and these are then analysed for a specific research purpose. Or existing diaries and communications may be analysed retrospectively. One of the key differences between letters and diaries is the audience. Letters are written to other people and can be formal or informal, whereas diaries are predominantly written for the individual themselves. Whilst on the one hand these types of documents can provide in-depth insights to people's mindsets, opinions, and feelings, the limitations around these stems from authenticity, factual accuracy, and truth. Furthermore, representation can potentially be limited, as the information might be very individualised and personal, therefore the findings may not easily generalise to the wider population.

3.3 Public Documents

A public document is a very broad term used to describe an extensive range of data sources, but examples can include acts of parliament, governmental documents, legislation and policy documents, birth, marriage, and death certificates, minutes from official meetings, and financial reports (Bryman and Bell, 2015). One of the main advantages of these documents is the fact that they are readily available and in the public domain, which means access is usually very straightforward and prompt. They can also be particularly useful if you need to investigate a specific event or company. One of the disadvantages is that the information in this category is potentially vast, therefore the researcher(s) will need to decide on what should and should not be included in the final sample. Such decisions might be based on a date range of publication, or the source itself (author, official body, etc). In addition, as with all secondary data sources, there can be potential issues with accuracy and intent, the latter referring to the point that the original data might have been collected for another purpose independent of the research objectives, consequently, the researchers may not be able to obtain answers to all their questions.

3.4 Organisational Documents

Organisational or company documents may fall under the public or private document domain. Standard documents that should usually be made public include annual reports, mission statements, shareholder reports, CEO speeches, and press releases. Other documents such as newsletters, organisational charts, meeting minutes, personnel information, policy statements etc may not be publicly available. Whilst the latter are likely to be more insightful, access for researchers may be limited, therefore the publicly available ones may be the only option. These types of documents can again be useful if you are looking at a specific company, sector, or taking a case study approach.

3.5 Media Sources

If you were to undertake a research project to explore the portrayal of a specific concept in the media, for instance sustainable supply chain management, several decisions regarding your sample would need to be made. Firstly, which core sources would you include, newspapers, magazines, radio, television, online media outlets, social media platforms? If you were to select one of these groups, for example newspapers, you would then need to decide, which type of newspapers would be included, for instance, print, online, local, national, global, free, or paid. Once you had decided

that you would then need to consider the date range of publication for the sampling process. If you were looking at a particular event, then this might be quite a narrow date range, however, if you were looking at a very specific topic and how it has changed over time, then your date range would be much broader. There will almost certainly be additional questions you would need to ask or other aspects to consider, so it is important to know these examples are not exhaustive, however, the point is that you need to be able to demonstrate and justify your choice of sample.

3.6 Visual Images

The use of visual imagery in business and management research is growing, although at the time of writing this chapter, less utilised in the supply chain management literature, which highlights a potential gap for exploration. Traditionally visual images have included photographs, however, as technology has evolved so has the type of visual information available to us. Visual images can include content from websites, social media platforms, film, television, video clips (e.g., You Tube videos), and even paintings and artwork (the latter may seem slightly more farfetched, but with interdisciplinary research opportunities increasing and the drive to find more creative solutions to problems, don't be afraid to think beyond the more traditional approaches). Visual imagery is arguably one of the more subjective data sources and that very notion can be a key advantage and disadvantage for researchers' depending on their philosophical viewpoint. A further advantage stems again from access, with so much material available through the Internet, it can be relatively easy to find visual images that suit your research purposes. As with any work, it is of course always important to gain permission and give credit to the originator. This is also a good point to mention that often data sources are not used singularly. Visual images for example can sometimes be used in individual interviews to help generate discussions or in participant observations (for example, there is an emerging field called Visual Ethnography).

3.7 Online Platforms

We've just mentioned that visual images can include graphics and other images from websites, videos, and social media platforms, but we can also obtain numerical, text, and audio data from these online platforms too. These may not be the most utilised types of data in supply chain management, however interest and usage of these are increasing. Nonvisual data sources from online platforms can include analytics, written captions or comments, information from Instagram

or Facebook posts and stories, and even the usage of emoji communication. There are also emerging branches of Ethnography such as Digital Ethnography and Netnography. Digital Ethnography is seen as an extension to the more traditional and offline approaches of Ethnography and is arguably more flexible in its implementation (Markham, 2005), whereas Netnography has a more specific set of research practices (Kozinets, 2002). Whilst both approaches are currently absent from the supply chain management literature, there is potential scope for their usage. For example, comments and conversations from internal company online forums could be collected and analysed. In addition, if you wanted to explore key elements of supply chain relationships (e.g., trust, commitment) perhaps such digital communications amongst supply chain networks and sociocultural online spaces could be utilised. Or staying closer to the marketing roots of Netnography you could use it to explore online social groups of consumers to gain insights into demand fluctuations related to specific product or services to help better manage supply chains.

4. Typical Qualitative Analytical Techniques

Having considered the methods and sources of data in qualitative research, we can now explore the various ways to approach the analysis of this data. As with the other sections of this chapter we will start with the more commonly utilised approaches before considering some alternatives. An important debate among academics is whether content analysis is a method or an analytical approach. If we stick with our previously discussed (in the introduction section of this chapter) understanding of the term 'method' as being a way to collect data, then content analysis does not fit that category as it does not generate data per se. That said, some have proposed that it is a research method because it has a set procedure and distinct approach to data analysis (Bryman and Bell, 2015). If you choose to adopt this approach, then as a researcher, you will need to ascertain what side of the debate you agree with and importantly, provide rationale and explanation for that decision.

4.1 Distinguishing Content Analysis and Thematic Analysis

Before delving into the specifics of content analysis and thematic analysis, it is useful to distinguish between the two and address any areas of confusion, potentially driven by inconsistent terminology usage throughout the published literature and textbooks. To aid our understanding of these two analytical techniques it is important to be clear on the objectives of qualitative data analysis. According to Braun and Clarke, 2006, research findings can be placed on a continuum, based on the degree of transformation of data during the analysis process, from description to interpretation. Although content analysis is commonly used in qualitative research approaches, the underlying origins of this approach are quantitative. The process involves quantifying the content (words / codes) of documents and texts, in an organised and replicable manner (Bryman and Bell, 2015). Therefore, most would argue that content analysis falls towards the descriptive end of the continuum as it describes the frequency and regularity of the content. In contrast, thematic analysis is at the interpretative end of the spectrum as it seeks ways to identify and report patterns (themes) within the data (Braun and Clarke, 2006). Through this process you are looking for connections and relationships between the words and grouping 'words' or 'codes' together.

Another aspect to consider, which also helps to distinguish between content and thematic analysis, is the specific process of analysis and how the data is viewed. This links to the idea that the content

we are analysing can be manifest or latent. Manifest content is data or evidence that can be directly seen or observed, for example the words in an interview transcript. Latent content refers to the underlying meaning of the content, so the interpretation drawn from the data. If we continue with the notion that content analysis tends to be more descriptive, whereas thematic analysis tends to be more interpretative, then the former will likely utilise manifest content and the latter, latent content. Of course, there may be instances where your chosen approach is not so straightforward as this. Some argue that with a content analysis approach you can choose to look at either manifest or latent content, and indeed thematic analysis can often be said to use a combination of latent and manifest information (Braun and Clarke, 2006).

Whether you take a content analysis approach that is more aligned with quantifying qualitative data and describing the content in an objective manner, or a thematic approach that looks to interpret the information in a more subjective way, may depend on your underlying philosophical assumption. A positivist may lean towards the quantification element of content analysis, whereas an interpretivist (or constructivist) may lean towards a thematic analytical approach. In summary, content analysis can be useful if you are conducting exploratory work where not much is known about the topic or concept(s), or if you are seeking to ascertain the frequency of concepts across the sampled data set. Alternatively, thematic analysis is potentially more flexible and allows you to identify themes that extend across an entire data set, and create rich, deep insights from interpretation. For some research projects, it may be that you utilise both content and thematic analysis. Again, you have plenty of options available to you, the key is in sound justification of your final choices.

4.2 Content Analysis

As we have seen, content analysis is a widely used qualitative analysis technique and the core principles of content analysis are to be objective, systematic, and replicable. It involves exploring documented information in the form of texts, media, or even physical items using pre-determined categories (Berelson, 1952). Hsieh and Shannon (2005) divided the processes behind content analysis into three types, conventional, directed, or summative. They stated that the differences between these three types lie in the approaches to coding and generating codes. In conventional content analysis, categories emerge directly from the data (text or words). With a directed approach, the coding is guided by established theory or frameworks. Finally, summative approach

involves counting or quantifying keywords or content, followed by the interpretation of the underlying context. Therefore, this latter summative approach, some may argue is strictly a combination of content and thematic.

Some of the benefits of content analysis include the fact that it is relatively straightforward to conduct. If a researcher is perhaps inexperienced in qualitative approaches, counting the frequency of words found within the data set can be a useful way to start developing some understanding, yet it still provides some useful insights as to the importance of a particular object, idea, or concept. Content analysis is also unobtrusive and can be used with both primary and secondary sources of data. It is transparent and replicable which aids the robustness of the process, and it is flexible enough to be used across multiple data types (Bryman and Bell, 2015). In contrast there are also some limitations. The analysis is dictated by the data source, therefore if the chosen documents are incomplete, inauthentic, or lacking credibility, then this will in turn impact the results. It must be said however, that this is a potential issue for many qualitative analytical approaches and not just content analysis. Another limitation links back to the quantitative underpinning of content analysis. By falling into the descriptive realm, this approach may be useful to understand the 'what' of a situation, but not necessarily the 'why'. Lastly, some academics state that content analysis can be considered 'atheoretical'. Of course, this really depends on your philosophical views and the nature of the topic under investigation.

4.3 Thematic Analysis

Thematic analysis is a technique which "allows the researcher to see and make sense of collective or shared meanings and experiences" (Braun and Clarke, 2006, pg. 57). According to Guest et al (2011) thematic analysis goes beyond a content analysis approach where you're counting explicit words or phrases and instead looks to identify and describe both implicit (latent) and explicit (manifest) ideas within the data, which in turn generate themes (Guest, et al., 2011). In other words, it draws on core 'themes' amongst the data set, be that published text or respondents' dialogue. A useful example of thematic analysis in the supply chain literature is provided by Sodhi and Tang (2018), here they utilised thematic analysis to explore the published literature around corporate social sustainability in supply chains.

It has been suggested that thematic analysis is not bound to any specific methodological position and can be utilised as a tool across differing philosophical perspectives (Braun and Clarke, 2006). A key characteristic of thematic analysis is the development of some form of visual representation of the data through themes, codes, and their relationships. These might be presented in tables or diagrams and can provide explanation as to the coding process as well as the final outcomes, which otherwise would be unobtainable from readers. These steps help to provide transparency, robustness, and replicability (Braun and Clarke, 2006). The main advantage of using thematic analysis really stems from its high level of flexibility and that it can be used in both inductive and deductive studies.

In terms of limitations, one of the key issues is around the process, whilst content analysis can be relatively straightforward in that it involves counting the presence of certain words etc, thematic analysis is less clear-cut. Knowing how to create and develop themes can take practice and relies on the individual. Indeed, common pitfalls can include providing data extracts with little to no interpretation of the data. Instead, the analysis can easily fall into the descriptive realm by simply paraphrasing the data (Braun and Clarke, 2006). To overcome this, researchers need to immerse themselves into the data and constantly re-read or review the information. In addition, providing evidence to explain and demonstrate how patterns emerged will also help to convince the reader of your interpretation.

4.4 Conversation Analysis

Stemming from Sociology, conversation analysis focusses on language in use (in conversation) as it happens in naturally occurring situations (Bryman and Bell, 2015). The talk or conversation is usually recorded and transcribed from interviews, court room trials, and interactions between people. According to Heritage (2011), conversational analysis is based on three conventions. Firstly, talk is structured, and an analyst will be looking for patterns across the data. Secondly, talk must be analysed in relation to its context, i.e., what preceded and succeeded it. Thirdly, analysis is data driven, in other words, there is no theoretical underpinning, the findings and outcomes emerge from the 'talk'.

4.5 Discourse Analysis

Discourse analysis is another approach which focusses on language, however, here we are using forms of communication which are not 'talk'. Typically, therefore, this technique is applied to texts, websites, and emails. Discourse analysis is interested in the social context and the culturally specific ways in speaking, writing, and organising communication. So not only does it seek to understand the linguistic elements (language) but also the non-linguistic elements (language within a specific situation) (Paltridge, 2021).

4.6. Narrative Analysis

The last specific approach to qualitative data we will mention is narrative analysis. This focuses on the temporal sequence of stories and people's lives or events. Longitudinal or life history research tends to fit this type of analysis well, however it can be used in other forms of research too. This approach analyses content from a variety of sources, such as interviews or observations. It focuses on using the stories and experiences shared by people to answer the research question. The purpose being to reconstruct people's personal accounts of events. Narrative analysis can be used to obtain accounts of changes, for example when respondents are asked to describe what happened when a change was implemented. It can be useful to draw a timeline in five stages – how things were long before the event, just before the event, during the event itself, straight afterwards, and long afterwards (now). The timescale also provides a prompt the interviewer can use to get the respondent to focus on a particular stage. This approach can be very useful in determining what aspects of change were seen as positive or negative and is good for providing learning that can be used in management. Although currently a lesser known and utilised approach in business management studies such as supply chain management, it is growing in popularity as a technique.

5. Coding in Qualitative Research

Coding is the process of defining and making sense of the data. It involves identifying and recording passages of text or other items such as the components of a picture or a website (Gibbs, 2007). Through this process we can describe the ideas present in the data, draw meaning from them, and potentially develop theoretical understanding. The steps involved in coding will depend slightly on both your overall research approach as well as the specific analytical technique you are taking.

5.1 Unit of Analysis

A core decision to be made is what constitutes the unit of analysis. For many projects, the unit of analysis will be based on language or words. Whether this is at the individual word level, the phrase level, or sentence level, or even a combination of these, will depend on the aims and objectives of the research. If you are utilising content analysis, the unit of analysis will be linked to the object(s) that is being counted. In thematic analysis the unit of analysis will generally be linked to the emergent codes and then by grouping similar codes together, you will begin to formulate themes. Although language and words tend to be the most common unit of analysis, with other data sources, such as visual images, the pictures themselves may be the unit of analysis, for example, you could ascertain how frequently specific images appear across all your data. Or it might be that you want to look at the detailed content within an image and components of the picture form the unit of analysis.

5.2 Deductive and Inductive Coding

A core decision in the coding approach will be dependent on whether your research is deductive or inductive. If your topic of investigation is well established and you want to understand principles in relation to existing theory then you are likely to be taking a deductive approach generally, which will also feed into your analytical and coding processes. So, for example if there are specific dimensions within a theoretical model it might be that you are looking for the same 'terms' or 'words' used in the theoretical model in your data sources. These words essentially become the codes within a data set. However, if your research area is relatively new and unexplored, with no established theoretical models to apply, then it is likely you will be taking an inductive approach. If there is little existing conceptualisation of ideas to utilise as your codes you may want to use codes linked to your research questions, if your data source is an interview transcript, it might be that

there are themes or topics covered in the interview schedule that will help formulate the choice of codes, or you could complete the coding process completely open minded and purely use the words within the data set to drive and establish codes and themes.

5.3 The Coding Process

The specific coding process will depend somewhat on your analytical approach, so although we will provide an overview of the main ways to code data, it is important you read the previous section 'Typical Qualitative Analytical Techniques' to ascertain whether you will be taking a content analysis or thematic analysis approach. Coding can be conducted manually, for example by highlighting the occurrences of an exact word in a transcript or document; this can be laborious and prone to mistakes, but potentially useful for comparisons across a small data set. A simple way to use computers for electronic documents is to use the 'find' function in a word processor, which will then locate instances of that word. For more ambitious coding, various software solutions are available, these generally allow the user to group expressions according to the theme. For example, the terms 'late', 'tardy', 'delayed', 'waiting' might all indicate the 'lateness' theme.

In content analysis you are looking to determine the frequency of the objects you're interested in (Bryman and Bell, 2015). In a deductive study, you may begin by utilising a specific theoretical model, therefore the 'codes' you are trying to find in the data set will be based on the 'words' used in the model. Essentially, the codes are 'predetermined' by the underpinning theory. In an inductive study, as you're reading through the data, you may simply find and highlight words which you think are relevant to the research topic, question, and objectives. These highlighted words (or phrases) will essentially be given a label or 'code'. You can then go through and count how many times this 'code' appears in the data set. If you're using more of an exploratory and inductive approach, then it is likely codes will continually emerge, therefore you need to keep track and list each code as it appears and you may need to go back through the data set several times, to check whether these new emergent codes occur earlier on.

In thematic analysis, coding is all about recognising similar words, or patterns of words, within the data. Williams and Moser (2019) suggest that there are three key stages involved in the process of coding and generating themes. The first stage is open coding, this is where you assign labels to segments of the data. These labels essentially summarise in a word or two what that section of the

data is addressing. Whether these labels are based on theory or driven by the data itself will depend on whether you're taking a deductive or inductive approach. The second stage is axial coding, here the generated labels or codes are grouped and categorised together. The final stage is selective coding, once the initial labels have been grouped together, they can be given an umbrella term to summarise the overall content of those codes / labels, which become your determined themes.

6. Reliability, Validity, and Generalisability

The terms validity, reliability, and generalisability strictly stem from quantitative research and there are ongoing debates amongst academics as to whether these terms are appropriate within qualitative research. On one side it is argued that these traditionally quantitative criteria are not suitable for qualitative research, however, others feel there is some applicability (Johnson, 1997).

Reliability is generally seen as whether the research conducted is of good quality. Stenbacka (2001) argues that as the overarching purpose of quantitative research (to explain) and qualitative research (to understand) are so different, the measure of 'quality' must also be different (Golafshani, 2003). "The concept of reliability is misleading in qualitative research, if a qualitative study is discussed with reliability as a criterion, the consequence is rather that the study is no good" (Stenbacka, 2001. p. 552). Other academics have suggested that alternative terminology should be used when considering measures of quality in qualitative research, for example, Lincoln and Guba (1985) use 'dependability' in qualitative research which they see as comparable to 'reliability' in quantitative research. The key to ensuring dependability in qualitative research is to provide detailed, clear, and transparent summaries of each step of the research process and to provide sound justification of decisions throughout.

In a similar vein to reliability, the usage of the term validity in qualitative research is also debated. Lincoln and Guba (1985) argue that the idea of discovering truth through validity (a quantitative based term) should be replaced by the idea of 'trustworthiness' and this can be achieved through assurance of the final outcomes and results (Lincoln and Guba, 1985). To complete this practically in qualitative research, one aspect is ensuring the appropriateness of the tools and processes used. This includes the research question, the specific methods used, sampling techniques, and the way the data is analysed.

Generalisability is the extent to which the findings from one piece of research would apply to other situations. In qualitative research sample sizes are often smaller in comparison to the methods used in quantitative research. This might mean that generalisability is lower, as fewer different contexts are studied, or that the research does not indicate how generalisable the results are. However, that does not detract from the importance or value of that data (Bryman and Bell, 2015) and qualitative research can lead to in-depth and rich understanding. Qualitative research also aims to reflect the

diversity of a given population, purposively aiming to highlight potentially important differences between participants and or settings (Collis and Hussey, 2013). However, it has also been argued that it is possible to generalise from a few cases if the data analysis captures the concepts under study and aids in theoretical developments, so in other words the data can be used to generalise to theory, rather than to populations (Bryman and Bell, 2015).

7. Conclusion

The aim of this chapter was to provide an overview of the post data collection needs of a qualitative researcher. Consequently, we have summarised common qualitative data collection methods, data sources, coding processes, analytical techniques, and included a consideration of reliability and validity from a qualitative perspective. The very nature of qualitative research does allow for some flexibility in the choices you make at each stage of the research process, which can be advantageous in obtaining rich and insightful data. Due to this wealth of choice however, it is important to ensure you are producing high quality and robust research, the essence of which is in making choices at every stage that are aligned and appropriate. In addition, these choices need to be explained and justified thoroughly with support from suitable academic sources.

We hope this chapter has provided a useful summary of some of the core decisions you will need to make throughout your research project. As stated throughout this chapter, the diverse exploration that qualitative research allows can be very exciting. Using less conventional techniques and / or seeking ways to work in a more interdisciplinary manner, may well be the key to enhancing our knowledge and understanding and finding solutions to world problems. We wish you the very best of luck in your research endeavours.

8. References

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