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Presenting a manual method for complex qualitative data analysis requiring a human perspective

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Authors:
Carin Strydom[1]
Stephan van der Merwe[1]

Affiliations:
[1]Faculty of Economic and Management Sciences, NWU Business School, North-West University, Potchefstroom, South Africa

Corresponding author:
Carin Strydom,
carinls@vox.co.za

Orientation: In her 2024 study, the researcher, C.S., applied a process of manual qualitative data analysis on data from different scientific fields and did not want to take risk by using AI (artificial intelligence) or CAQDAS (computer-assisted qualitative data analysis systems) analysing this complex data, as human intervention was required to fully comprehend all nuances of the reasons for survival.

Research purpose: The study aimed to as certain whether a manual method of data analysis incorporating the techniques and methods of well-known scholars was still feasible and would yield usable results.

Motivation for the study: The study had to find a substitute way to analyse data, contradictory to the current popular trend of AI analysis, as businesses surviving the COVID-19 pandemic, had to be analysed from a human perspective. The data that had to be analysed were spanning various scientific fields, facts and emotions.

Research design, approach and method: The empirical part of this qualitative exploratory study consisted of 16 face-to-face semi-structured interviews with successful small-, medium- and micro- enterprise (SMME) owners from the Western Cape in South Africa and used snowball sampling.

Main findings: A framework for SMME survival was developed using this manual data analysis method.

Practical/managerial implications: This study indicated that it is still possible to utilise a manual method for complex data analysis when a human perspective is required.

Contribution/value-add: It was proven that CAQDAS programmes or AI-generated software are not the only solutions for analysing complex qualitative data.

Keywords: thematic analysis; data analysis; manual method; wall coding; interrelated links.

Introduction

Social value

In recent years, AI (artificial intelligence) has been gaining momentum and becoming popular in the field of research (Garcia-Horta & Guerra-Ramos 2009:151; Van Heerden 2024) to assist scholars with analysing data through means of leading CAQDAS (computer-assisted qualitative data analysis software) programmes and in the workplace with human beings being replaced by intelligent machines (De Cremer & Kasparov 2021:1). This scholar agrees using AI or CAQDAS is much quicker when using software for coding or creating categories than when using the human brain (Cooper & Schindler 2008:412); however, for certain studies where a human reflective and a reflexive perception is required instead of mechanical thinking, it is better to use a manual method for qualitative data analysis (Saunders, Lewis & Thornhill 2019:638).

Before the existence of software programmes, researchers relied on pen and paper to analyse data. These days, research students constantly and regularly rely on AI or CAQDAS programmes to do all of the thinking (Carcary 2011:10), which leads to the question – do they not risk losing their cognitive abilities when AI replaces our thinking (Kavathatzopoulos 2024:19)? Should we not use our cognitive abilities and perform the interpreting sections ourselves rather than outsource our intelligence to technology (De Cremer & Kasparov 2021:2)? This researcher asks the question: Can a researcher still legally claim in all honesty that it is his or her own work, if the heart of the work, the analysis part of the data, was performed using a computer programme? What are the ethical considerations about the use of software that is so close to AI? AI incorporates

and utilises publicly available, published data, databases, websites and structured knowledge bases (Agrawal, Gans & Goldfarb 2017; Majer 2024). The social value of developing this manual method lies in the fact that all research and analysis conducted applying this method can truly be claimed as the scholar's work, with no risk of relying on the thought processes of another researcher.

Scientific value

The scientific value of this qualitative study and applying a manual method during the analysis phase will indicate that the manual method assisted the researcher in gaining an understanding of 'what' the participants did and 'how' the participants survived the coronavirus disease 2019 (COVID-19) pandemic: these were the important questions asked to fill the knowledge gap, as emphasised by Osterwalder in his research (Osterwalder 2004:42). The reason why we should obtain an understanding on how and why some SMMEs (small, medium and micro enterprises) survived is that we can use this information for future entrepreneurs on how to survive a difficult period or similar disaster. Small firms constitute a large percentage of most countries' economic backbone (refer to Table 1 for their contributions):

Researching the reasons for SMMEs' success while the pandemic was occurring was opportune timing for performing such research (Doern 2020:1). The original study also attempted to ascertain whether an entrepreneurial climate created by the Western Cape Government through their interventions assisted the SMMEs to survive the challenging economic lockdowns (Western Cape Government 2021:1). The original study delivered a complex dataset in the empirical study. A comprehensive literature study was also conducted to enhance comprehension, as knowledge about lockdowns was scant at the time (Fubah & Moos 2022:1). A two-pronged approach was followed to fill this knowledge gap. Firstly, a literature review was conducted to understand the global situation and its impact on the South African economy. Secondly, the empirical study interviewed 16 survivors of the COVID-19 pandemic to understand the lockdowns, restrictions and regulations and their socio-economic impact on the participants (Odeku 2021:1) in a qualitative study for full human comprehension.

The pandemic caused emotional upheaval (Markowitz 2021:10) and challenging economic circumstances (Sakhbieva et al. 2021:6054); hence, a simple computer programme focused on understanding cold, hard economic facts (Garcia-Horta & Guerra-Ramos 2009:160) was insufficient to analyse the data. Emotional factors and frustrations emerged from the code (Strydom 2024:213). Thus, data from interdisciplinary fields had to be interpreted with the correct level of entrepreneurial understanding and empathy to comprehend what the successful entrepreneurs did to survive. These human skills of being intuitive, emotional and culturally sensitive are what make us unique and can bring more effective abilities to the analysis process (De Cremer & Kasparov 2021:2). The purpose of this article is not to promote a specific method but rather to investigate whether it was still possible where AI is the norm if a manual method of data analysis in a qualitative research study can produce a framework for SMME survival of a disaster (Strydom 2024:1–649).

Conceptual framework

The theoretical basis for the original study was grounded in a review of underlying entrepreneurial theories, including grounded theory, the resource-based theory of the firm, the social network theory and the public sector theory of entrepreneurship, as outlined in the literature review of the original study (Strydom 2024:50–56). Once the empirical study was completed, it became apparent that more theories emerged. The code indicated which modern-day theories were widely utilised. The opportunity-based theories were applied in practice in the original study, not only in South Africa but also in similar studies in other countries, such as the United Arab Emirates (Zakaria et al. 2023:267). Religion and social change theories also emerged, as the code indicated that religion assisted faith-led businesses in finding strength and support to survive (Astrachan et al. 2020:637). The resource-based theory of the firm showed that small firms with intangible resource advantages had a more robust ability pertaining to growth and survival (Anderson & Eshima 2013:413). Even social network theories, although dating back in origin to the 1950s, were still relevant as connectivity and networking seemed to be a crucial cornerstone of survival (Strydom 2024:537). Entrepreneurial leadership theory also made a significant appearance among the code words, as 15 of 16 participants agreed that organised leadership was essential for survival. An Irish study confirmed this with '… Benevolent leaders demonstrated a values-driven, inclusive approach to decision making …' (Faherty 2021:11). Additionally, the public sector theory was applied in various countries through government interventions. In Lithuania, participants indicated how they benefited from government support during the time of the pandemic (Zuperkiene et al. 2021:1).

The main theory emerging from the empirical study, not identified beforehand, was resilience theory. Resilience theory was firmly established in psychology, with Masten later elaborating on the original theory of Garmezy by laying a foundation of how resilience can be applied to different stages of life and to other fields than originally proposed (Masten 2020). These concepts will be discussed in detail under the findings section.

TABLE 1: Small, medium and micro enterprises in perspective as a vital component of economies.

Demographic area	SMMEs as a % of Businesses	Share % of GDP per country	Share % of SMMEs in labour force
South Africa	91	34.0	60.0
European Union	99	58.0	48.0
United States	99	43.5	46.4

SMME, small, medium and micro enterprises; GDP, gross domestic product.

Aim and objectives

The original 2024 study aimed to determine whether a framework for survival could be developed by performing a qualitative study applying a manual method. This article describes how a manual method was developed to analyse the data and proved that software programmes are not always needed for data analysis, especially in a field where human perception is required.

The objectives are to demonstrate how exactly the manual method was developed and which techniques of well-known scholars were incorporated into the manual method.

The primary objective of this article is to ascertain whether AI or CAQDAS programmes are required to analyse a complex set of data across different study fields or whether it can be performed manually.

Research methods and design

The research design refers to the plan detailing how the study will be conducted and which methods will be followed (Babbie & Mouton 2001:74). Different types of data analysis methods are available for analysing qualitative data (Friese 2012:10; Marshall & Rossman 2016:392). In this article, the researcher will provide a literature review on the most used manual methods and some of the most used CAQDAS programmes within NWU (North-West University), where the original PhD study was conducted. The research methodology utilised in the original study will be discussed to provide an overview of how this specific comprehensive manual method was developed and the results the study yielded.

Study design

The reason why the researcher chose the topic of how COVID-19 impacted SMMEs was that research on small businesses' survival in response to an ongoing pandemic was scarce (Katare, Marshall & Valdivia 2021:2213). There is also a lack of sufficient empirical business studies among SMMEs on the African continent (Mkhonza & Sifolo 2022:483). The original study on which this article is based followed a bilateral approach of a literature review followed by an empirical study. The manual methods, as supported by leading scholars, were included in the literature review. The literature review was necessary to determine whether this process was viable and had widespread academic support.

Normally, once the data have been collected, they need to be organised first and can then be analysed. The reason for data analysis is that it aids the researcher in understanding the research patterns and investigations (Cozby 2009:224). Data analysis can be performed through manual intervention or through computer software. There are two camps of researchers: those who prefer software as it is quick and will yield the best results (Friese 2012:3) and those who are of the opinion that CAQDAS is peripheral and applying it can distance a researcher from the data (Welsh 2002:5). When

using software tools to obtain the data, such as SurveyMonkey or Qualtrics, the research can flow naturally from the data collected into the analysis process (Marshall & Rossman 2016:342). The problem is that data collection, analysis and eventual report writing are not detached steps of the whole research study. These different stages are interrelated and happen concurrently in a research study (Creswell & Poth 2018:327).

Initially, in data collection when conducting the fieldwork, data need to be pre-arranged, with provision made that data can be added at later stages (Ritchie & Lewis 2003:56). Transcribing data is normally the next step, and if the researcher is laboriously involved in all the processes, he or she can immerse himself or herself in the data and obtain a better understanding. Identifying themes upfront by thematic analysis aids in the data analysis process (Ritchie & Lewis 2003:56). In the original study where the manual method was applied, the researcher realised that theming the data (Saldana 2016:200) by thematic analysis is an important step that had to be incorporated upfront. This realisation came after completing the pilot phase (Strydom 2024:164) with two participants.

Study setting

The original study was conducted in the Western Cape province of South Africa, with a total area of 129 462 square km, roughly the size of England (Wikipedia 2020). The researcher decided on a qualitative explorative study to fully comprehend the reasons for the SMMEs' success in surviving the pandemic. Sometimes, quantitative research cannot reveal the facts, which are needed to make proper business decisions (Cooper & Schindler 2008:8).

The type of community studied was the successful SMMEs in the Western Cape of South Africa as a population, with a sample of 16 participants interviewed face to face. The reason behind this sample in the study setting was that the researcher wanted to ascertain the reasons why and how some SMMEs managed to be successful during the pandemic and what they did in order to survive or thrive during a disaster.

Study population and sampling strategy

The study population was the successful SMMEs in the Western Cape province of South Africa who managed to survive the COVID-19 pandemic. Despite a list of successful SMMEs being available from which a probability or non-probability sample could be extracted, the researcher applied snowball sampling, as prescribed by the Ethics Committee of the NWU. A sampling strategy of snowball sampling as part of the volunteer categories of the non-probability sampling techniques was used by starting with two known successful entrepreneurs as approached by the researcher in the pilot phase. From there, the participants recommended potential participants. Only those meeting the criteria and willing to participate were interviewed. A visual of the process is presented in Figure 1.

As per the guidance of the Ethics Committee to comply with the POPI Act in South Africa (Strydom 2024:181), the snowball sampling method was preferred to protect all personal information of potential participants. Only successful SMMEs with other relevant criteria could be approached by existing participants, and they had to agree to participate before the researcher obtained their contact details. The list of criteria that the successful SMMEs had to adhere to was summarised into inclusive and exclusive criteria as per Table 2.

Intervention

There were no comparison groups in the original study, only a pilot phase and a main interview phase. The pilot study with two participants indicated that more questions were required to attain more quality-rich data through the in-depth interview process (Marshall & Rossman 2016:210) once the themes started to appear (Strydom 2024:164). The pilot testing phase allowed for preliminary evaluation of the validity and reliability of the data (Saunders et al. 2019:812), enabling the researcher to organise and standardise the interview guide to effect thematic analysis of the data. Themes could thus be identified as per the questions of the semi-structured interview questionnaire used for all 16 participants.

Data collection

Data can be collected applying various methods and options such as focus groups, observations and document analysis. In this 2024 study, the face-to-face interview method was chosen to extract data-rich in-depth answers using probing

Source: Strydom, C., 2024, 'Developing a framework for SMME survival based on events during COVID-19 in the Western Cape of South Africa', PhD thesis, North-West University
Note: SW, HLBH, STR, HLB, BVL, DBN, STB, GB, NUM, PB, MC are the code names for participants to comply with the confidentiality and anonymity agreement of the study.

FIGURE 1: The snowballing process of participants interviewed.

TABLE 2: Inclusive and exclusive criteria for the 2024 COVID-19 study.

Criteria for this study sample	Inclusive	Exclusive
SMME operative in the WC, SA.	X	-
Operating since before COVID.	X	-
SMME was operational after COVID.	X	-
Owner-managers of SMMEs can partake.	X	-
The business closed down during COVID.	-	X
The business started during COVID.	-	X
The business has more than 200 staff.	-	X

Source: Strydom, C., 2024, 'Developing a framework for SMME survival based on events during COVID-19 in the Western Cape of South Africa', PhD thesis, North-West University
COVID, coronavirus disease; SMME, small, medium and micro enterprises; WC, Western Cape; SA, South Africa.

techniques from the 16 participants obtained by applying the snowball sampling method, with transcription of the interviews done by the researcher verbatim and extraction of the code words (Austin & Sutton 2014:438).
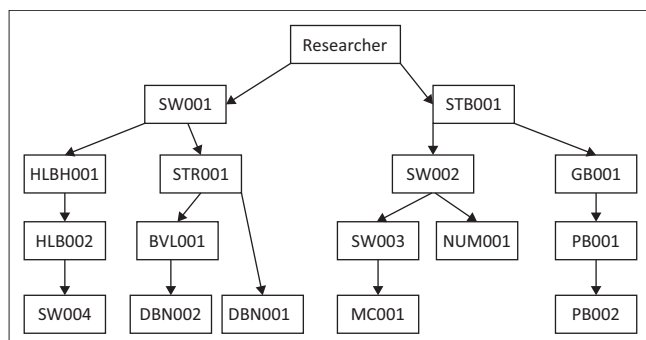
The data collection process has been described in detail in the original study, from the length of interviews (Strydom 2024:189) to the venues of the interviews (Strydom 2024:190) to the methods applied to harvest data-rich information (Strydom 2024:192). Once all the interviews were conducted and the researcher realised that the point of saturation had been reached (Strydom 2024:542), the interviews were transcribed and thematic analysis and coding commenced. Saturation is the concept used when a point is reached in the data collection process, and no more new data emerge (Morse 2020:5).

The thematic analysis process of Creswell was then applied to the coded data (Creswell & Poth 2018:333–335). This process also entailed using data reduction on qualitative data by applying segmentation, categorisation and summarisation and then reconstructing it in a manner that focuses on the vital concepts of the data (Given 2008:867). Once thematic analysis was applied, there emerged 12 themes that the researcher had to analyse manually, as indicated in Table 3:

These themes became the backbone of the research study, providing the raw data to be analysed, with the step-by-step process described in the data analysis section.

Data analysis

Lately, it is the norm to make use of CAQDAS when analysing data, as it is a quick and easy process. Still, sometimes, a quick fix is not what is needed, especially when an in-depth qualitative study is required with a human reflective understanding (Saunders et al. 2019:638). If a researcher wishes to make use of CAQDAS, then some of the most frequently used computer programmes utilised for data analysis to consider are Nvivo, Max Qualitative Data Analysis Software (MAXQDA), Quirkos, Transana, Qualitative Data Analysis Miner software (QDA Miner), Dedoose, R package for Qualitative Data Analysis software

TABLE 3: Colour-coded themes of the 2024 study per thematic analysis.

Figure	Key colour	Theme name identified
1	Light pink	Challenges before COVID-19 experienced by your SMME
2	Yellow	Unique challenges during COVID-19 for your SMME
3	Red	Motivating factors to start your SMME
4	Green	Role model or mentor you had in entrepreneurship
5	Blue	Personal characteristics, attributes and skills
6	Dark blue	Leadership style
7	Dark pink	Your view of success before COVID-19
8	Grey	Changed perception on measuring success post-COVID-19
9	Teal	Western Cape Government interventions
10	Brick brown	Support received from the entrepreneurial ecosystem
11	Mint	Factors/actions contributing to the survival of your SMME
12	Light brown	Advice/recommendations for others in entrepreneurship

Source: Strydom, C., 2024, 'Developing a framework for SMME survival based on events during COVID-19 in the Western Cape of South Africa', PhD thesis, North-West University
COVID, coronavirus disease; SMME, small, medium and micro enterprises.

(RQDA), Analysis of Qualitative Data software (AQUAD), Taguette, HyperResearch, SuperHyperQual and Archiv für Technology, Life-World and Everyday Language text interpretation software (ATLAS.ti) (Friese 2012:10; Given 2008:407, 845). These days, there is also transcription software easily available that can be used to transcribe the interviewed and recorded voice recordings into Word documents, including Express Scribe, Olympus Digital Wave Player, Microsoft OneNote, a Live Scribe smartpen, Dragon NaturallySpeaking, e-Speaking and many more (Marshall & Rossman 2016:392). To review all these here will be time consuming; thus, only the software programme most used at the NWU was reviewed.

ATLAS.ti appears to be the software of choice at the NWU as it was most widely used and is compatible with most textual, graphical and doc and docx files, while it can also convert multimedia formats into rich text. Most computers with a Windows operating system have the converters installed, or it can be done by installing an Office package. PDF files are also supported (Friese 2012:23). Even if the research was conducted as action research or through observations, interviews, focus groups or through biographical research, this software tool can assist with data analysis for all of the above methods in a systematic computer-assisted manner (Friese 2012:3).

Whichever method a researcher uses does not matter, as individual researchers do have a freedom of choice, as so eloquently described by Creswell and Poth when they stated that researchers '… are free to choose the methods, techniques and procedure of research …' when performing research to obtain the best results for their specific study (Creswell & Poth 2018:82). A researcher must choose whether it follows the group who sees it as a brilliant aid and analysing tool that adds rigour to data analysis process of qualitative research (Neergaard & Ulhoi 2007:346) or select the opposing group who feels CAQDAS can create a distance between the researcher and the data (Welsh 2002:5). The researcher preferred to stay close to the data and handle all the processes herself in order to reach the ultimate level of human comprehension of how and why some SMMEs survived. An informed decision can only be made on whether to follow a manual method or use software, by understanding what a CAQDAS programme can deliver or after obtaining some guidance on what it entails (Friese 2012:6). A detailed investigation was conducted on Atlas.ti in the original study to gain this understanding (Strydom 2024:166).

The data analysis process chosen by Strydom for her 2024 study on the COVID-19 pandemic was a manual method, as the data covered several fields of science and as human understanding was required, it was decided that it would be best not to follow the mainstream, easier CAQDAS route. In order to decide whose manual method of qualitative data analysis to follow, a few of the scholars advocating the manual process were reviewed.

The experts who were reviewed on manual data analysis included Kent Lofgren (Department of Education, Sweden and Umea University), Prof Johnny Saldana (Arizona State University, USA), Prof Svend Brinkmann (Aalborg University, Denmark) and Dr Daniel Turner (Quirkos – Youtube).

Kent Lofgren (Lofgren 2013) developed several YouTube tutorial videos on how to perform manual qualitative data analysis. Some of the videos have been frequently visited (over 1 million views) by numerous students. A video titled 'Qualitative analysis of interview data: A step-by-step guide for coding/indexing' suggested a researcher should first read the transcripts, then read them a second time while starting with the labelling or marking of relevant words, either actions or concepts, thus 'coding' the data – whatever you, as researcher, think is relevant in this interview or transcript. He stated this step is key, as your opinion matters. If compared to the research onion of Saunders et al. (2019), the researcher will, at this stage, be following the outer layer of the research onion and highlighting the code applying either a mindset of critical realism or interpretivism, as applied in the original study.

Lofgren suggested in his videos that a researcher can code data on the typed transcript (Lofgren 2013) and that the researcher can decide why that particular piece of code is relevant. He stated that it remains up to the researcher to decide which phrases or words can be coded, as the researcher will be interpreting the study and should inform the reader of the rationale why this specific code was chosen (Lofgren 2013). In the original study, the researcher decided to code by highlighting the code words in a specific colour according to each theme electronically in each individual transcribed interview, then transferred all the codes into a coding bible and, from there, later transferred the code onto corresponding coloured paper as a final step (Strydom 2024:209).

This process of manually sorting and analysing the data has been referred to as a 'tabletop category', which involves the literal arrangement of cut-out data chunks in a tabletop format (Saldana 2016:231). Saldana stated that coding is not the only way of analysing data; it is just one of the possible ways to analyse it (Saldana 2016:3). He said that his students confirmed 'touching the data' after pieces were cut out and physically moving them around into multiple arrangements, helped them to find the ultimate fit, to discover patterns and understand their data better, especially under different organisational concepts such as hierarchy, process, interrelationship, theming and structure (Saldana 2016:231).

Saldana was of the opinion that a researcher can manipulate data more quickly with two hands than a computer can with CAQDAS software (Saldana 2016:231). He advised moving the chunks of data around as much as one needs to get to a structure that 'feels right' and then adapting it into an operational model diagram. This researcher followed a

similar approach by writing the code onto colour-coded paper, sorting it on a tabletop format and then pasting it onto a wall for a visual overview, referred to as wall-coding (Strydom 2024:210) as per Figure 2.

Another pro-manual scholar from Denmark, Brinkmann, has always been an advocate for using your brain. His recent book 'Think! In Defence of a Thoughtful Life' (Brinkmann 2023) took the rationale for his thoughts back to Socrates, who was known for his long spells of contemplation, which he referred to as listening to his inner voice. Brinkmann also said that we as a biological species are called 'homo sapiens', which is the Latin term for 'wise man' or then loosely translated to 'thinking human', indicating we as humans should use our brains. He also quoted Kant's slogan of 'sadare aude!', which means to have the courage to use your reason (Brinkmann 2023:6). In using and applying the manual method of qualitative data analysis, this researcher has used her courage to attempt to analyse the 2631 code words extracted from the data in her 2024 study by utilising her cognitive abilities for the analysis process, rather than the abilities of a computer software programme.

Scottish scholar Turner created various YouTube videos, which educated many students in various data analysis methods over the years. He stated that content analysis of data in a qualitative study is a blanket term to determine what the content is about, and from there on, the researcher can apply any of many approaches (and it can be deductive or inductive) to analyse data, as there is not a specific correct or wrong method (Turner 2021) to analyse code.

When the researcher thus developed her manual method to analyse the qualitative data, she reviewed the procedures of well-known scholars to ensure all important aspects were adhered to.

An approach taken into account was that of Marshall and Rossman (2016:209), who stated that seven steps could be followed to analyse data, and these were:

- Step 1: Data must first be organised.
- Step 2: Immerse yourself in the data.
- Step 3: Allocate or generate themes, categories and subcategories for the data.
- Step 4: Coding of the data can now commence.
- Step 5: Interpreting the data should follow.

Source: The photo has been taken by, Carin Strydom, Cape Town on 28 March 2023 and permission to use has been granted.
FIGURE 2: Code words of first 10 themes sorted and organised.

- Step 6: Find summaries or alternative understandings.
- Step 7 : Write the report using the themes and understandings.

A very similar approach was followed by Creswell and Creswell (2018:268), who suggested that researchers should treat the data as follows during manual analysis:

- Step 1: Data should be organised and prepared for the process of manual analysis.
- Step 2: Researchers should read or look at the data several times to understand it.
- Step 3: Start the coding process of all the data.
- Step 4: Generate a description and themes.
- Step 5: Allocate different descriptions or themes to the coded data.

These 7-step and 5-step approaches were applied in this research by including all the steps in the 11 steps of the researcher, applying several other techniques as well, in the creation of a detailed and thorough manual data analysis process.

Ethical considerations

All the ethical considerations as specified by the Senate Committee for Research Ethics at the NWU were complied with under Ethics number NWU-00694-22-A4.

The *POPI Act* was adhered to (POPIA 2020), ensuring compliance with the Act, also during the interview process with all the participants who provided written consent to participate and that the interviews may be recorded. The measures taken on how data were stored after completion of the thesis included storing it on off-site electronic storage devices not connected to the Internet for 5 years after publication of the thesis. This ethics committee required the use of snowball sampling and interview of only willing participants, as referred by previous participants who gave informed written consent.

A requirement when human participants are included in a study is that the study may cause no harm. The no-harm clause does not only refer to physical harm but also to emotional harm. In the 1971 Zimbardo study, participants suffered psychological impairment because of pretending incarceration (Haney & Zimbardo 1998:709), and it is therefore pertinent to ensure that this does not happen in a research study. Some of the referred participants, through the snowballing technique, did not want to be reminded of the traumatic COVID pandemic and were not willing to participate in the study or be interviewed. Some of them made brilliant business decisions for their small businesses to survive, yet because of their unwillingness to participate, the researcher had to make the ethical decision not to pursue them and not to try and convince them to be interviewed (Strydom 2024:182).

Results

The results of the qualitative study were reached in designing a framework for survival using a manual method of incorporating all the different well-known scholars' techniques and methods, as described in the data analysis section and incorporating it into a new manual method with 11 steps as developed by Strydom in the 2024 COVID-19 study.

Step 1: Read through the transcriptions carefully (Saldana 2016:69) and apply thematic analysis (Creswell & Creswell 2018:270) to create themes.

Step 2: Assign a different colour to each theme (refer to Table 3). Highlight the code in your electronic document in different colours corresponding to the themes. Interpretivism may be applied as per the last layer of the research onion (Saunders et al. 2019:174) to the participant's exact words or in vivo coding as long as the meaning of the participants is reflected in the final code. The condensing of sentences into one-word codes is already one form of code condensing.

Step 3: The highlighted code on the different MS Word or any other type of electronic documents of all the different participants now has to be summarised in one document or coding bible, where all the code is incorporated into one spreadsheet. Some writers call it a codebook and provide the categories it usually contains, whether it is a paper-based codebook or a spreadsheet version (Cooper & Schindler 2008:405).

Step 4: The highlighted code in the electronic coding bible can now transform from the electronic realm into the physical world. Transform all the preferably condensed code onto pieces of paper and display it on a flat surface where it is visually available for analysis. For a video of the process, the YouTube video of the researcher can be visited at https://youtu.be/1yYIAvtQhRs (Strydom 2023). A good option is a whiteboard, a tabletop or even a large open wall, as in Figure 2, where paper code was stuck to a wall with reusable white sticky adhesive. Once all the codes are on a wall, it can be organised. When various participants mentioned the same concept under a theme, repeating the same actions, such as 'start saving' rather than using one label of code with dots on the piece of paper indicating how many participants agreed, for example, six dots indicate that six participants agreed, this is another form of code-condensing, instead of repeating the code on paper six times.

Step 5: To organise the themes, take each theme down separately to create the network diagrams separately. Saldana advised it is best to sort the data by hand by physically moving the pieces of data around and to 'feel' the code (Saldana 2016:231). The process of manually sorting and analysing the data has been referred to as a 'tabletop category', which involves the literal arrangement of cut-out data chunks in a tabletop format, as 'touching the data' helped Saldana's students to discover patterns and understand the data better (Saldana 2016:231). In this step, layers 4 and 5 of the research onion can assist. Standard

categorisation can be applied, as done with Internet or textbook searches, or subcategories can be added onto small pieces of paper by the researcher to organise the code into a more usable format. The secret is to move the bits of code around until it makes sense and physical patterns appear under your fingertips. No computer programme organising the data for you can provide this level of satisfaction. In this step, the researcher becomes the data analyser and creates the operational network diagrams per theme. Take a photo of the operational network diagram – this is part of the deductive layer to create the tables and figures.

Step 6: Repeat this process for each theme to create an operational network diagram per theme (Strydom 2024:224) and then transfer it back to the wall or surface used, but this time displayed in an organised format, with the different categories and subcategories. Before transferring the network diagrams back to the wall, remember to photograph that. Figure 3 illustrates the theme 'Motivational factors to start an SMME'. This image indicates the use of sticky notes or coloured paper, with pieces of string or wool, to indicate which subcategory falls under which particular section.

Step 7: Once all network diagrams are created, the raw code can be converted into mind maps. This step entails creating a mind map in MS PowerPoint or Paint. The researcher used a simple organising tool where the programme draws the exact network organogram using the input from the researcher, namely Simple Minds. This step did not involve using AI, as no mechanical thinking was required (Strydom 2024:224).

Step 8: This step entails creating a new spreadsheet per theme, called a matrix, to organise the data (Saldana 2016:262). In the first column, provide the categories per theme; in the second column, provide the subcategories per theme and so forth and then provide a column for the main code words. A column for each participant should follow this, labelling it P1 for the first participant, P2 for the second participant and so forth for all the participants. The main code words per subcategory are then typed into the column called 'Main codes'. Now it is a simple matter of scrolling through the Coding Bible or Codebook (Creswell & Poth 2018:335) in Excel to summarise which participants agreed on certain aspects, then simply mark that participant with an x in the matrix to indicate the level of consensus among participants.

Source: The photo has been taken by, Carin Strydom, Cape Town on 24 April 2023 and permission to use has been granted.
FIGURE 3: Network diagram of motivational factors to start small, medium and micro enterprises.

Step 9: The creation of a table with the top codes per theme is important to indicate some quotations from the participants, as accompanying tables are a method applied in the past to indicate which code was used or which categories were constructed (Saldana 2016:264). Such a table can prove the validity of the study, as exact quotes can be traced back to the original transcribed interviews and recordings. This path of relevance indicates that no biased opinions from the researcher occurred. A table with direct in vivo code creates a digital audit trail that can serve as evidence of where the code originated from, as it can be easily retrieved from the transcribed interview and examined (Silver & Lewins 2014), as per Table 4.

Step 10: The next step is to elaborate on each visual aid: the matrix, the table and the mind map of the network organogram should all now be discussed. The researcher can indicate here how many participants agreed or not and the emotional reasons explaining their answers; this is an important human aspect that AI can never replicate. Discussing each figure in detail helped the researcher understand where the code originated from and how it fits into the bigger picture, which were important codes and delivered findings. Saldana advises keeping the write-up brief to about two full paragraphs per theme at most (Saldana 2016:284).

Step 11: This step entails the identification of interrelated links between key findings. These code words or terminologies appeared under several themes and deserved further attention as they were focus areas. The focus areas assisted in surviving the pandemic. In the original study, the key findings identified were financial matters, networking, communication, focus, resilience, technology and self-constructed support. Identifying links acknowledges intricate interrelationships in both qualitative and quantitative research (Vogt et al. 2014:200).

Following these manual steps and identifying the key findings, the study resulted in the development of a framework for survival of a difficult event such as a pandemic; see explanatory article on 'A survival framework for SMMEs based on COVID-19 events in the Western Cape of South Africa' (Strydom & Van der Merwe 2025). The full framework with a detailed explanation of all the elements of the framework was a result of the manual method followed.

The interrelated links and the code words that were repeated the most were indicative of the synergies between participants under various themes. In the COVID-19 study, seven concepts emerged from the manual data analysis process that appeared to be the reasons why some participants with SMME managed to survive the pandemic, as they placed their focus on:

• financial matters
• networking
• communication
• focus
• resilience
• technology
• self-constructed support.

Several theories also emerged and were reviewed in the study, with resilience theory being the most applicable to describe why the participants managed to survive the pandemic and the managerial implications that emerged from this study.

Discussion
Key findings

Manual data analysis is possible on a complex set of data in a qualitative data-rich study, especially where a human reflection is required; it is, in fact, advised to utilise this manual method.

Discussion of key findings

The key findings of the study were reaching a conclusion by incorporating the main techniques of data analysis experts who are pro-manual method, that a manual method is

TABLE 4: Extract from the table on motivational aspects with direct quotations from the transcript.

Theme	Category	Sub-category	Codes and quotations from participants
Motivating factors to start own SMME	Push	Financial	**For survival, had to start own SIMME -** 'Realised I have to really focus on creating my own constant income stream for survival and not only do favours for friends,' Participant GB001 and 'I was retrenched in 2008 … so in the recession, so he took my tree, and uprooted me, and he put it down here, goof. I knew nothing. I was so out of my depth. No other option but to survive.' Participant STR001.
			Wanted financial independence - 'My aunt had her own business, and I liked the money she made. I wanted to have her same lifestyle and financial freedom.' Participant NUM001. **Had financial expertise -** 'I started my own company as I had the knowledge and the expertise, and I knewl could provide better service.' Participant SW004.
			High profits lured - 'Working at this big chain of hair salons, I realised the high-profit margin to be made.' Participant MC001.
		Family	**Wanted to take care of own family -** 'The biggest reason for me to start my own business was that I wanted to take care of my own family. I do not want to take a slice of bread from your table. I can survive on my own.' Participant HB002. **Family background is entrepreneurs -** 'We have been involved as a family in the fuel sector for years.' Participant BVL001.
		Dissatisfied	**Had support from spouse -** 'And my late husband was a big support, he motivated me, he encouraged me, and he believed in me, and he said I could do it, so I did.' Participant SW004. **Frustrated with status quo-** 'And I was frustrated at that stage that our income was decided upon political factors and not dependent on the entrepreneurial skills of the businessman.' Participant BVL001.
			Hated corporate - 'I was working before that in the corporate environment for quite a while, but it was not very satisfactory for me.' Participant STB001. **Needed to be independent -** 'I saw how the banks dealt with foreigners. I realised there and then that people who do not generally speak English or Afrikaans will always struggle.'

possible and AI or CAQDAS are not the only usable methods. Applying the human brain can yield the same usable results, with the added benefit that there is no ethical dilemma in using AI or plagiarised work. Another finding was that when a researcher is involved in all the planning, data collecting, transcribing, analysing, organising and reporting phases of the research process, it yields the definitive human comprehension of human actions on how some SMMEs survived a pandemic.

In his thesis 'Christian Ethical Guidelines to Artificial Intelligence and Technological Singularity', Van Heerden was of the opinion that there is an ethical dilemma in using artificial superintelligence. He called for a future where faith and technology can collaboratively enhance ethical standards and human values, as without the human aspect of values and standards, there is a risk that societal morals will not be upheld (Van Heerden 2024).

In a Harvard Business Review, De Cremer and Kasparov advocated that AI should augment human intelligence, not replace it, as when computers are introduced as the new super employee, it may leave humans feeling inferior to the machine (De Cremer & Kasparov 2021:5). Artificial intelligence means that no job is safe, and we are ultimately creating unemployment when using AI, as eventually this may replace most human jobs and undermine our existence (Kavathatzopoulos 2024:19). It appears there will be an implication of ethical issues on society if AI is further advanced (Gogineni 2022:1). This study has proven that the human brain is capable of performing advanced qualitative data analysis just as effective as AI.

Strengths and limitations

The limitations of the original COVID-19 study were not relevant to this article. Suffice it to say, the *POPI Act* caused some limitations as to how a sample of participants could be selected, as the study had to be conducted using snowball sampling. The *POPI Act* limited the scope and outcome of the original study.

Implications or recommendations

The managerial and practical implications of this study indicated that it is possible for any researcher or SMME owner to easily follow a manual approach to analyse problems. Demanding and complicated computer programmes are not needed to analyse a research problem. Any researcher or SMME owner can perform an analysis of their specific research problem, such as performance issues during a difficult economic situation. Whereas most researchers would have previously applied a CAQDAS programme to analyse data, a variety of people, such as scholars, researchers and even SMME owners, can simply apply this 11-step manual method to analyse their code or data (extracted from their staff or organisation) about the research problem they are facing in a qualitative human-oriented study.

Conclusion

By following a scientific process of the research onion from start to end, incorporating the techniques and visual aids of well-known scholars, it was possible to analyse a complex dataset and be able to confirm that the research was 100% the work of the researcher. This manual method enabled the researcher to develop a framework for survival (Strydom 2024:526). Special mention is needed of the various instruments incorporated to create the comprehensive 11-step method: the research onion of Saunders et al. (2019:174), the thematic analysis process and code book example of Creswell and Poth (2018:338), the advice of Saldana on 'feeling the data' and moving it around until it 'reaches a perfect fit' (Saldana 2016:231) – all contributed to the final process.

This manual method is not promoted as being better than CAQDAS programmes. It is rather presented as an alternative to existing software programmes in the instance of research where AI or CAQDAS cannot cope with a wide variety of aspects, specifically for emotional, culturally sensitive or intuitive aspects. Whether this 11-step manual method is useful or not, only future research and application of this manual method in a wider scope will be able to indicate. As a conclusion, it certainly can aid in the ethical dilemma that humans may feel inferior to machines if they feel they are not able to do complex qualitative data analysis themselves anymore – this 2024 Strydom study has proven it is indeed still possible to perform a manual analysis method when a human perspective is required.

Acknowledgements

Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

C.S. developed the article based on her PhD thesis, and S.v.d.M. was the supervisor who provided final review and editing.

Funding information

Data availability

Raw data on which this article was based, is available from the corresponding author, C.S., on request.

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References

Agrawal, A., Gans, J. & Goldfarb, A., 2017, 'What to expect from artificial intelligence', *MIT Sloan Management* 58(3), 23–26, https://doi.org/110.7551/mitpress/11645.003.0008

Anderson, B.S. & Eshima, Y., 2013, 'The influence of firm age and intangible resources on the relationship between entrepreneurial orientation and firm growth among Japanese SMEs', *Journal of Business Venturing* 28(3), 413–429. https://doi.org/10.1016/j.jbusvent.2011.10.001

Astrachan, J.H., Binz Astrachan, C., Campopiano, G. & Baù, M., 2020, 'Values, spirituality and religion: Family business and the roots of sustainable ethical behavior', *Journal of Business Ethics* 163(4), 637–645. https://doi.org/10.1007/s10551-019-04392-5

Austin, Z. & Sutton, J., 2014, 'Qualitative research: Getting started', *The Canadian Journal of Hospital Pharmacy* 67(6), 436–440. https://doi.org/10.4212/cjhp.v67i6.1406

Babbie, E. & Mouton, J., 2001, *The practice of social research*, SA edition, Oxford University Press, Cape Town.

Brinkmann, S., 2023, *Think: In defence of a thoughtful life*, John Wiley & Sons, New Jersey.

Carcary, M., 2011, 'Evidence analysis using CAQDAS: Insights from a qualitative researcher', *Electronic Journal of Business Research Methods* 9(1), 10–24.

Cooper, D.R. & Schindler, P., 2008, *Business research methods*, 10th edn., McGraw-Hill Irwin, New York, NY.

Cozby, P.C., 2009, *Methods in behavioural research* (Maufur, Ed.), Pustaka Pelajar, Yogyakarta.

Creswell, J.W. & Creswell, J.D., 2018, *Research design: Qualitative, quantitative and mixed method approaches*, 5th edn., Sage, London.

Creswell, J.W. & Poth, C.N., 2018, *Qualitative inquiry and research design: Choosing among five approaches*, 1st edn., Sage, London.

De Cremer, D. & Kasparov, G., 2021, 'AI should augment human intelligence, not replace it', *Harvard Business Review* 18(1), 1–8.

Doern, R., 2020, 'Knocked down but not out and fighting to go the distance: Small business responses to an unfolding crisis in the initial impact period', *Journal of Business Venturing Insights* 15(1), 1–10.

Faherty, C., 2021, *Surviving a crisis as a family business: Benevolent leadership*, pp. 1–11, Ulster University, viewed 05 May 2022, from https://www.irsihnews.com/business/2021/05/11/news/surviving-a-crisis-as-a-family-business-benevolent-leadership-2314779/.

Friese, S., 2012, *Qualitative data analysis with ATLAS.ti*, Sage, London.

Fubah, C.N. & Moos, M., 2022, 'Exploring COVID-19 challenges and coping mechanisms for SMEs in the South African entrepreneurial ecosystem', *Sustainability* 14(4), 1944. https://doi.org/10.3390/su14041944

Garcia-Horta, J.B. & Guerra-Ramos, M.T., 2009, 'The use of CAQDAS in educational research: Some advantages, limitations and potential risks', *International Journal of Research & Method in Education* 32(2), 151–165. https://doi.org/10.1080/17437270902946686

Given, L., 2008, *The SAGE encyclopaedia of qualitative research methods*, Sage, London.

Gogineni, V.A., 2021, 'Can AI develop human-like consciousness? Cognitive abilities? What about ethics?', *SSRN Solutions*, viewed 16 June 2022, from https://ssrn.com/abstract=4072601.

Haney, C. & Zimbardo, P., 1998, 'The past and future of US prison policy: Twenty-five years after the stanford prison experiment', *American Psychologist* 53(7), 709. https://doi.org/10.1037//0003-066X.53.7.709

Katare, B., Marshall, M.I. & Valdivia, C.B., 2021, 'Bend or break? Small business survival and strategies during the COVID-19 shock', *International Journal of Disaster Risk Reduction* 61, 2212–2219. https://doi.org/10.1016/j.ijdrr.2021.102332

Kavathatzopoulos, I., 2024, 'Artificial intelligence and the sustainability of thinking: How AI may destroy us, or help us', *Ethics and sustainability in digital cultures*, pp. 19–30, Routledge, London.

Lofgren, K., 2013, *Qualitative analysis of interview data: A step-by-step guide for coding/indexing*, YouTube, viewed 02 March 2023, from https://www.youtube.com/watch?v=DRL4PF2u9XA.

Majer, C., 2024, *Discovering the data sources that fuel AI*, ICOM, viewed 29 June 2024, from https://www.icom.ai/blog-posts/where-does-ai-get-its-data.

Markowitz, D.M., 2021, 'Psychological trauma and emotional upheaval as revealed in academic writing: The case of COVID-19', *Cognition and Emotion* 36(1), 9–22. https://doi.org/10.1080/02699931.2021.2022602

Marshall, C. & Rossman, G.B., 2016, *Designing qualitative research*, 6th edn., Sage, London.

Masten, A.S., 2020, 'Background to the classic review', in A. Masten (ed.), *Developmental psychology: Revisiting the classic studies*, p. 251, Sage, London.

Mkhonza, V.M. & Sifolo, P.P., 2022, 'Investigating small, medium and micro-scale enterprise's strategic planning techniques in Johannesburg central business district post-COVID-19 lockdown', *The Southern African Journal of Entrepreneurship and Small Business Management* 14(1), 483. https://doi.org/10.4102/sajesbm.v14i1.483

Morse, J., 2020, 'The changing face of qualitative inquiry', *International Journal of Qualitative Methods* 19, 1609406920909938. https://doi.org/10.1177/1609406920909938

Neergaard, H. & Ulhoi, J.P., 2007, *Handbook of qualitative research methods in entrepreneurship*, Edward Elgar Publishing, Northampton, MA.

Odeku, K.O., 2021, 'Socio-economic implications of the COVID-19 pandemic in South Africa', *Academy of Entrepreneurship Journal* 27, 1–6.

Osterwalder, A., 2004, '*The business model ontology: A proposition in a design science approach*', PhD thesis, University of Lucerne, Luzern.

Protection of Personal Information Act (POPI Act), 2020, viewed 14 September 2023, from https://popia.co.za.

Ritchie, J. & Lewis, J., 2003, *Qualitative research practice: A guide for social science students and researchers*, Sage, London.

Sakhbieva, A., Goncharov, V., Zatsarinnaya, E., Gordeeva, D., Kalyakina, I. & Ignatyeva, O., 2021, 'Some global economic realities and environmental impact in the context of the pandemic: Causes and trends', in *Web of conferences*, Vol. 258, 06054, EDP Sciences.

Saldana, J., 2016, *The coding manual for qualitative researchers*, Sage, London.

Saunders, M., Lewis, P. & Thornhill, A., 2019, *Research methods for business students*, 8th edn., Pearson, London.

Silver, C. & Lewins, A., 2014, *Using software in qualitative research: A step-by-step guide*, 2nd edn., Sage, Thousand Oaks, CA.

Strydom, C., 2023, *Manual qualitative data analysis,* YouTube, viewed 05 May 2025, from https://youtu.be/1yYIAvtQhRs?si=mRolemblr-R3S5F5I.

Strydom, C., 2024, 'Developing a framework for SMME survival based on events during COVID-19 in the Western Cape of South Africa', PhD thesis, North-West University, Potchefstroom.

Strydom, C. & Van der Merwe, S., 2025, 'A survival framework for SMMEs based on COVID-19 events in the Western Cape of South Africa', *The Southern African Journal of Entrepreneurship and Small Business Management* 17(1), 960. https://doi.org/10.4102/sajesbm.v17i1.960

Turner, D., 2021, *Qualitative content analysis*, Quirkos Blog, viewed 29 June 2021, from https://www.quirkos.com/blog/post/qualitative-content-analysis/.

Van Heerden, E., 2024, 'Christian ethical guidelines to artificial intelligence and technological singularity', PhD thesis, North-West University, South Africa.

Vogt, W.P., Vogt, E.R., Gardner, D.C. & Haeffeke, L.M., 2014, *Selecting the right analyses for your data: Quantitative, qualitative and mixed methods*, Guilford, New York, NY.

Welsh, E., 2002, 'Dealing with data: Using NVivo in the qualitative data analysis process', *Forum: Qualitative Social Research* 3(2), 26.

Western Cape Government, 2021, *Update on Western Cape Government's economic recovery interventions Feb 2021*, Western Cape Government, viewed 11 May 2021, from https://www.westerncape.gov.za/news/update-western-cape-governments-economic-recovery-interventions.

Wikipedia, 2020, *Western Cape, Wikipedia. The Free Encyclopaedia*, viewed 01 April 2024, from https://en.wikipedia.org/wiki/Western_Cape#:~:text=The%20total%20land%20area%20of,Worcester%2C%20Paarl%2C%20and%20George

Zakaria, N., Sehgal, R., Watson, A. & Kamarudin, K.A., 2023, 'Staying afloat? Using a reflective cycle approach to examine the effects of crisis on the business resilience of SMEs during COVID-19', *Journal of General Management* 48(3), 267–281. https://doi.org/10.1177/03063070221088371

Župerkienė, E., Šimanskienė, L., Labanauskaitė, D., Melnikova, J. & Davidavičienė, V., 2021, 'The COVID-19 pandemic and resilience of SMEs in Lithuania', *Entrepreneurship and Sustainability Issues* 8(3), 53–65.