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Article

Data saturation in qualitative research: A literature review in entrepreneurship study from 2004–2024

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Abstract: This systematic literature review examines data saturation in qualitative research within the context of entrepreneurship studies from 2004 to 2024. Data saturation, a critical concept in ensuring the rigor of qualitative research, remains inadequately defined in terms of sample size and assessment criteria across various studies. This review synthesizes 11 empirical studies, focusing on strategies such as stopping criterion, code frequency counts, and comparative methods for determining saturation. It identifies sample sizes ranging from 7 to 39 interviews, with an average saturation occurring between 10 and 12 interviews. Furthermore, the study explores the influence of different sampling methods and homogeneity of study populations on saturation outcomes. Despite the reliability of existing methods, the findings underscore the need for greater transparency and consistency in reporting saturation criteria. The review offers valuable insights for entrepreneurial researchers aiming to design qualitative studies, emphasizing the importance of tailored saturation standards based on research objectives and methodologies. This research contributes to a clearer understanding of data saturation in entrepreneurial studies and highlights the necessity for further empirical investigation into saturation across diverse qualitative methods.

Keywords: sample size; saturation; qualitative research; interview; entrepreneurship study

1. Introduction

In qualitative research, data saturation is an inevitable step (Kerr et al., 2010). If no new data or information emerges in an ongoing study, the data collection process can be stopped at that moment; this stage is known as data saturation (Cresswell et al., 2006). However, the scope of defining data saturation and the samples required is still vague in academia, and research related to the sample sizes required for various types of studies has yet to emerge (Hennink and Kaiser, 2022). Therefore, there has never been a better time to conduct research related to data saturation. This systematic review aims to assess saturation in qualitative research, determine appropriate sample size for saturation, and provide strategies for determining the saturation level.

2. Literature review

The concept of data saturation is based on the idea of "theory saturation" developed by Glaser and Strauss (1967). According to them, theory saturation is "the collection of more data on the underlying theoretical constructs without the discovery of new properties or the emergence of new insights into the current theory". Later, Yonge and Stewin (1988) investigated data saturation by developing

a grounded theory based on this foundation. They claimed that when all the important data can no longer be extracted from the current information during data collection, the theory's foundation is saturated, making it comprehensive and well-supported by data. In qualitative research, the concept of saturation is not only found in grounded theory but is also widely used in other qualitative research methods, and this use of saturation is more in terms of evaluating the sample than in terms of data sufficiency to develop a theory (Hennink et al., 2017).

Additionally, the specific nature of qualitative research makes saturation the most common guarantee for providing rigour for reviewers and readers. Saturation ensures that the current amount of data can explore the current phenomenon and can answer the current research question being asked, thus proving the validity of the research content (Morse, 2015).

In previous studies, researchers often used triangulation or their own experience to determine the sample size in qualitative research (Marshall et al., 2013). While existing studies have summarised the sample sizes of different types of qualitative studies for saturation, the differences in the explicit ranges of such studies for saturation are relatively large; for example, the sample size for data saturation should be about 4–30 (Sim et al., 2018). Some researchers have argued that the standard sample size for data saturation lacks a realistic justification. This is because qualitative research encompasses a diverse range of research methodologies, including interviews, observation, and document analysis. Therefore, the idiosyncratic nature of each type of research can lead to variability in the presentation of the data (Sandelowski, 1995; Suddaby, 2006; Trotter, 2012; van Rijnsoever, 2017). Consequently, the focus of the present study is on the specific sample size for data saturation, as such studies lack a clear determination of this particular range.

In addition, the justification of sample size and the explanation of saturation are not transparent enough in current published qualitative studies (Hennink and Kaiser, 2022), and many researchers base their judgement on their own experience as to whether saturation has currently been reached. For example, in interviews, if researchers keep hearing repetitions, based on this, they tend to judge that data saturation has been reached and therefore will stop further data collection (Jackson et al., 2015). Making saturation judgements based on a researcher's personal experience and immediate situation is inaccurate. This is because the relationship between coding, themes, and content categorisation changes constantly during data analysis, including modifications to the code, merging, and adding new options (Saunders et al., 2018). Therefore, there are more obvious drawbacks to relying only on a researcher's own experience as a criterion for judgement. In fact, many articles in the qualitative category indicate that the data has reached a saturated state but do not clearly indicate what criteria are used to define saturation or explain rather superficially that the data has reached the saturation point and do not present substantiated proof of saturation (Francis et al., 2010; Marshall et al., 2013). In this review, an attempt will be made to identify strategies for evaluating saturation in order to improve transparency.

Existing research on data saturation has focused mainly on medical and health-related fields, especially medical qualitative research, where data saturation criteria

are relatively clear. For example, Hennink and Kaiser (2022) point out through systematic evaluation that the sample size for data saturation in qualitative research depends on the specific research context, which provides valuable guidance for researchers in the medical field. However, in the entrepreneurial management field, discussions on data saturation are relatively scarce and lack systematic empirical support. Most research in this field still relies on the researcher's personal experience to determine whether the data has reached a saturation state. For example, Jackson et al. (2015) showed that many researchers judge data saturation by repeatedly hearing the same information repeated. Although intuitive, this empirical method lacks theoretical and methodological precision, resulting in insufficient transparency and consistency in the data saturation assessment.

Therefore, in this systematic review, the researcher aims to synthesise strategies for assessing qualitative data saturation and the scope involved in saturation.

3. Methodology

In the present study, the researchers followed the SALSA Framework, which was first discussed by Booth, Papaioannou, and Sutton; they opined that the SALSA Framework is a tool designed to simplify literature reviews, especially for review projects that do not have enough data for quantitative meta-analysis or need to deal with complex topics. The main purpose of the framework is to help researchers systematically search, evaluate, synthesise, and analyse literature. Compared with more procedural frameworks, such as PRISMA, SALSA is more flexible and is especially suitable for qualitative research (Booth et al., 2016).

The SALSA Framework is superior to the PRISMA Framework in terms of depth of analysis (Siksnelyte-Butkiene et al., 2021). SALSA emphasises detailed analytical phases in order to more deeply integrate research results. This is particularly beneficial for research that requires a nuanced understanding of complex problems (Bathaei and Štreimikienė, 2023). Another crucial point is the clear analytical structure (Siksnelyte-Butkiene et al., 2021). Although both SALSA and PRISMA allow for a systematic evaluation of the literature, SALSA includes clear analytical phases that lead to more insightful and actionable conclusions (Howard et al., 2023). This structure is essential for research that is constantly improving and updating indicators (Ying et al., 2021).

The SALSA Framework is structured into four parts: Search, Appraisal, Synthesis and Analysis. In this study, these four parts will be applied accordingly.

First, the search phase is where the search strategy, databases, and keywords are described. The second phase is the appraisal, where researchers list the criteria for selecting literature, explain how to assess the quality of the literature, and present the literature selection process in a flowchart. The third phase is synthesis, where researchers discuss the comprehensive results of the literature, identify the main patterns and themes, and analyse the methods used to achieve data saturation in various studies. Finally, the analysis phase concludes the data saturation situation in qualitative research in the field of entrepreneurship management, drawing conclusions based on the comprehensive results.

3.1. Search

The Web of Science (WoS) and Scopus are selected as the primary databases for the systematic literature review (SLR) because of their authority and broad academic coverage (Mariani et al., 2023). These two databases contain many high-quality journal documents that have undergone rigorous peer review, ensuring that researchers can retrieve the most influential academic results (Echchakoui, 2020). The journals in WOS and Scopus generally have high citation rates and influence in their respective fields, which provides a reliable basis for SLR (Vera-Baceta et al., 2019).

In this study, two databases were selected for article searching, which included "SCOPUS" and "WOS," and the keyword "data saturation" is applied to filtering the articles; other keywords in filtering the articles will be presented in the appendix. The results of selected articles are limited to "ENGLISH WRITING" and "BUSINESS." In this study, there is a fixed publishing time for article selection, which ranges from the year 2004 to the year 2024. The authors independently screened all article titles, abstracts, and the entire text to confirm eligibility.

3.2. Appraisal

The following criteria were used to select articles: 1) The articles must be in the entrepreneurship field; 2) they have to be conducted in interviews to collect data; 3) they must be published as journal articles; and 4) they are presented in English.

For articles that have passed the initial screening, a secondary screening of the content was required. The present study, an analysis of data saturation in qualitative research on entrepreneurship, employed the following screening criteria: 1) remove duplicates; 2) the selected article can be downloaded and read; 3) it should be a research article, not a review article; 4) it should present the data saturation clearly, like the number of saturations.

Based on this, 296 articles were retrieved via database searches; after screening and identification, a total of 11 articles remained. The **Figure 1** presents the process for systematic review search.

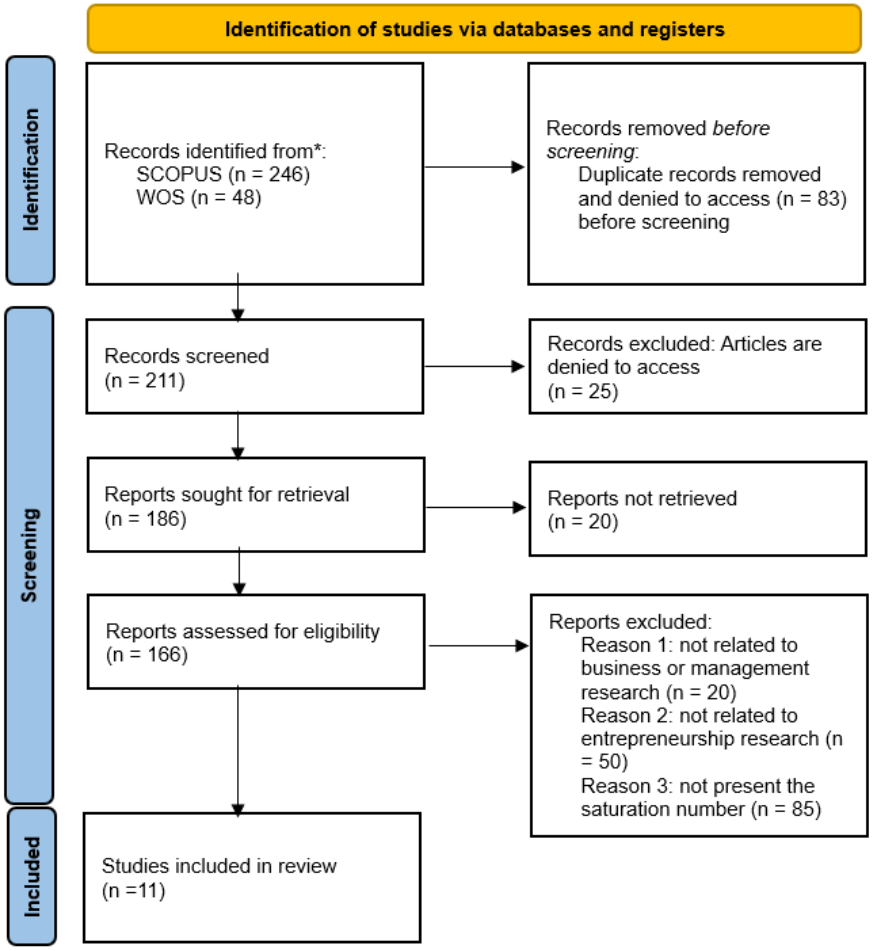

Figure 1. The SALSA flow diagram for the systematic review search procedures. Adopted from Booth et al., (2016).

3.3. Synthesis

At this stage, the researchers conducted a systematic synthesis of the screened literature. The aim was to summarise and integrate the results of the different studies to form a comprehensive research picture. To enhance the transparency and methodological rigour of the research as well as the synthesis process, the researchers followed clearly defined category criteria and systematic synthesis steps to better identify similarities and differences in the literature.

Prior to the synthesis, the researchers had established clear criteria for categorising the literature. These included three key aspects: research content, research methods, and data saturation assessment methods. In terms of research content, the researchers mainly identified the objectives of each study and their contribution to entrepreneurship management, with the aim of determining the coverage of different literatures on topics such as entrepreneurship development, human resource management, market development, etc. In terms of research methods, the researchers categorised the specific methods used in qualitative research, including purposive sampling, theoretical sampling, snowball sampling, etc., in order to understand the impact of different research methods on data saturation. In addition, for the assessment of data saturation, the researchers further

categorised and compared the strategies used in each study, such as the "stop criterion", the "frequency count of coding", and the "comparison method". The establishment of these classification criteria helps ensure the systematic and rigorous nature of the synthesis process.

During the implementation of the literature synthesis, the researchers compared the documents in each category to identify their similarities and differences. For example, for the research content category, the researchers divided the documents into several major research topics, including entrepreneurs' market entry strategies, human resource management challenges, and capital management of startups. Through this categorisation, the researchers were able to reveal general patterns and specific cases in the use of data saturation in the entrepreneurial field. To compare research methods, the researchers analysed each sampling method and its corresponding data saturation strategy. For example, this study found that purposive sampling is more likely to achieve data saturation in a highly homogeneous sample, while snowball sampling is suitable for research groups with difficult boundaries. This analysis not only shows the impact of different sampling methods on data saturation but also provides specific guidance for future researchers in their choice of methods.

In addition, during the synthesis process, the researchers further clarified how the literature was classified and integrated by providing specific examples. These practical case illustrations not only made the synthesis process more intuitive but also enhanced its transparency and credibility. At the same time, when describing the use of the frequency counting strategy for coding, the researchers gave examples of how to determine whether the data had reached saturation by continuously interviewing new codes until the frequency decreased to zero. These specific examples of operational use made it easier to understand and use complex methodological concepts.

Through these comprehensive steps, the researchers gradually constructed a complete research picture and clarified the main models and evaluation methods for data saturation in qualitative entrepreneurship research. The goal of this comprehensive process was not only to identify the similarities and differences between existing studies but also to lay a solid foundation for subsequent analysis stages. Through clear, transparent, and comprehensive steps, the researchers ensured that the integration of the literature was logical and scientific, thus providing a systematic reference framework for qualitative research in entrepreneurship management.

This approach not only revealed the applicability of data saturation in qualitative research on entrepreneurship management but also provided theoretical and methodological guidance for future research. The specific, detailed results of this part will be presented in "Chapter 4: Results".

3.4. Analysis

The core of the analysis step is to conduct an in-depth analysis of the synthesis results to determine trends, similarities, differences, and other elements in the literature. During this phase, the criteria and uses for data saturation in the

entrepreneurial field are identified, as well as how these research articles determined data saturation. Furthermore, the various qualitative methods of entrepreneurship research, such as case studies, interviews, and focus groups, each have unique requirements and challenges when it comes to reaching data saturation. The analysis should summarise the similarities and differences between these methods. Finally, the analysis section should summarise the main findings of the literature and provide insights and reflections on the data saturation issue in the entrepreneurial field, thereby providing a clear direction for follow-up research. This part will be fully detailed in "Chapter 5: Discussion".

4. Results

4.1. Approaches to assess saturation

This systematic review includes 11 articles evaluating saturation in qualitative research. The following information is derived from 11 eligible articles: 1) The authors of the article, the journal in which it is published, and its publication year; 2) The article's methodology, which includes sampling techniques, the study's objective, and the population under investigation; 3) The specifics of data saturation, including the approach to achieving saturation and the sample size for it. Details are presented in **Table 1**.

Table 1. Articles assessing saturation using empirical data.

Article		**Methodology**		**Saturation Results**	
Author, Year, Journal	**Research Objective**	**Sampling Method**		**Saturation Standard**	**Sample Size for Saturation**
Ashworth (2012) International Entrepreneurship and Management Journal	To explore the organisational development in fashion retail online marketing.	Theoretical and Purposive Sampling		Code Frequency Counts	14
Calheiros-Lobo et al. (2024) Administrative Sciences	To identify the best practices SMEs, engage in towards internationalisation.		Theoretical Sampling	Code Frequency Counts	12
Che Nawi et al. (2022) European Journal of Training and Development	To explore the challenges faced by young social entrepreneurs who operate social enterprises in Malaysia		Purposive Sampling	Comparative Method	7
Fallah and Soori (2023) Journal of Science and Technology Policy Management	To provide a framework for the successful entry of female entrepreneurs into the field of green entrepreneurship		Snowball sampling	Stopping Criterion	12
Irani et al. (2024) Interdisciplinary Journal of Management Studies	To identify the motivation of lifestyle entrepreneurs in Iran who struggle to seize opportunities.		Purposive Sampling	Stopping Criterion	13
Jekanyika Matanda (2012) Thunderbird International Business Review	To discover the approach for SMEs entrepreneurs to globalise and move to foreign markets.		Purposive Sampling	Stopping Criterion	8
Molly et al. (2018) Journal of Small Business and Enterprise Development	To explore the relationship between family entrepreneurship and private equity.		Snowball sampling	Stopping Criterion	18

Table 1. (*Continued*).

Article		**Methodology**	**Saturation Results**	
Author, Year, Journal	**Research Objective**	**Sampling Method**	**Saturation Standard**	**Sample Size for Saturation**
Movahedi and Farani (2012) International Journal of Entrepreneurship and Small Business	To identify and explore the barriers and limitations of female involvement with rural entrepreneurship in Iran.	Snowball Sampling	Stopping Criterion	39
Orobia et al. (2013) Qualitative Research in Accounting and Management	To develop a new conceptual framework of networking entrepreneurial platforms for leadership innovation.	Purposive Sampling	Stopping Criterion	10
Pan and Lin (2019) Journal of Business Economics and Management	Develop a new conceptual framework of network entrepreneurial platform for leadership innovation.	Theoretical Sampling	Code Frequency Counts	24
Samer Ali and Rashid (2024) Journal of Enterprising Communities: People and Places in the Global Economy	To explore the entrepreneurial personal characteristics among people with disabilities and explain how these characteristics influence their entrepreneurial capabilities.	Purposive Non–random sampling	Stopping Criterion	12

Table 1 summarises 11 articles that assess saturation using empirical data. Some articles used the purposive sampling method to collect data, and some articles used Snowball sampling. Most articles used the "stopping criterion" to assess data saturation (7/11), and three articles used "code frequency counts" to assess the data saturation; only one article used the comparative method to assess the data saturation.

The original research objectives of each dataset used in the test were different. Four articles focused on entrepreneurs developing businesses; three articles focused on human resource management in startups; three articles focused on the startup market; and only one article focused on startups and investment management.

These research objectives are typical of many qualitative entrepreneurship studies. The sample sizes of the datasets range from 7 to 39; all of them clearly exhibit indicators of data saturation, so saturation can be effectively assessed. The research populations of the vast majority of the datasets (10/11) are homogeneous, all coming from a specific population group (startup founders). The remaining datasets, which include venture capitalists, exhibit a certain degree of sample heterogeneity.

The authors articulated their saturation targets in a manner that indicated the absence of new content or codes. The nomenclature varies among articles; nonetheless, code often refers to specific themes or elements within the data, while content denotes broader classifications, such as novel ideas or meta-topics. 27% (3/11) of the articles sought saturation of code, 64% (7/11) sought saturation of content, and only 9% (1/11) sought saturation of both content and code.

When assessing saturation, the authors used relevant strategies for evaluation. These strategies are categorised in **Table 1** and explained in **Table 2**. The "stopping criterion" is the most used of the three strategies for accessing saturation (7/11).

Second, researchers used the "code frequency counts" (3/11) strategy to assess saturation, counting codes in a continuous set of transcripts until the frequency of new codes decreases to 0, indicating the level of saturation. Finally, only one article used the comparative method to assess data saturation by comparing it with pre-determined codes until no new codes were generated, thus determining that the data had reached saturation.

Table 2. Strategies for assess saturation.

Type of Approach	Description of Approach	Articles
Comparative Method	This method reviews the notes from each interview and counts the number of new codes in each successive set or group of notes. At the same time, the recorded codes are compared with pre-determined codes. This comparison continues until saturation is reached, where there are few or no new codes identified.	Che et al. (2022)
Stopping Criterion	This method refers to the addition of a stopping criterion to frequency counting, which usually indicates data saturation when no new codes or new concepts emerge after X interviews. In other studies, the stopping criterion relies on the recurrence of codes or themes, such as identifying a specific code, theme, or concept twice.	Fallah and Soori (2023); Irani et al. (2024), Jekanyika Matanda (2012); Molly et al. (2018); Movahedi and Farani (2012); Orobia et al. (2013), Samer and Rashid (2024)
Code Frequency Counts	This method involves recording every interview and counting the number of codes that appear in each interview until the frequency of new codes decreases and no new codes are identified.	Ashworth, (2012); Calheiros-Lobo et al. (2024); Pan and Lin (2019)

4.2. Sample size for saturation

Figure 2 shows the sample size for saturation with in-depth interview data.

The results of the data saturation test for each data set (n = 11) are shown as individual points. The results indicate that between 7 and 39 samples reached data

saturation in the data saturation test for each of the 11 data sets. The minimum sample size is seven interviews (Che et al., 2022), that study was conducted on the same type of group of individuals. By comparing the frequency of codes with the stopping criterion, the reason for the data package reaching saturation at the 7th interview can be explained. The sample with the highest saturation is 39 (Movahedi and Farani, 2012), The authors used Snowball sampling to maximise the stopping criterion and ensure data saturation through the collection of more data and multiple rounds.

Excluding these outlying values, and despite the different ways in which the studies collected data and determined data saturation, most of the data sets reached saturation between 10 and 18 interviews, with an average of 10 to 12 interviews.

In these studies, although the sample methods for the data were different, the study populations were relatively homogeneous. Only one study employed a heterogeneous sample, and the saturation of the dataset in that study did not exhibit any abnormalities. Moreover, in the three studies using theoretical sampling, only one dataset (24) had an unusually high saturation rate, far higher than the average. Similarly, in the two studies using Snowball sampling, one dataset (39) had an unusually high saturation rate, far higher than the average. In the five studies of purposive sampling, only two data sets (8) and (9) had unusually low saturation rates, well below the average.

Therefore, no correlation was found between saturation and the sample method of the data. Similarly, establishing the rule of saturation based on data homogeneity and heterogeneity may be arduous, since the majority of research does not assess saturation before data analysis but rather subsequent to the completion of data collection.

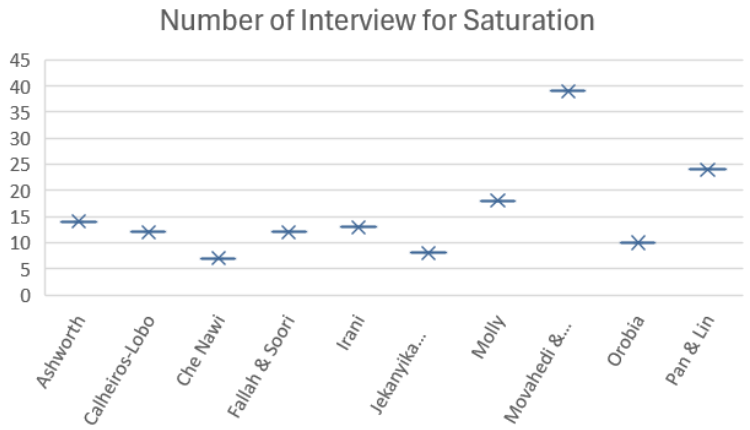

Figure 2. Number of interview for saturation.

5. Discussion

The aim of this systematic literature review is to identify empirical studies that assess saturation in entrepreneurship research, determine the sample size required to assess the level of saturation, the strategies used to assess the level of saturation, and the guidelines that can be drawn from these studies. The present study identified 11 empirical research articles that assessed saturation, 45% of which were published after 2020. Two different methods for assessing saturation were identified: content confirmation and code frequency confirmation.

Despite the use of different methods to assess saturation, different data sets, different saturation targets (codes and categories), and homogenous and heterogeneous study populations, the examined studies still reached saturation within a limited number of interviews. This indicates a strong reliability of different methods.

In the literature review process, many existing studies have given extensive recommendations on the data saturation sample size for qualitative research. For example, Sim et al. (2018) proposed that the data saturation sample size in qualitative research should generally be between 4 and 30. However, these ranges are often too broad to provide precise guidance for specific research fields. In addition, Sandelowski (1995) noted that varying research methods and objectives lead to significant variations in data saturation criteria, further complicating the process for researchers in determining the appropriate sample size. The present study analysed qualitative research in the entrepreneurial field from 2004 to 2024 through a systematic literature review and found that saturation could be achieved with 10–12 interviews in most cases. This result is similar to that found by Guest et al. (2006), but it is more specific and provides a quantitative reference standard for the field of entrepreneurial management. The clarity of this standard not only provides

more reasonable guidance for sample selection in qualitative research on entrepreneurship management, but also reduces resource waste in research, improving the scientific nature and rigour of the research.

Furthermore, this study found that the Sampling Method and the nature of the interviewed population (homogeneity) had no significant effect on saturation, and there were also outliers in the data saturation presented by the data sets collected using the same sampling method.

Overall, these findings provide much-needed empirical evidence on the sample size required for different qualitative methods in entrepreneurship research. Although an exceptionally high saturation index exists for a specific range (research purpose) of interviews, the saturation for most interviews is concentrated in the range of 10–12. However, the present study advises against using these results as a uniform sample size for qualitative entrepreneurial research; instead, they should be used as a reference to modify the Saturation Standard according to the individual research scope or objective.

Research significance

There are some important implications from the results of this systematic review. First, the results offer empirical guidance on the necessary sample size for achieving saturation in interviews, a valuable tool for developing a qualitative research plan in entrepreneurship research. Therefore, these results are recommended to be used as a starting point to determine the scope of potential interview data and then designing a sample size tailored to each specific entrepreneurship study based on research characteristics (e.g., research objectives, sampling strategies, researchers' qualitative research experience, saturation goals, etc.). This approach provides a clear rationale for the recommended sample size and enhances rigour.

Second, the findings of the present study determined the average sample size required for saturation across different data collection techniques (10–12). This is crucial since qualitative research suggestions about sample size often rely on empirical standards. The absence of explicit criteria may result in ethical dilemmas, including the misallocation of research funds or data (Carlsen and Glenton, 2011). Consequently, this study's findings serve as a benchmark for the sample size and saturation in qualitative research pertaining to entrepreneurship.

Finally, the rationale and attributes of saturation are essential in establishing and validating the appropriate sample size for qualitative research. The findings of the present study offer empirical insights into the ideal sample size for saturation, empowering entrepreneurial researchers to employ qualitative research more explicitly. For example, they can understand why a sample size of 15 attains saturation and is suitable for analysis. Despite the availability of various strategies for determining saturation among qualitative researchers, the transparency regarding the methods employed to assess the saturation level is severely lacking, which can compromise the rigour of qualitative research. This study examines the ways that entrepreneurial qualitative researchers might use to evaluate saturation more transparently in their publications and if the data set utilised in their research has achieved saturation.

From a practical point of view, transparent saturation assessment criteria also play an important role when publishing qualitative research articles. Vasileiou et al. (2018) point out that some journal editors encourage qualitative research scholars to include in their papers how saturation was determined. These requirements indicate that the current academic community hopes that qualitative research can present academic results in a more transparent and rigorous manner. Therefore, the results obtained in this study can help entrepreneurial qualitative researchers present research findings in a more rigorous manner.

Despite the selected articles in this study being in English, the limited scope focusing on entrepreneurship ensures that the conclusions adequately address qualitative research topics pertinent to entrepreneurship. The analysed research articles encompass not only the organisational management of startups, but also the evolution of startup markets and the management of human resources within such enterprises.

6. Conclusion

In qualitative research, saturation is argued to be the basis for determining sample size, yet there is little guidance on saturation determination beyond a researcher's judgement based on experience. The researchers of this systematic review identified studies on data saturation in qualitative research on entrepreneurship, recorded the methods used to assess saturation, and determined the sample size for saturation. These substantially help qualitative entrepreneurship researchers determine saturation in small sample sizes (10–12), especially in relatively homogeneous research populations.

Although this study determined the saturation of the qualitative research sample size, it did not address the saturation of qualitative research on entrepreneurship in the group interview, nor did it further analyse the factors that affected maximum saturation. Therefore, further research is needed in these areas.

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Availability of data and material: The data and supporting evidence for the findings of the study are accessible upon request from the corresponding author.

Conflict of interest: The authors declare no conflict of interest.

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