

Qualitative, Quantitative, and Mixed Methodology Paradigms

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Abstract

Which methodology is best for my research project? is the first question most research students and early career researchers ask. While a perfect answer does not exist, this conceptual paper provides some guidance as a point of departure in the right direction. The aim of this conceptual paper is, therefore, to present a comparative analysis of contemporary research methodologies. Although adopting one methodology than the other primarily depends on the research question, personal preference and prior experience and disposition, this analysis has found that mixed methodology research paradigm has the potential to producing more rigorous findings than relying on mono methods. This conceptual paper contributes to the methodological literature in two areas. First, it creates an awareness among research students and early career researchers about the availability of possible research methodologies to help them adopting suitable research designs to address their unique research questions. Second, it encourages researchers from all disciplines to engage in a dialogue with regards to adopting appropriate methodologies.

Keywords: Qualitative Research Methodology, Quantitative Research Methodology, Mixed Methods Research Methodology, Research Paradigms

1. Introduction

Business, management, and social research have traditionally relied on two overarching paradigms: the positivist (also called scientific or functional) paradigm and the constructivist (also called interpretivist) paradigm (Chan & Kwan, 2024; Scotland, 2012; Shah & Corley, 2006). A paradigm is a set of fundamental belief systems that people hold and that guides their disciplined actions (Guba, 1990). The types of paradigms can be distinguished based on three aspects: the ontological stance (the nature of knowledge or reality), the epistemological position (the relationship between the knower and the knowable), and the methodological approaches (how to access that knowledge) (Bazeley, 2002; Guba, 1990).

The positivist paradigm is based on the ontological assumption of objectivity. That is, a single reality exists about a phenomenon which can be understood by using quantifiable facts (Park et al. 2020; Shah & Corley, 2006). This approach generally seeks theory testing or refinement based on small amounts of structured data collected from a large sample (Maxwell,

2012b). The constructivist paradigm, in contrast, implies that an objective reality does not exist because all realities are socially constructed (Maxwell, 2012a; Wikgren, 2005). Constructivists seek explanations based on in-depth analysis of large amounts of unstructured data collected from a small sample (Stenbacka, 2001). In its extreme form, the constructivist paradigm suggests that there are as many realities about a phenomenon as there are people in a context (Mills et al., 2008). Constructivists may interpret the same phenomenon differently (Shah & Corley, 2006), and each interpretation may be true at the same time (Charmaz, 2004).

The divide between the two fundamental paradigms has increased over time due to continued development in methodologies. However, a useful development of the divide between these two paradigms paved the way for a third approach called mixed methodology (Denzin, 2010). Consequently, some researchers appear to increasingly find compatibility in combining both qualitative and quantitative methodologies to understand complex research issues in the same research project (Creswell, 2002; Dellinger & Leech, 2007; Denzin, 2010; Mark Tadajewski & Sherry, 2014). This departure from mono-methodologies to mixed methodologies signifies that understanding social complexities necessitates methodological triangulation to achieve reliable and trustworthy research outcomes (Hales et al., 2010).

While this departure is a productive development, there is an apparent lack of coordination across different disciplines, such as business, management, and social research, which may potentially lead to the isolated furtherance of methodological knowledge. Yet, this lack of coordination may present an opportunity for further research as research methodologies keep evolving and some methodologies (such as mixed methodology) have not yet reached the consensus stage (Creswell & Garrett, 2008). However, the flip side is that this lack of cooperation among different disciplines and scholars can lead to a lack of understanding of methodological adaptation and appropriate training for research students and early-career researchers. This, in turn, may have negative implications for the whole research enterprise in employing newer methodologies such as mixed methods (Denzin, 2010). For example, it is perhaps due to the blurred boundaries between methodologies that some researchers (e.g., Thornberg, 2010) tend to believe they have adopted a mixed methodology, whereas they have only described small qualitative samples using numbers. While quantifying qualitative data is not rare, merely describing purposefully selected small samples in numerical form and calling such a practice a form of mixed methodology may be questionable considering the widely used definitions of mixed methodology (Creswell & Plano Clark, 2007; Creswell & Tashakkori, 2007; Driscoll et al., 2007; Jogulu & Pansiri, 2011).

Thus, this paper highlights the urgent need from various paradigmatic standpoints to communicate with each other, so that issues surrounding methodological adaptation can be demystified. This demystification in turn will help researchers, specifically research students and early-career researchers, in embracing a suitable methodology to answer their research questions within the framework of their chosen ontological and epistemological positions. In addition, this paper responds to current debates surrounding the use of mixed methodology as a pragmatic research approach (Azabar and Thijssen, 2025; Dawadi et al., 2021). The paper clarifies that mixed methodology is not about presenting qualitative research using numbers, neither it is about using multiple methods. Mixed methodology is about mixing qualitative methodology with quantitative methodology to pragmatically triangulate results and making research findings more robust. Table 1 compares qualitative, quantitative, and mixed methodologies to highlight their unique strengths and weaknesses as a starting point.

Table 1. Comparison of Qualitative, Quantitative, and Mixed Methodologies

Issue	Qualitative methodology	Quantitative methodology	Mixed methodology
1. Overall aim	Understanding and explanation of social phenomena	Generalisation and confirmation	Aims both explanation and generalisation
2. Sample size	Small	Large	Both small and large
3. Amount of data	Large amounts of textual raw data	Relatively small amount of numerical data	Both large and small amounts of data
4. Relationship with participants	Close one-to-one relationship	Almost no direct relationship	Close one-to-one relationships with some but not with all participants
5. Frequently used data collection techniques	Semi-structured interviews, easy but costly and time consuming	Large scale surveys, low response rates, less costly and less time consuming	Combines methods based on objectives, more costly and time consuming than the other two methods
6. Frequently used data analysis techniques	Thematic analysis, tedious and time consuming	Statistical analysis using computer-aided programmes, relatively simple and quick	Combines methods from qualitative and quantitative approaches, takes longer and costs more
7. Flexibility and standardisation	Flexible	Less flexible than qualitative analysis	More flexible than both

8. Research process and data quality	The meticulous record keeping process adds value to quality of process and data	Compromises quality of data for standardisation	Quality of process and data is considered better than in the other two methods
9. Interpretation of results	Lot of interpretation is required	Interpretation is concise due to use of statistics	Interpretation is harder and longer because of the use of both qualitative and quantitative methods
10. Generalisability	Not generalisable but generalisability is not an objective	Highly generalisable in general	Generalisability is stronger than in any of the other two methods
11. Triangulation	Results are not triangulated in general	Results are not triangulated in general	Results are always triangulated
12. Overall usefulness, assuming cost, time and expertise are not issues	More useful than quantitative methods in understanding social phenomena	More useful than qualitative methods in replication	More useful than both qualitative and quantitative methods in all aspects
13. Term(s) used for quality of research	Trustworthiness	Rigour	Both trustworthiness and rigour

Note: The above list of issues is not exhaustive; the order does not represent priority. Source: Haq (2015)

2. Qualitative Methodology

Qualitative research methodology gained popularity in the 1960s, when researchers realized they needed to understand complex social issues more thoroughly than before relying on traditional quantitative methodology (Alasuutari, 2010). Qualitative research is typically concerned with inductive analysis of complex realities, adopting a descriptive and exploratory orientation (Guest et al., 2012). The overall aim of qualitative research is to build theory and define new variables by using rich and in-depth data from the participants' standpoint (Krefting, 1991). Qualitative researchers achieve this aim by understanding the lived experiences of people and then presenting these experiences as abstract concepts (Elliott et al., 1999).

Qualitative researchers see the world from the perspective of their participants (Curry et al., 2009; Guest et al., 2012; Holloway & Wheeler, 1996). This concept is referred to as the emic perspective, which means how local people think what is important for the world around them in each context instead of etic perspective (quantitative research) which is concerned how researchers believe what is important in each context (Harris, 1976; Holloway & Wheeler, 1996; Morris et al., 1999; Press, 2005; Shah & Corley, 2006). The qualitative approach focuses on a wide range of observations from a small sample and strives to paint a vivid picture of how reality is created (Orb et al., 2001).

Qualitative research typically leads to explanation rather than generalisation (Payne & Williams, 2005) as it untangles the meanings attached to a given phenomenon. However, there are three areas in which qualitative research is criticized. Firstly, small samples can lead to poor generalisation; secondly, researcher bias can guide the interpretation of raw data based on their own predispositions (Mays & Pope, 1995; Morse et al., 2008; Stenbacka, 2001); thirdly and finally, in extreme cases qualitative research can lead to idiosyncratic theory building, i.e., one theory relates to one issue or one case or one individual only (Eisenhardt, 1989).

2.1. Sampling in Qualitative Research

Qualitative research often employs small sample sizes to facilitate in-depth analysis (Haq et al., 2024a; Yasin et al., 2025). Fewer samples in qualitative research provide the opportunity to analyse a specific phenomenon in detail, yielding unique insights from rich data (Suter, 2011). Qualitative researchers act as part of the instrument and record information in a natural context to uncover meaning in various ways, such as description, explanation, and exploration (Suter, 2011). Random sampling and survey techniques are not useful in qualitative research due to the non-feasibility of large samples, given time and cost constraints (Marshall, 1996). The most widely used data collection method in qualitative research is purposive (also referred to as convenience) sampling (Jogulu & Pansiri, 2011; Suter, 2011; Tongco, 2007), where participants are selected based on their knowledge about the phenomenon under consideration and their availability (Basu, 1998; Haq et al., 2024; Haq et al., 2021; Suter, 2011; Tongco, 2007). In addition, purposive sampling is adopted when fewer potential participants are available and it is expected that these participants will lead to more participants, a concept referred to as snowballing (Haq & Davies, 2023; Lewis-Beck et al., 2004). While there is no definitive answer to the acceptable sample size in qualitative research, Saunders and Townsend (2016) suggest that a sample size of 15-60 participants can provide trustworthy research findings, or when the saturation point is reached.

Other sampling techniques available in qualitative research include case incidental quota sampling, intensity sampling, deviant case sampling, maximum variation sampling, criteria sampling, and open-ended questionnaire surveys (Bricki & Green, 2007; Bryman & Bell, 2007; Marshall, 1996).

2.2. Data Collection in Qualitative Research

The data collection methods available in qualitative research include (but are not limited to) ethnography, focus group discussions, open-ended questionnaires, semi-structured interviews, unstructured interviews, analysis of videos and photographs, and archival documents. The most widely used technique is face-to-face semi-structured interviews (Eisenhardt & Graebner, 2007; Press, 2005). Compared to other methods, face-to-face semi-structured interviews yield more and more accurate data. Goffman (1989) argued that researchers cannot conduct serious research without being close to their participants and observing their bodily gestures and the words they speak. By using this method, researchers can capture the feelings and body gestures of participants, in addition to what they verbally express (Gilbert, 2008). In this method, several open-ended questions are asked, allowing the interviewer to ask relevant and varied questions, including probing and prompting questions, to collect in-depth, rich data (Denscombe, 2010). The open-ended questions also give autonomy to the interviewees (also referred to as participants) to express their feelings and experiences in a naturally relaxed environment which may not be possible in most other data-gathering methods (Bricki & Green, 2007; Bryman & Bell, 2007; Denscombe, 2010; Guest et al., 2012; Haq & Davies, 2023; Hollway & Jefferson, 2008; May, 2011; Orb et al., 2001). Moreover, this method gives interviewees the freedom to tell their story or share their lived experiences in their own words, which they may be unwilling or unable to do in an indirect situation such as surveys or interviews involving closed-ended questionnaires.

Additionally, the one-to-one semi-structured interview method is easy to control, as it involves only two parties at a time, the interviewer and the participant (Denscombe, 2010; May, 2011). However, this method can be expensive and time-consuming compared to some other techniques (such as focus groups). Nevertheless, it is certainly less expensive and less time-consuming than unstructured interviews and ethnography (Goffman, 1989).

2.3. Data Analysis in Qualitative Research

Data analysis is complicated in qualitative research because data are often buried in the text and other objects, such as pictures, videos, and bodily clues (Bricki & Green, 2007). Most qualitative researchers tend to adopt inductive analysis to make sense of the data because they deal with issues where little prior knowledge is available (Elo & Kyngäs, 2007). The most used qualitative data analysis techniques are thematic analysis, discourse analysis, descriptive approaches, interpretative phenomenological analysis, grounded theory, narrative analysis, ethnographic, and template analysis (Arregle et al., 2007; Braun & Clarke, 2006; Bricki & Green, 2007; Graneheim & Lundman, 2004; Yasin et al., 2025; Yasin and Hafeez, 2023).

The espousal of a specific data analysis technique depends on the research question, objectives, and the type of data that has been collected. For example, in exploratory or explanatory qualitative research, where data are mostly collected using a semi-structured interview technique, researchers may find thematic analysis to be the most suitable technique. Thematic analysis is a flexible approach which accommodates various types of qualitative data, and which allows researchers to employ both inductive and deductive methods in identifying, analysing, and reporting themes (also referred to as patterns) in the data (Braun & Clarke, 2006; Bricki & Green, 2007; Graneheim & Lundman, 2004; Haq et al., 2024a). Themes are identified by breaking down a dataset into manageable chunks and then coding each of these chunks (Hollway & Jefferson, 2008). Although the process of coding and theme-building is a tedious activity, it helps researchers identify rich sources of patterns buried in the data, providing a basis for meaningfully interpreting the data (Yasin et al., 2025).

2.4. Validity and Reliability in Qualitative Research

Validity and reliability, or rigour, refer to the extent to which the object under research has been measured and whether the process or methods of measurement yield the same results when repeated in similar environments (Drost, 2011; Stenbacka, 2001). This understanding of rigour exists in quantitative research where the overall aim in general is to make generalisation from sample to population. However, the primary aim of qualitative research is not generalisation. Rather, the overall aim of qualitative research is to explain or explore why a social reality exists in its current form. Hence, trustworthiness in qualitative research is the equivalent to validity and reliability in quantitative research (Munhall, 2011).

Critics of qualitative research argue that small samples yield either poor or non-generalisable results (Mays & Pope, 1995; Morse et al., 2008; Stenbacka, 2001). Small samples in extreme cases can lead to idiosyncratic theory building, where each phenomenon, case, person, or situation requires its theory for explanation (Eisenhardt, 1989). Specifically, the qualitative research paradigm is criticised for three reasons (Mays & Pope, 1995). Firstly, research bias can occur due to the researcher's close involvement in the data collection process, which may influence their personal impression and interpretation. Secondly, a lack of reproducibility can occur due to the unique individual understanding of a phenomenon by the researcher, as other researchers using the same methods and data may not come to the same conclusion. Thirdly, qualitative research findings are typically not generalisable because of large amounts of unstructured data from small samples.

In contrast, admirers of qualitative research (e.g., Britten & Fisher, 1993; Haq & Davies, 2023; Krefting, 1991; Payne & Williams, 2005; Stenbacka, 2001) argue that unlike quantitative research in which quality of data is sacrificed for quantity or standardisation, qualitative research focuses on small samples to gather a rich set of data to understand a phenomenon deeply. Accordingly, small sample size is not a generalisability problem because small samples are chosen for three good reasons. Firstly, to access disadvantaged, minority, or hard-to-reach groups (Yasin et al., 2025). Secondly, to maximize diversity so that a range of phenomena can be described. Thirdly, to go beyond mere numbers, yes/no answers, and superficially measured Likert Scales in uncovering deep feelings based on lived experiences.

The notion that research bias negatively affects research quality in qualitative research is also refuted (Tongco, 2007) because reality is jointly constructed by the researcher and the researched to make sense of the world around them (Zarefsky,

2014). That is, while the researcher can be value-laden (Sobh & Perry, 2006), they facilitate the research (but not persuade the participants) by providing broad guidance to generate data that can lead to answering a particular research question. Hence, the quality of the overall research in qualitative research is considered, rather than focusing only on the results. The overall quality of qualitative research can be achieved by thoroughly documenting the research process and methods, enabling others to trace the results back to each step of the research and build confidence in the overall project (Stenbacka, 2001).

However, the conflicting description of qualitative research can be problematic. For example, Dellinger and Leech (2007) used the terms truth value, credibility, dependability, trustworthiness, generalisability, legitimation, and authenticity to refer to the overall quality of qualitative research. Onwuegbuzie and Johnson (2006) identified five types of validity in qualitative research. First, descriptive validity - factual accuracy of the research. Second, interpretive validity - accuracy of the interpretation of the data. Third, theoretical validity - the consistency of the theoretical explanation of the data. Fourth, evaluative validity - whether an evaluative framework can be applied to the research. Fifth, generalisability - whether results of the research can be generalised to other contexts. Similarly, Mays and Pope (1995) suggested five steps to ensure rigour and minimize research bias. First, to adopt a systematic and self-conscious research design. Second, to collect accurate data. Third, to follow a thorough data analysis process that may involve collaboration with other researchers and consideration of previous relevant research findings. Fourth, to communicate effectively with participants in data collection and with other researchers in interpretation. Fifth, to meticulously document the research process.

While the above scholars have made insightful contributions to the qualitative research literature, conflicting terminologies still exist and so does the complication of selecting appropriate methods at least for research students and novice researchers. However, qualitative researchers in practice can navigate issues related to validity and reliability through maintaining meticulous documentation in terms of how and why each step was taken in their research as well as the outcome of each stage, a term referred to as auditability or audit-trail (Carcary, 2009). Moreover, rigour can also be improved by discussing research results with participants a process referred to as respondent or participant validation (Burnard et al., 2008).

3. Quantitative Methodology

Quantitative research involves collecting large amount of numerical data and analysing it using statistical methods to explain a phenomenon. The quantitative approach generally relies on brief and structured observations of a large sample and generalises results from the sample to the population. Quantitative research, in its extreme form, presupposes that there exists only one single reality about a phenomenon that is not influenced by researchers (Muijs, 2010).

Quantitative research is used to identify cause-and-effect relationships between variables, verifying or nullifying theories or hypotheses (Creswell, 2002; Feilzer, 2010; Teddlie & Tashakkori, 2012). Critics argue that quantitative methodology is primarily concerned with numerical data, but most phenomena (such as education, health, and organisational performance) do not naturally generate numerical data (Muijs, 2010). However, these weaknesses can be mitigated by using indirect variables such as Likert Scales (Muijs, 2010). The use of proxy indicators is another way for generating indirect numerical data to measure a phenomenon, such as the number of years of schooling and the number of trainings attended, to assess the level of human capital (Crook et al., 2011; Hatch & Dyer, 2004).

It is also argued that quantitative researchers over-rely on procedures (Jogulu & Pansiri, 2011) and sacrifice the quality of data for standardisation (Stenbacka, 2001). Furthermore, quantitative researchers tend to miss more by looking at the phenomenon as outsiders than qualitative researchers do, as qualitative researchers become part of the research process and thus are able to understand better how participants view their world (Harris, 1976; Mays & Pope, 1995). However, since quantitative research typically deals with structured data, it can generate reliable and generalisable research findings (Jick, 1979; Stenbacka, 2001).

3.1. Sampling in Quantitative Research

The most frequently used sampling technique in quantitative research is random sampling, which encompasses a wide range of variations, including systematic random sampling, stratified random sampling, and quota random sampling. The most popular of these is systematic random sampling, in which each sample is selected from a list of potential respondents by following a random selection method. This type of sampling technique can be applied to any population size, but it is most used for larger populations. The formula used is $k = N/n$, where k is the sampling interval, N is the population size, and n represents the desired sample size. In cases of a small population, the entire population can be selected to draw reasonably accurate statistical inferences. Smaller samples are not useful in quantitative research because the response rate in quantitative research (such as surveys) is generally low (Newby et al., 2003), and responses of less than 100 cannot be used to draw statistically significant results (Shook et al., 2004).

3.2. Data Collection in Quantitative Research

Various instruments are used to collect quantitative data, including telephone interviews, web-based surveys, postal surveys, and structured questionnaires. Each instrument has its strengths and weaknesses in terms of time, cost, and data quality. Since most quantitative researchers in business, management, and social research use structured questionnaires for data collection (Bryman, 2006; Driscoll et al., 2007; Edwards et al., 2002; Jogulu & Pansiri, 2011; Newby et al., 2003), they have little to no influence over the respondents. Thus, quantitative data collection methods naturally lead to low response rates. However, researchers can use various techniques to increase response rates including (but not limited to) the use of pre-notification letters

to respondents, post card follow-ups, first class outgoing postage, and cash/monetary incentives (Edwards et al., 2002; Fox et al., 1988; Newby et al., 2003). Like sampling, data collection methods in quantitative methodology are also relatively simple than they are in qualitative methodology (Newby et al., 2003).

3.3. *Data Analysis in Quantitative Research*

Quantitative researchers use several statistical data analysis methods to analyse and make sense of quantitative data. These methods include (but are not limited to) Structural Equation Modeling (SEM), LISREL, SPSS, MATLAB, MINITAB, STATA, and STATISTICA. While the decision to employ a particular method for data analysis depends on the research question, objectives, and the type of data that is available, SEM is the most widely used data analysis method in various disciplines, including business, management, social science (Anderson & Gerbing, 1988), management information systems (Chin, 1998), and strategic management (Shook et al., 2004). SEM is a comprehensive analysis method for statistical analysis of quantitative data (Anderson & Gerbing, 1988; Suhr, 2006). Unlike many first-generation statistical analysis methods, such as regression, correlation, and analysis of variance, SEM, as a second-generation method, offers several benefits (Chin, 1998; Suhr, 2006). These benefits include SEM's incorporation of observed (measured) and unobserved (latent) variables in a multivariate environment to perform path analytic modeling. SEM enables researchers to conduct multiple tests to determine the optimal model fit. SEM allows numerous measurements of latent constructs to resolve multicollinearity problems. SEM represents complex relationships among several variables in a visual manner, rather than merely describing them in complex statistical statements. SEM can test a priori theoretical assumptions against empirical data. SEM has the unique ability to analyse several interdependent relationships in which dependent variables become independent variables simultaneously. SEM can analyse multiple dependent variables simultaneously (Shook et al., 2004). SEM has excellent predictive and explanatory capabilities for endogenous (dependent) latent variables in model estimation (Ringle et al., 2012).

3.4. *Validity and Reliability in Quantitative Research*

The issues of validity and reliability are generally less complicated in quantitative research than they are in qualitative research (Onwuegbuzie & Johnson, 2006). It is perhaps for this reason that research on improving validity and reliability in quantitative research has not undergone as significant changes as those in qualitative research over the last half a century. For example, the four steps recommended by Campbell et al. (1963) to improve the quality of quantitative research have been repeated by others in recent years (Drost, 2011; Haq et al., 2025). These are (1) Statistical conclusion validity, which refers to the fact that if a relationship exists between the variables, it can be tested statistically. (2) Internal validity - it refers to whether a causal relationship exists between variables and if the samples are representative and unbiased. (3) Construct validity - it refers to how well a construct is interpreted into a functioning and understandable reality. (4) External validity - to what extent a causal relationship between variables is generalisable.

Others have highlighted three types of validity (Dellinger & Leech, 2007; Onwuegbuzie & Johnson, 2006), which are similar to the above-mentioned recommendations. These are (1) content validity, which refers to the extent to which items on a measurement instrument represent the specific domain aimed to be studied. (2) Criterion validated - to check if scores from the test correlated with other constructs or if the scores were able to predict future scores of hypothetically related constructs. (3) Construct validity - it refers to whether the instrument used to measure the construct has been measured correctly in accordance with the claims that were made. Dellinger and Leech (2007) argue that construct validity encompasses all types of validity, including measurement-related validity, design-related validity, and statistical-inference validity. Their argument is useful because construct validity overlaps with all other types of validity, and if the construct has been measured and the meaning of the data has been interpreted properly, that would mean other types of validity are broadly covered.

Business, management, and social researchers have increasingly utilized a variety of computer-aided software programs to enhance the validity and reliability of their research (Guest et al., 2012; Mays & Pope, 1995). The use of software, however, has been greater in quantitative than in qualitative research because quantitative research deals with numerical data that is easier to analyse using software such as SPSS, SEM, and LISREL. However, qualitative researchers are increasingly finding it helpful to use specialized computer-aided qualitative data analysis software (CAQDAS), such as NVivo and Atlas.ti (Bazeley & Jackson, 2019; Bernauer et al., 2013; Edhlund & McDougall, 2019; Haq & Davies, 2023; Haq et al., 2021, Haq et al., 2024b; Ishak & Bakar, 2012; Ozkan, 2004; Schönfelder, 2011; Welsh, 2002).

In summary, scholars at the constructivist (qualitative methodology) extreme of the epistemological spectrum believe that reality is socially constructed, and researchers play a vital part in its interpretation, based on personal and/or societal factors such as their own mental models, cultures, and politics. Scholars at the positivist (quantitative methodology) extreme of the epistemological spectrum believe that researchers have no role in creating reality, as each reality is independent of human intervention or influence. However, extremes positions are not applicable in practice (Eisenhardt, 1989; Muijs, 2010; Press, 2005) because laws of natural sciences, in which all objects behave in the same way to any change in their environment, are not applicable to human beings as different people may react differently to the same change. Due to the ever-widening gap and the inherent limitations of the two fundamental research paradigms, some scholars are progressively shifting their attention towards adopting a third paradigm: mixed methodology.

4. **Mixed Methodology Research**

Although the rise of qualitative methods has enhanced our ability to understand social constructs more effectively, researchers are increasingly inclined to employ both qualitative and quantitative methodologies in the same research (Alasuutari, 2010). They aim to maximise research rigour and minimise methodological weaknesses, which are difficult to avoid if either of the two traditional methodology is adopted alone. Symonds and Gorard (2008) believe that the shift towards mixed methodology from mono-methodology was triggered by the categorisation that all numerical research is quantitative, and all other research is qualitative. They argue that any research involving both numerical and alphanumeric or non-numerical data necessitates the use of mixed methodology as an alternative research approach. The nature and benefits of using mixed methodology are summarised by Creswell and Plano Clark as:

As a methodology, it [mixed methodology] involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing, and integrating both quantitative and qualitative data within a single study or a series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone. (2007, p. 5)

4.1. Added value of Adopting Mixed Methodology

Those who tend to adopt mixed methodology argue that it is difficult to capture a reality by using only a positivist or constructivist paradigm and their associated methods, due to their selective nature (Azabar and Thijssen, 2025; Dawadi et al., 2021; Mays & Pope, 1995). It was due to two issues that resulted in the widespread use of mixed methodology as an alternative research approach from a variety of disciplines, including psychology, education, health, sociology, business, management, ecology, and environment, to name a few, since the 1990s (Azabar and Thijssen, 2025; Brannen & Moss, 2013; Bryman, 2006; Caruth, 2013; Dawadi et al., 2021; Driscoll et al., 2007; Hafsa, 2019; Jogulu & Pansiri, 2011). These are: (1) the ambition among social researchers to make research more robust than before (Alasuutari, 2010); and (2) the potential that mixed methodology makes complex relationships between social constructs clearer than mono-methods (Brannen & Moss, 2013). Enthusiasts of mixed methodology also believe that combining the two approaches helps to understand the nature of social reality more coherently (Driscoll et al., 2007; Timans et al., 2019). Moreover, it is probably the pragmatic nature of mixed methodology that makes it appealing, as it helps to achieve multiple research goals, such as explanation, confirmation, and triangulation (Caruth, 2013; Creswell, 2002; Feilzer, 2010; Gioia & Thomas, 1996; Jick, 1979; Tashakkori & Teddlie, 2010; Teddlie & Tashakkori, 2012). The concept of triangulation is a strong driving force behind the popularity of mixed methodology (Jick, 1979; Symonds & Gorard, 2008). Hales et al. defines:

Triangulation is a method used to determine the location of a fixed point based on the laws of trigonometry. These laws state that if one side and two angles of a triangle are known, the other two sides and angle of that triangle can be calculated. (2010, p. 12)

Triangulation refers to the use of multiple methods to collect and analyse data, thereby developing a comprehensive understanding of a research problem and testing the validity of findings (Dawadi et al., 2021; Driscoll et al., 2007; Jogulu & Pansiri, 2011; Symonds & Gorard). When triangulation is employed, data are collected from different sources about the same phenomenon or at various points from the same source, which is referred to as data triangulation. It is also possible to collect data by adopting different methods, which is referred to as methodological triangulation. Whatever type of triangulation is adopted, multi-angle data can be merged into a single point or compared with each other to obtain more reliable outcomes than those that can be derived from data collected using a single source, at a single point in time or space, or using a single method. This is because what people say about a situation may differ from what they would do if they were faced with it or a similar situation (Charmaz, 2004; Goffman, 1989; Press, 2005).

Thus, the espousal of mixed methodology can result in reduced uncertainty and enhanced confidence in the research findings (Jick, 1979). Therefore, adopting mixed methodology can mitigate both the inherent bias associated with mono-methodologies and help avoid the potential for making inappropriate generalisations. Moreover, the adoption of mixed methodology makes generalisation possible from samples to population as well as to theoretical propositions (Sobh & Perry, 2006). Furthermore, mixed methodology increases the validity of research findings and provides more rigorous results than adopting either a qualitative or quantitative methodology alone (Bryman, 2006; Driscoll et al., 2007; Jick, 1979; Shah & Corley, 2006). This is because most social issues cannot be measured directly, nor can they be accurately assessed using direct variables or by adopting either a qualitative or quantitative research approach alone. Take the example of the amount and level of human capital in an organisation, which is the sum of individual-level qualifications, skills, training, and abilities that are not solely owned by the firm but can be used in attaining strategic objectives (Haq, 2016; Haq et al., 2024b). Although this construct has been researched using several proxy variables (Basu, 1998; Mahsud et al., 2011; Unger et al., 2011; Yasin and Hafeez, 2023), no research has ever been able to capture the impact of this socially complex and causally ambiguous construct on individual- and/or firm-level performance (Barney, 1991; Wernerfelt, 1984) using direct variables. It is possible to draw insights about this and other complex social phenomena by using a combination of qualitative and quantitative research methodologies, as well as data from different angles or at various times and spaces.

The use of mixed methodology has the potential to eliminate various unnecessary and unproductive controversies between qualitative and quantitative research approaches. For example, some scholars mistakenly assume that quantitative social researchers presuppose regularity in social behaviour, like that found in the natural sciences, and some qualitative social

scientists believe that all social events are idiosyncratic, therefore, any kind of replication is not possible (Press, 2005). This article argues that while these extreme views may not exist in practice, no research is fully generalisable or replicable due to social dynamics, and idiosyncratic theory-building is not required for every phenomenon. Some generalisation can always be possible, as one individual's experience can match, to some extent at least, that of other individuals in a similar situation in similar conditions.

4.2. Criticism of Mixed Methodology

Having described the various benefits that mixed methodology can offer, it is acknowledged that they are not immune to criticism. Some researchers blame mixed methodology for inhibiting the development of new and more effective research methodologies. For example, Symonds and Gorard (2008) argue that combining elements from the two traditional paradigms (qualitative and quantitative) forms a third paradigm (mixed methodology) which is philosophically unnecessary. Others believe that researchers cannot be totally subjective or objective in collecting, analysing, and interpreting data because researchers are inherently biased (Charmaz, 2014). Scholars also appreciate that since extreme views do not exist in practice, extreme positivism does not provide any useful insights into how a given society or culture operates (Muijs, 2010; Press, 2005), and idiosyncratic theory building is not useful (Bazeley, 2002; Curry et al., 2009).

Based on the probability of for and against arguments presented above, it is reasonable to say that mixed methodology, as a research paradigm, is neither a proxy nor a duplication of the two traditional methodologies. Therefore, it is unhelpful to consider the use of mixed methodology as a hindrance to the potential of further development of methodologies. This is because the widespread use of qualitative methodology since the 1960s did not cause the demise of quantitative methodology, and that of mixed methodology since the 1990s did not cause the demise of qualitative methodology. Hence, contrary to Symonds & Gorard's (2008) suggestion that any new developments, including but also beyond and above mixed methodology, are not likely to cause the demise of any of the three paradigms. The next question is, "How can methodologies be mixed?"

4.3. Types of Mixed Methodology

Methodologies can be combined in various ways, depending on the research objectives (Bronstein & Kovacs, 2013; Onwuegbuzie & Johnson, 2006; Tashakkori & Teddlie, 2010; Teddlie & Tashakkori, 2012), as well as the researchers' interests and experiences. A brief outline of different mixed methodologies is provided in Table 2, and a widely used mixed methodological design is explained next as an exemplar.

Table 2. Types of Mixed Methodologies

Type of mixed methods	Basic description
Concurrent	Qualitative and quantitative data are collected and analysed independently but concurrently.
Sequential	Qualitative and quantitative data are collected and analysed separately in a sequential way, one after the other.
Conversion	Data are converted or transformed from one form to another (e.g., quantifying qualitative data) and then analysed.
Parallel	Both types of data are collected but analysis is done in an integrated way in a parallel design.
Fully mixed	Qualitative and quantitative approaches are mixed in an interactive way at all stages of the research.
Transformative	Qualitative and quantitative data collection methods are chosen based on data requirements and changes are made in the research process during the project when and as required.

Source: Haq (2015)

4.4. Sequential Mixed Methodology

Sequential mixed method, also known as non-fixed and emergent mixed methods (Bronstein & Kovacs, 2013), is the most widely used mixed methodology design (Driscoll et al., 2007). Bryman (2006) has analysed 232 journal articles and found that more researchers used sequential mixed methods than other mixed methods research designs. Onwuegbuzie and Johnson (2006) also argued that sequential mixed methods are used more widely than other forms of mixed methods. In a sequential mixed methods design, researchers collect and analyse one type of data in the first phase, which informs the type of data to be collected and analysed in the second phase. A typical sequential mixed methods design is conceptualized in Figure 1.

Sequential mixed methods research design can provide the opportunity to collect and analyse data and judge each methodology without diluting the other (Brannen & Moss, 2013). To further illustrate this argument, four examples are provided from the extant literature that utilise sequential mixed methods. Firstly, in their study, Driscoll et al. (2007) collected quantitative data using a survey followed by qualitative data using a semi-structured interview technique. They then transformed qualitative data into quantitative data before the final analysis. With the help of embedded qualitative data, they were able to explain and augment many contradictions they found in the quantitative data. Secondly, Jogulu and Pansiri (2011) analysed two doctoral research projects that had employed sequential mixed methods. The postgraduate researchers collected and analysed both quantitative and qualitative data. The doctoral researchers were able to elaborate on the quantitative results by using the qualitative data to address the research questions more accurately, which might not have been possible if a single

research methodology had been employed. Thirdly, Jick (1979), in his PhD research, found that mixed methodology research design was a strong approach to analysing employees' anxiety in uncertain and insecure situations. He collected quantitative data using a survey design, followed by qualitative data through interviews, which he used to triangulate the results of the quantitative analysis. Fourthly and finally, adopting a sequential mixed methods design, Gioia and Thomas (1996) collected qualitative data by interviewing all three members of the top management team of a large public university on multiple occasions. They also interviewed top management team members from other similar institutions. Based on the core categories they had identified from analysing the interview data, they collected quantitative data from a much larger sample using a questionnaire. This process helped confirm and triangulate their results.

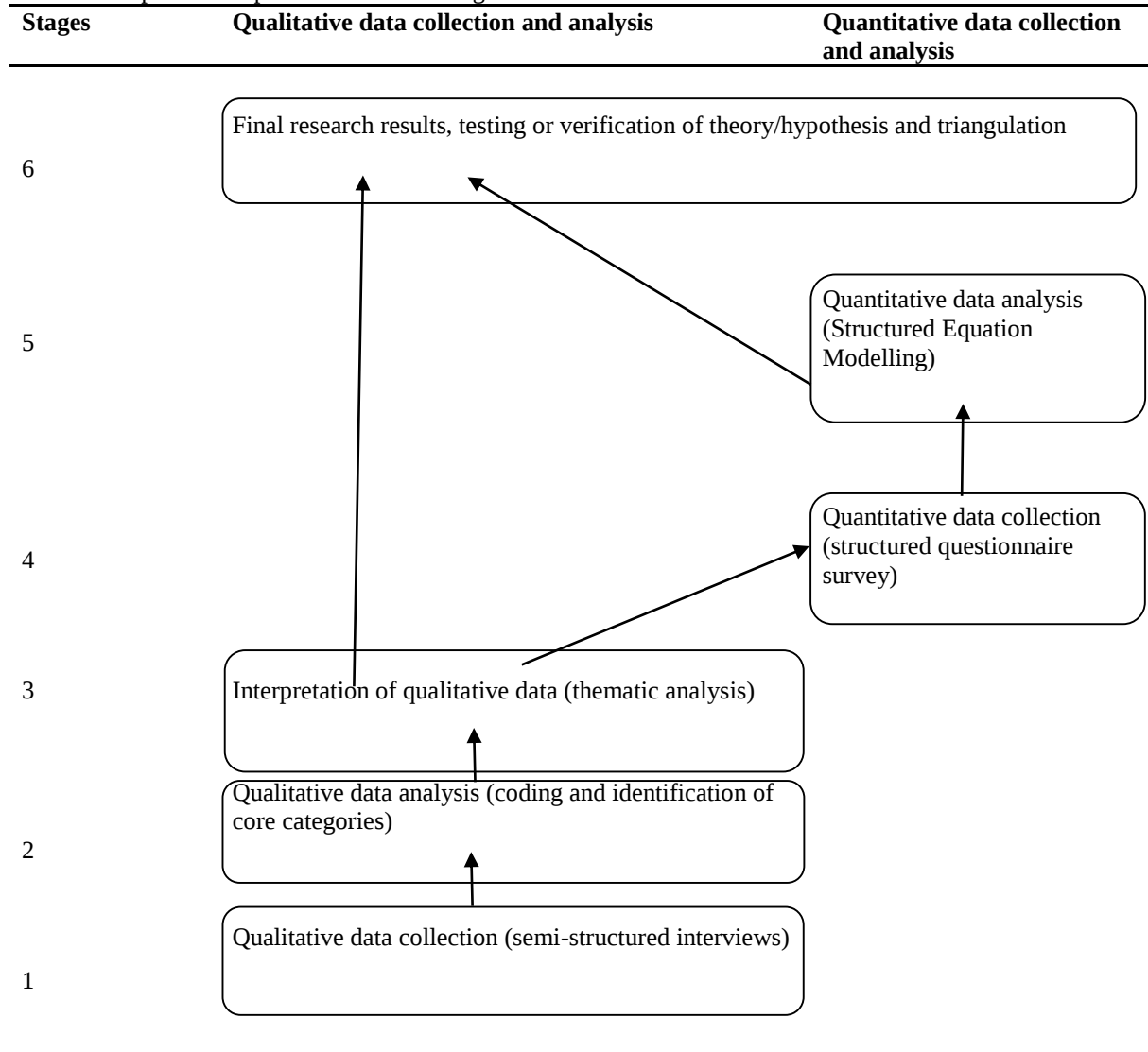


Figure 1. A typical example of Sequential Mixed Methodology Research Design. Source: Haq (2015)

4.5. Validity and Reliability in Mixed Methodology

The issues of validity and reliability in mixed methodology research differ from those in qualitative and quantitative methodologies. While the process of combining qualitative with quantitative methodologies creates complementary strengths, it also results in non-overlapping weaknesses (Dellinger & Leech, 2007; Onwuegbuzie & Johnson, 2006). Complementary strengths refer to the value added to the overall research when qualitative and quantitative methodologies are combined. Non-overlapping weaknesses refer to the difficulties of analysing qualitative textual data (also known as the problem of representation) and making credible, transferable, and confirmable inferences (also referred to as the problem of legitimization or integration).

As qualitative and quantitative research methodologies complement each other (Britten & Fisher, 1993), the concept of trustworthiness can be somewhat compatible when methodologies are mixed appropriately, such as in sequential mixed methods. This advantage of mixed methodology over mono methods may be the result of mixed methodology being able to minimize research bias (a criticism raised by positivist paradigm), and the risk of survey questionnaires not being uniformly understood by participants and researchers (a criticism raised by constructivist paradigm) (Mays & Pope, 1995). In addition, employing verification and self-correcting strategies at each stage of the research process in mixed methodology, which are

considered measures of validity and reliability in the qualitative research paradigm (Morse et al., 2008), may further contribute to the research rigour (Azabar and Thijssen, 2025). A hypothetical explanation is provided below, outlining how validity and reliability can be addressed in a sequential mixed methods design (cf. Figure 1).

In the first phase, qualitative data can be collected from purposefully selected individual participants using a semi-structured interview technique. The interviews would provide a rich source of textual data, leading to the identification of codes, categories, and themes that will inform addressing the research question. These codes, categories, and themes would provide a basis for interpreting the lived experiences of the participants. In the second phase, a quantitative data collection process can be followed using a closed-ended questionnaire-based survey. Variables and constructs would be defined based on the codes and themes that had already been identified during the thematic analysis of the qualitative data. By doing so, both internal and external validity can be achieved, as the samples would be representative of the population, and assessing or measuring the phenomenon would not be flawed.

Additionally, the second phase would complement and triangulate the results from the first phase. To improve overall research quality, other researchers (such as supervisors, coauthors, and/or peers) may be asked to critically evaluate each stage of the research process and provide feedback, which can be considered and acted upon. This type of mixed methodology research can achieve analytical generalisation (Stenbacka, 2001) as well as an intermediate type of limited generalisation (also called *moderatum* generalisation), which is an acceptable norm in qualitative research, as well as in mixed methodology (Payne & Williams, 2005; Cronholm & Hjalmarsson, 2011).

5. Discussion

Although the divide between the two conventional paradigms (positivist vs. constructivist, in other words, qualitative vs. quantitative methodologies) has resulted in a rich amount of scholarly investigation, the two traditions seem to remain as apart as ever. Consequently, social researchers started using mixed methodology increasingly as an alternative approach (Caruth, 2013) because there are greater benefits of using mixed methodology than relying on a qualitative or quantitative methodology alone. For example, the use of mixed methodology enables researchers to build and test theory in the same research project. Moreover, results drawn using mixed methodology can be more reliable due to the inherent complementarity advantages than results obtained using only a mono methodology.

Nevertheless, scholars need to develop a consensus on when mixed methodology should be adopted and how methodologies should be combined. While several mixed methodology designs are discussed in extant literature, methodological literature does not provide a step-by-step guide to help researchers (especially research students and early career researchers) choose appropriate data collection and analysis methods (out of many) that are suitable for their research. However, it is acknowledged that some scholars (e.g., Dellinger and Leech, 2007; Onwuegbuzie and Johnson, 2006; Mays and Pope, 1995) have suggested various steps to improve the quality of research, mostly from qualitative and to some extent mixed methodology research standpoints. However, much of this evidence is confusing due to the use of conflicting jargon (such as truth value, credibility, dependability, trustworthiness, generalisability, legitimization, authenticity, and so on), which often refers to the same concept. Hence, the lack of relevant research on methodological appropriateness has resulted in difficulty in adopting suitable research methodologies to address a unique research question in a specific context, especially for research students and novice researchers. For example, there are some philosophical positions which can be adopted by both qualitative and quantitative researchers in the same way (realism, for instance) (Sobh & Perry, 2006). But a uniform application of a philosophy can only be valid at the ontological level. Researchers need to embrace a position on the qualitative or quantitative camp at the epistemological level, unless they employ a form of mixed methodology.

Another example of methodological decision-making confusion can be quoted from the blurred boundaries between discourse analysis and narrative analysis. In discourse analysis, researchers examine how their subjects use language to describe their experiences. They include and carefully examine the selected themes they find in the textual data (Burck, 2005; Schiffrein et al., 2008) and exclude other themes as uninteresting or redundant. In contrast, researchers put themselves in the shoes of their research subjects in narrative analysis and retell their stories to draw meaningful insights from what the participants shared about their lived experiences (Burck, 2005; Daiute & Lightfoot, 2004). While researchers reply on the perceptions/statements of their participants and do not put themselves in the shoes of their participants in discourse analysis, language here too plays a crucial role because the words and phrases used to describe certain events convey the feelings of the narrators. This murkiness around the boundaries of methods is not helpful, specifically for research students and early-career researchers. While there may not exist a quick fix to demystify these overlapping differences in qualitative research, further research is required to advance the field of methodological appropriateness to expand our understanding of research methodologies that can produce trustworthy and reliable research findings.

5.1. Future Research

The authors recommend future research in the following three areas. Firstly, while extant research suggests that mixed methodology produces more accurate and reliable results than qualitative or quantitative methodologies alone, there is little guidance as to when and how to combine methodologies to obtain reliable and trustworthy research results (Coviello & Jones, 2004) keeping in mind the nature of the research problem and the available resources. Addressing this issue is of paramount importance due to three reasons. (i) The classification of methodologies without elaborating on why and how boundaries are

drawn between them and what will be the possible consequences in case if these boundaries are violated (Symonds & Gorard, 2008)? (ii) What are the underlying reasons whereby researchers tend to adopt a particular form of mixed methodology (such as sequential mixed methods) than other designs? (iii) Whether or not samples be repeated in mixed methodology from one phase to another as repetition of samples may add value to data due to participants' knowledge about the research or non-repetition may contribute to control research bias and over exposure of the participants?

Secondly, while qualitative research can produce high-quality research results, there is little evidence to suggest a practically workable philosophical stance that can guide researchers (specifically research students and novices) in collecting data, analysing it, and coherently interpreting the findings. Part of the complexity comes from two sources. (i) Some philosophical positions are shared by both quantitative and qualitative research on ontological levels, but they differ on epistemological levels depending on the specific research questions. Such differences at epistemological levels require a different set of analysis techniques to be employed, in addition to necessitating a distinct set of data that can provide a reasonable answer to the research question under investigation. Realism is one example of this nature (Sobh & Perry, 2006). Realists believe that reality exists independent of the human mind (Wikgren, 2005), which essentially describes the positivist paradigm. Qualitative realism shares the same belief at ontological level but unlike positivism it argues that while such a reality can be accessed by adopting different methodologies, but it can be fallible (Wikgren, 2005). Therefore, adopting a particular research design is shaped by both ontological and epistemological standpoints.

Thirdly and finally, while SEM is widely used in quantitative methodology, SEM is a mathematically complex package that many researchers find difficult to use (Chin, 1998; Shook et al., 2004). To navigate the technically complex issues, researchers can take three steps which may guide them in applying SEM correctly to make sense of data. Firstly, to ensure that the data meet the assumed multivariate normal distribution of indicator variables. Secondly, to measure indicators appropriately, that is, weak measures may lead to inappropriate modifications of structural models and false findings. Thirdly, to choose an acceptable sample size to assess model fit because large samples may produce trivial differences, and small samples may lead to a suspicious model fit. Therefore, to address limitations of SEM, we suggest further research on 'How to make sure that quantitative data meet the assumed multi-variability of normal distribution of indicator variables?' 'How to measure indicators appropriately?' and 'What will be an acceptable sample size to assess model fit when SEM is used for data analysis?'

6. Conclusion

This paper presents an exposition of contemporary research methods and draws three main conclusions. Firstly, although quantitative research is simple and can produce robust results that can be generalised from samples to population, it does not necessarily provide better or more valid explanations than qualitative research does. Secondly, while qualitative research is complex and offers poor generalisation, it can capture deeper meanings of a social phenomenon. Thirdly and finally, all research is selective as no single research can capture the factual truth of events by following either a qualitative or quantitative tradition alone.

In any case, the quality of any research is an important issue that can be assured by collecting sufficient, accurate, and rich data to explain a particular social phenomenon, as well as to help readers form an independent assessment of the findings. Such a broad objective is more likely to be achievable when an appropriate mixed methodology is adopted instead of relying on either of the two traditional methodologies. Although past research shows that the use of sequential mixed methodology is more popular among business, management, and social researchers than other forms of mixed methodologies, it is unclear when and how methodologies can be, or should be, mixed. To narrow this gap, this paper highlights the need for a dialogue among researchers to further the debate of methodological appropriateness and adoptability.

Moreover, despite the understanding that mixed methodology offers clear benefits over qualitative and quantitative methodologies, an interdisciplinary dialogue appears to be lacking in the methodological literature. This call is not new per se, as others (e.g., Coviello & Jones, 2004; Creswell & Garrett, 2008; Denzin, 2010) have already advocated for a debate on devising dynamic research approaches that integrate qualitative and quantitative methodologies. However, these calls have not gone far enough and have not attracted a sufficient response, in clarifying the emerging nature of mixed methodology and acquainting research students and novice researchers with methodological trends and complexities. Despite making several insightful contributions to methodological literature, this paper has two fundamental limitations. First, it has not been possible to discuss in detail all available research methodologies and methods. This paper has focused primarily on widely used data collection and analysis tools in both quantitative and qualitative methodologies. Second, this paper explained only one type of mixed methodology (sequential) out of many as an exemplar.

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