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Research Methodology in the Built Environment

A selection of case studies

Edited by
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3 Choosing an appropriate research methodology and method

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The choice of appropriate research methodology is one of the most difficult and confusing decisions for most researchers. The type of research will dictate the right research methodologies that should underpin the research and data-collection methods to be used. Regardless of the method or methodology adopted for the study, the data-collection techniques employed must be suitable and capable of meeting the objectives of the study. Moreover, it is important that the technique used to collect data is adequate to provide the information required to accomplish the overall goals of the study. This chapter builds on Chapter 2 to discuss the available research methodologies and the basis of selecting the most suitable. The chapter presents a review of relevant current literature on the choice of appropriate research methodology, sampling procedures and data-collection techniques. It highlights the strengths and weaknesses of each type of research methodology: qualitative, quantitative and mixed methods.

3.1 Introduction

There are many research strategies that can be adopted by a researcher, depending on the kind of research; such strategies include: experiment, survey, case study, action research, grounded theory, ethnography, archival research etc. (Crotty, 2004; Saunders *et al.*, 2009). The choice of research strategy is guided by the research question(s), research objectives, amount of existing knowledge, available time and resources and, finally, the philosophical underpinnings of the researcher (Saunders *et al.*, 2009). The choice of suitable data-collection and -analysis methods (qualitative, quantitative or mixed methods) for any research study is determined by the paradigm of the research and the nature of the research question. Creswell (2003) argues that no particular method has an advantage over the others, and that the actual research questions of the study should help determine the choice of method. The research methodology focuses on the process or steps and the kinds of research tool and procedure needed to obtain the required data for the study (Mouton, 2001). Generally, a research approach, whether a quantitative, qualitative or mixed method, is designed with the primary objective to collect data considered to be representative of the larger population (Gray, 2006). As it is usually not practical for the researcher to collect all the information required from the entire population, use of a sampling technique allows the assembling of such information from a segment of the population (Saunders *et al.*, 2009).

A significant number of social science studies, including construction management, involve acquiring information from the subject or topic under investigation through the use of questionnaire surveys, interviews, participant observations, etc., to fulfil their objectives. However, among these data-collection techniques, the questionnaire has been found to be the most prominent instrument used by many researchers to seek answers to research questions for their studies (Fellows and Liu, 2003). Interviews are considered to be the best data-collection option in situations where the objective of the research is concerned with the exploration of the feelings and attitudes of participants, in an attempt to gain a deeper appreciation and greater understanding of a particular phenomenon (Gray, 2006; Denzin and Lincoln, 2008). Fellow and Liu (2003) argue that interviews are useful tools to obtain detailed information about personal feelings, perceptions and opinions. The second section of the chapter discusses the various types of research methodology, and Section 3.3 describes populations and samples. Section 3.4 presents data-collection techniques, followed by illustration of the process of choosing an appropriate research method in Section 3.5. The last section highlights the conclusions and summary of the chapter.

3.2 Research methodology

The choice of a research methodology is a difficult one and should be based on the researcher's convictions, beliefs and interests (Goulding, 2002). Other important factors involved in choosing a research methodology include the aim of the research, epistemological concerns and norms of practice of the researcher and other previous work in this topic area (Buchanan and Bryman, 2007). A *methodology* refers to the philosophy and framework that are fundamentally related to the entire process of the research. Research *design* involves the plan of action that links the philosophical assumptions to specific methods (Creswell, 2003; Crotty, 2004), and *methods* are the specific techniques of data collection and analysis (Creswell, 2003). Mackenzie and Knipe (2006) argue that *methodology* is the overall approach to the proposed research linked to the paradigm or theoretical framework to be used, whereas the *method* refers to systematic modes, procedures or tools used for the collection and analysis of data. Three main methods are currently accepted for conducting research: quantitative, qualitative and mixed methods. A qualitative methodology focuses on process and meanings and uses techniques such as in-depth interviews, focus groups and participant observation (Sale *et al.*, 2002). Quantitative research, however, involves a systematic scientific investigation of quantitative phenomena and their relationships by employing mathematical models to test theories and hypotheses pertaining to the natural world (Fellows and Liu, 2003; Creswell, 2009). The use of the mixed method approach allows researchers to adopt multiple approaches to data collection and analysis in a single study.

Qualitative research method

A qualitative research method helps to address questions that cannot be answered by way of quantification (Ospina, 2004). In the qualitative research paradigm, the

most important focus is for researchers to capture accurately the existing experiences and perceptions of participants involved in the phenomenon or process under investigation (Onwuegbuzie and Johnson, 2006). It is better for obtaining important preliminary insights about the phenomena being studied than quantitative surveys. Liamputtong and Ezzy (2005) add that exploratory qualitative research helps researchers to acquire information about research issues where little is known. Qualitative methods are concerned with words and images, which the researcher employs in seeking to interpret meanings and explanations of the way people behave and to develop an understanding of social constructs. The principal advantage of the qualitative method is its ability to generate very rich, deep data. Ospina (2004) summarised the benefits of using qualitative research methods as follows. They can be used to:

- add more detail to existing knowledge of a phenomenon obtained from a quantitative study;
- better understand a topic by studying it simultaneously or concurrently;
- explore a phenomenon that has not been studied before;
- develop understanding of any phenomenon in its complexity;
- help understand intricate phenomena that are difficult to approach quantitatively;
- advance a phenomenon well studied quantitatively but not well understood in any depth.

Quantitative research method

Many such discussions in favour of quantitative research within the built environment have centred on such reliability, validity and the scientific principles considered as a major strength associated with this research methodology. Creswell (2003) described quantitative research as *objective* in nature, whereas Naoum (2013) defined it as an enquiry into social or human problems based on testing a hypothesis or a theory composed of variables, measured with numbers and analysed with statistical procedures. Quantitative methods centre on objectivity and endeavour to capture reality. However, it has been asserted that quantitative methods are inflexible, myopic, mechanistic and limited to the realm of testing existing theories (Toor and Ofori, 2008). Some of the commonly used quantitative research methods are structured interviews, structured surveys, symbolic models and physical experimentation (Naoum, 2013). Quantitative methods are used in a systematic, controlled, empirical way for a significant investigation of facts about natural phenomena. However, the use of a quantitative technique stipulates that complete objectivity, as implied in the positivist position, is not possible, as all observations are driven by pre-existing theories or concepts that determine how and why objects are constituted and selected (Seale, 2002). A summary of the key characteristics of qualitative and quantitative research is presented in Table 3.1.

Table 3.1 Key characteristics of qualitative and quantitative research

<i>Qualitative research</i>	<i>Quantitative research</i>
Uses inductive approach	Uses deductive approach
Involves theory building	Involves theory testing
Employs subjective approach	Employs objective approach
Open and flexible approach	Closed and planned approach
Researcher is close to the respondents	Researcher is distant from respondents
Employs theoretical sampling	Employs random sampling
Uses explicative data analysis	Uses reductive data analysis
Low level of measurement	High level of measurement

Source: Adapted from Sarantakos, 1998

Mixed methods research

Mixed methods research is increasingly being accepted as the third major research approach and has become popular in a number of disciplines (Johnson *et al.*, 2007; De Silva, 2009). According to Teddlie and Tashakkori (2009), a mixed methods research allows the researcher to answer quantitative and qualitative questions simultaneously. A mixed method study combines elements of qualitative and quantitative research approaches (qualitative and quantitative viewpoints, data collection and analysis techniques) in a single study, concurrently or sequentially (Johnson *et al.*, 2007; Creswell *et al.*, 2008; Borrego *et al.*, 2009). Mixed methods research attempts to consider multiple viewpoints, perspectives, positions and standpoints using both qualitative and quantitative research (Johnson *et al.*, 2007). Mixed methods research aims to draw from the strengths and minimise the weaknesses of both in single research studies and across studies, but not to replace either of these approaches (Johnson and Onwuegbuzie, 2004). Although the use of qualitative studies provides eloquent, in-depth insights through subjective interpretations of experiences, adopting mixed methods allows researchers to minimise the over-dependence on statistical data to explain a social occurrence and experiences that are mostly subjective in nature (Jogulu and Pansiri, 2011). Creswell (2003) identified that using mixed methods research provides strengths that offset the weaknesses of both quantitative and qualitative research. It also provides more comprehensive evidence for studying a research problem than either using quantitative or qualitative research alone. According to Creswell (2003), a mixed methods approach helps answer questions that cannot be answered by qualitative or quantitative methodologies alone. It encourages researchers to collaborate across the sometimes adversarial relationship between quantitative and qualitative researchers and also encourages the use of multiple worldviews or paradigms. The key strengths and weaknesses of using mixed methods research methodology are presented in Table 3.2.

However, some researchers believe that mixed methods are incompatible, arguing that qualitative and quantitative methodologies are drawn from different

Table 3.2 The strengths and weaknesses of using mixed methods research

Strengths	Weaknesses
<ul style="list-style-type: none"> • Provides strong evidence for conclusions • Increases the ability to generalise the results • Produces more complete knowledge necessary to inform theory and practice • Answers a broader range of research questions • Uses the strength of one method to overcome the weaknesses in another method 	<ul style="list-style-type: none"> • More expensive and time consuming • Researchers need to understand fully how to use multiple methods and approaches • Difficult when used in a single study • Can be difficult for a single researcher, especially when the two approaches are used concurrently

Source: Teddlie and Tashakkori, 2009; Creswell, 2003; Johnson and Onwuegbuzie, 2004; Bazeley, 2004

epistemological assumptions and have different research cultures that work against the merging of research methodologies (Sale *et al.*, 2002; Brannen, 2005; Scott and Briggs, 2009). In addition, the use of mixed methods research presents a number of challenges to the researcher, including the need to develop new skills, more time required to complete the research, logistical issues in conducting the research, the need to demonstrate the rigour of the additional data and the integration of research findings. Bryman *et al.* (2008) argue that the use of mixed methods through the combination of different data sources helps uncover different views, perceptions and experiences. There are four types of mixed method design, including *triangulation*, *embedded*, *explanatory* and *exploratory* design methods. The triangulation design method collects both quantitative and qualitative data at the same time and merges the results to generate greater reliability. The embedded design, however, collects data sequentially, but one set will be supportive of the other. The explanatory and exploratory designs are both two-phase methods, but, whereas the explanatory design collects number data and then narrative data to explain the number data, the exploratory mixed method design collects data in reverse order (Creswell, 2012). The triangulation mixed method design is illustrated in Figure 3.1.

3.3 Population and sampling

The main motivation for every researcher conducting research is to draw sufficient information for a meaningful analysis to be carried out so that the best conclusion can be arrived at (May, 2011). However, the major challenge researchers are often confronted with when conducting such research work is how to estimate the number of respondents required to provide them with the information, as well as the processes by which sufficient information can be generated to achieve their research objectives (Sarantakos, 1998). In view of this, a sampling technique has been seen as the most suitable means by which such estimation and information can be obtained in a manner that enables them to address the requirements of their research objectives. The population is the total number of members of the group

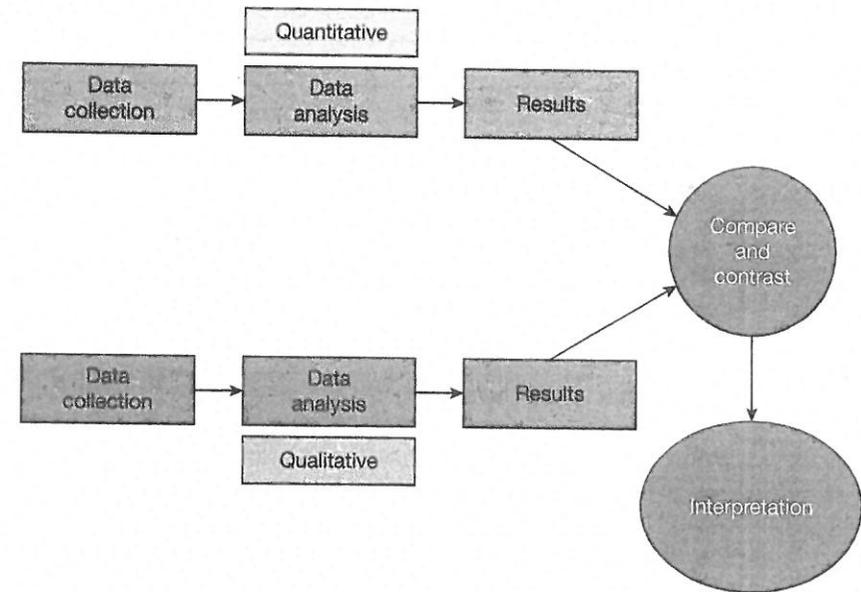


Figure 3.1 Triangulation mixed method design

Source: Adapted from Creswell, 2012

that the researcher is interested in studying, and a sample is a subset of the population that is usually chosen to serve as a representation of the views of the population. It is not practical to study the whole population, owing to restrictions on time, money and other resources (Burgess, 2001). According to Bryman (2001), the need to adopt a sampling technique is central to any research work because a sampling technique is based on sound criteria and its adoption enables researchers to estimate, identify and obtain detailed information from a reasonable number of respondents within a targeted population.

Qualitative research focuses on smaller groups of expert practitioners so as to obtain the optimum data in order to examine a particular context in great detail (Borrego *et al.*, 2009), whereas quantitative research collects data that are representative of a population and uses the information gathered to generalise findings from a drawn sample back to a population, within the limits of error (Bartlett *et al.*, 2001). In qualitative research, the guiding principle for choosing the sample size should be the concept of expertise and eventual data saturation (Mason, 2010). Table 3.3 provides a brief summary of the key differences between qualitative and quantitative sampling.

However, Naoum (2013) cautioned researchers to be careful when choosing the appropriate sample size required during the research design stage, to ensure that the sample size selected is a true reflection of the entire population. Although, usually, sample sizes are relatively small in their composition for most research

Table 3.3 A summary of the difference between qualitative and quantitative sampling

Qualitative sampling	Quantitative sampling
Relatively small sample	Relatively large sample
Cost is low	Cost is high
Less time-consuming	Time-consuming
Flexible parameters	Parameters are fixed
Occurs during data collection	Occurs before data collection
Often based on saturation	Based on probability theory
Not representative	Representative
Respondents are treated as persons	Respondents are treated as units
Sample size is not determined statistically	Sample size is determined statistically
Selection is influenced by the researcher	No researcher bias in selection

Source: Adapted from Sarantakos, 1998

projects, it is argued that careful selection may lead to a more credible and desirable outcome (Naoum, 2013). It is further argued that, irrespective of the research approach, correct estimation of sample size will enable researchers to examine the variability in the samples to draw inferences from the whole population (May, 2011). According to Sarantakos (1998, 2013) and Saunders *et al.* (2009), the estimation of the required sample size for any particular research approach should involve the consideration of issues such as: the nature of the research questions, the time and resource availability, and the characteristics of the population from which the sample is required. It is argued that, where the aim of a research is to understand common perceptions and experiences among a group of relatively homogeneous individuals, twelve interviews should be sufficient (Guest *et al.*, 2006). This study conducted an experiment on a corpus of transcripts from interviews with women in two West African countries, in which the researchers carried out a systematic analysis of transcripts of sixty interviews and found that 94 per cent of the coded topics that appeared were identified within six interviews, and saturation was attained after twelve interviews.

There are two main types of sampling technique available: these are probability or random and non-probability sampling (Sarantakos, 1998, 2013; May, 2011). Probability sampling techniques adopt well-structured, stringent procedures for the identification and selection of samples from the target populations (Sarantakos, 1998, 2013). They are useful in situations where a high degree of reliability and generalisation of the findings is required (Sarantakos, 1998). Using a probabilistic or random sampling approach also allows researchers to ensure that all participants within the defined population are proportionally represented (Black, 1999; Fisher, 2004; May, 2011). Probability sampling forms include *simple random*, *systematic*, *stratified* and *cluster*, which are generally employed for quantitative-based studies (Saunders *et al.*, 2009). Non-probability sampling techniques, in contrast, adopt approaches that are less stringent, with less emphasis on representation of samples from the larger population (Sarantakos, 1998). According to May (2011), they are mainly adopted in situations where there are no well-defined sampling frames, and

yet the general features of the population are already known to the researcher. Owing to their flexible nature, they are mainly adopted by qualitative researchers when deciding which sample sizes are best suited for the study (Sarantakos, 1998). Their main forms include: *accidental*, *purposive*, *quota* and *snowball* sampling, which are usually inclined to a qualitative-based research methodology (Sarantakos, 1998; Black, 1999). One major guiding principle that determines the identification and selection of samples from the population, using either probability or non-probability types of sampling technique, is the application of a sampling frame (May, 2011; Naoum, 2013). Saunders *et al.* (2009) described a sampling frame as a complete list of all respondents located within a larger population, from which research samples are drawn. Without such an appropriate sampling frame, in which the population can be properly defined and estimated, it is impracticable for the researcher to collect a representative sample to arrive at a definitive conclusion, generalisable to the entire population (Saunders *et al.*, 2009). Researchers will then be able to generate a sample size that can generally be used to estimate the saturation points in qualitative terms and also examine the sample size statistically in quantitative terms (Sarantakos, 1998). Figure 3.2 illustrates the sampling approach when the mixed method approach is used; the sampling technique adopted is a combination of probability and non-probability sampling. A purposive sampling

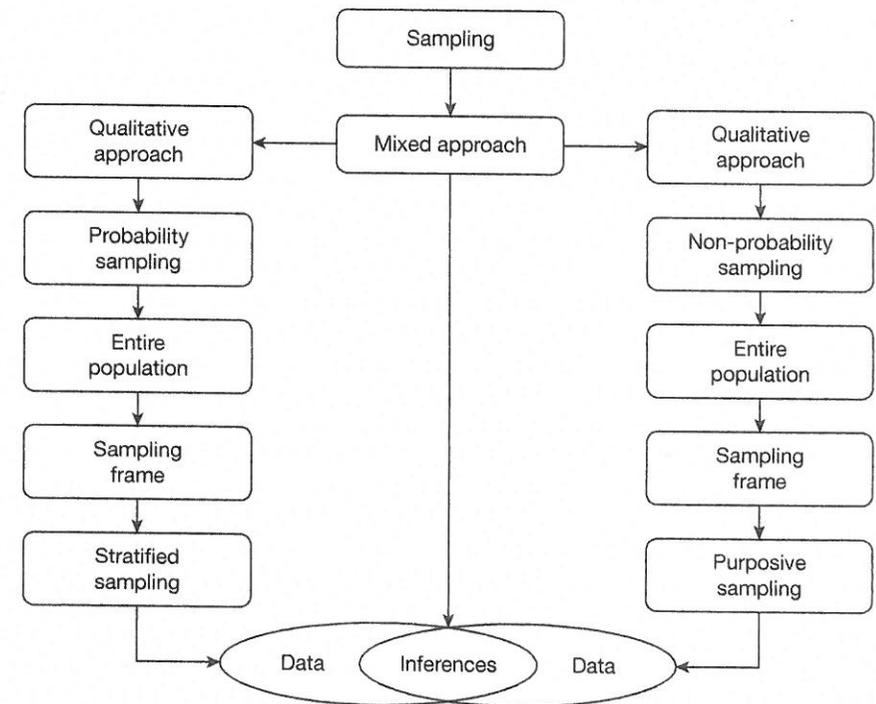


Figure 3.2 The sampling approach adopted from Saunders *et al.* (2009)

technique is used for the qualitative part of the study, whereas, on the other hand, a stratified random sampling approach is used for the quantitative study.

3.4 Data-collection techniques

There are a number of research data-collection methods for research design and these include: *focus group discussions, questionnaires, interviews* (structured, unstructured and semi-structured), record reviews (including literature) and observations (Denscombe, 2007). A major determinant of the data-collection technique is the nature and type of the enquiry and the information required about a particular setting or context (Naoum, 2007). The fundamental rationale for collecting data is to allow the researcher to gather enough evidence and, consequently, draw the inferences required to make important decisions about the findings (Tashakkori and Teddlie, 2010). Different data-collection techniques may be suitable to different research methodologies and enquiries (Pope *et al.*, 2002). However, deciding on the types of data-collection technique to adopt will depend largely on the research methodology and the overall objectives of the study (Fellows and Liu, 2003; Naoum, 2007).

Therefore, to ensure such fitness for purpose for a particular study, Naoum (2007) suggested that data-collection techniques such as personal interviews could be combined with a questionnaire survey to best understand participants' behaviour. Data-collection techniques can also be used independently or in combination, depending on the circumstances and the researcher's own judgement as to which technique(s) is best suited to obtain the required data for the study (Naoum, 2007; Saunders *et al.*, 2009). It is argued that data collected from multiple sources could complement each other to offer a more comprehensive picture for the study (Bazeley, 2004). For this reason, the adopting of multiple data-collection techniques, such as interviews, observation, a questionnaire survey and so on, provides the medium to collect both open- and closed-ended data, as required (Saunders *et al.*, 2009). Additionally, it is expected that the outcomes of such multiple data-collection approaches will yield more powerful research results than if there were just one data-collection approach (Cfien, 2006). Equally, the application of multiple data-collection approaches would generally help to corroborate, complement and authenticate evidences obtained from other sources (Johnson *et al.*, 2007).

Although a distinction is commonly drawn between data-collection techniques for qualitative and quantitative research methodologies, it has been argued that the techniques can be combined in practice. It is acknowledged that using qualitative and quantitative data sources can be complementary (Saunders *et al.*, 2009). Using such an approach will enable researchers to triangulate their findings to provide more solid evidence and a better representation of the social world. For example, data collected through semi-structured interviews may be used to complement and triangulate findings obtained from questionnaire survey data. Table 3.4 illustrates the research philosophy/paradigm, the primary research methods and the suitable data-collection tools that are generally available. It shows how research methods cross philosophical/paradigm boundaries.

Table 3.4 Research paradigm, primary methods and data-collection tools

Philosophy/paradigm	Primary methods	Data-collection tools
Positivist/postpositivist	Quantitative methods	Experiments Quasi-experiments Tests Scales
Interpretivist/constructivist	Qualitative methods	Interviews Observations Document reviews Visual data analysis
Pragmatic	Qualitative and/or quantitative methods	Techniques from both positivist and interpretivist paradigms, such as interviews, observations and testing and experiments

Source: Adapted from Mackenzie and Knipe, 2006

Table 3.4 indicates that the choice of appropriate data-collection and -analysis method for a study is determined by the research philosophical stance or paradigm and the research question being considered. It is, therefore, important for a researcher to choose the right data-collection and -analysis methods for each particular study.

Questionnaires

An important part of any good research design involves making sure that the questionnaire design addresses the needs of the research questions (Burgess, 2001). Some of the advantages of using a questionnaire as a data-collection technique include flexibility, which allows it to be adapted in a diversity of theoretical positions and research questions, its relative cheapness and speed or ease of administration (Bryman, 2011). According to Saunders *et al.* (2009) and Bryman (2008), the questionnaire constitutes the most commonly used survey tool for eliciting data from a large geographical area for many research works, in comparison with the use of non-standardised data-collection techniques. It is believed that the internal validity and reliability of the findings will be enhanced to a large extent, if questionnaires are properly designed, structured, worded and administered (Naoum, 2007; Saunders *et al.*, 2009). The basic process of survey research is illustrated in Figure 3.3.

Questionnaires can be delivered to the respondent by various means, including post and email attachments, or by publishing on a website for interactive completion (Burgess, 2001). The traditional form of questionnaire survey is the postal questionnaire, but the use of electronically mailed questionnaires rather than posted questionnaires is gaining momentum owing to the increased speed and lower cost (Naoum, 2013). The use of email or Internet-based questionnaires offers more

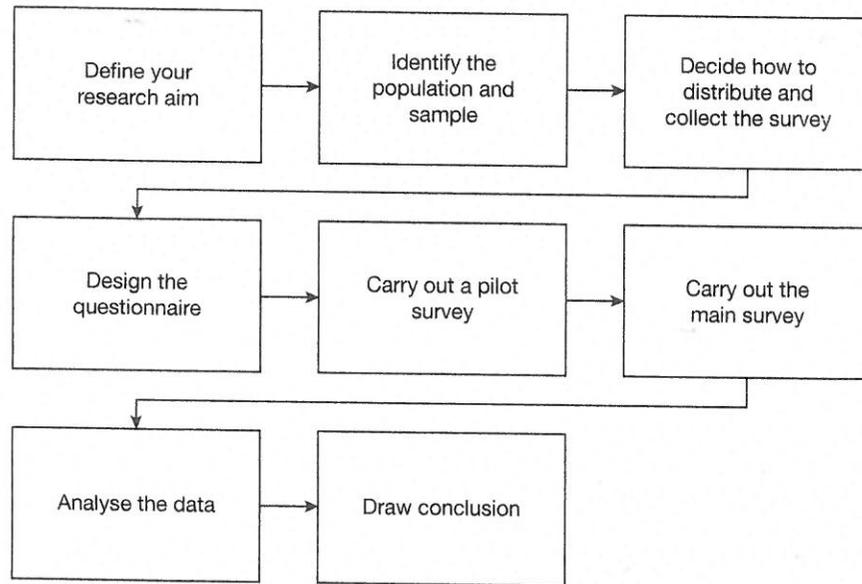


Figure 3.3 Questionnaire design process

Source: Adapted from Burgess, 2001

benefits than the traditional, posted surveys. They are much cheaper and offer significant time-saving in terms of ease of data administration. According to Bryman (2008), use of online questionnaires provides many advantages: they facilitate easy and speedy responses and reach out to a large number of respondents in a cost-effective manner, irrespective of distance and location. Similarly, by using an online service, the researcher is able to create his/her own questions speedily with the available survey-template software (Creswell, 2009), which allows for easy downloading of responses from the survey software database.

Generally, questionnaires are usually designed in two main forms: open-ended or unrestricted questions and closed-ended or restricted questions (Fellows and Liu, 2003; Naoum, 2007). The open-ended questions provide flexibility, as the respondents can respond to questions in their own way without being restricted to the researcher's line of thought. No options or predefined categories are suggested. The questions are designed to elicit full information from the respondents in an open and flexible manner. They allow respondents to provide their own answers without being constrained by a fixed set of possible answers, and they can also provide alternative answers to the problems/questions when they want to do so. Closed-ended questions, in contrast, are designed to elicit a limited set of specific responses from the respondents (Fellows and Liu, 2003). The closed-ended questions usually require straightforward answers from respondents, limited to a fixed set from which they can choose. They are usually characterised by short questions, which often require short and direct responses (Naoum, 2007), which are readily

analysed by the researcher. They are useful in obtaining specific data to confirm a fact or opinion from respondents (Saunders *et al.*, 2009).

A questionnaire allows large populations to be surveyed more efficiently than other instruments, such as interviews (Denscombe, 2007), because the data can be collected simultaneously from a sample, thus providing a snapshot of its characteristics and opinions at a moment in time. The response rate could be very high if it is administered properly, especially when respondents are sent reminders. Finally, respondents get the opportunity to consult or carry out research before answering the questions. However, the disadvantages of using questionnaires include: industry fatigue, accuracy, lack of control over respondents, the requirements for simple questions that are easily understood and lack of flexibility (Fellows and Liu, 2003). The absence of the researcher means they have no opportunity to probe the issues further for respondents to elaborate more (Bryman, 2008) or to clarify any ambiguity or deviation from the issues (Naoum, 2007).

Interviews

Interviews are major data-collection techniques commonly used to elicit data, mainly for qualitative-based studies (Bryman, 2001). As they allow for social interaction and free flow of communication between the interviewer and the interviewee, they are largely regarded by many researchers as the most effective tool for gathering information that is concerned with the narration of interviewees' opinions and experiences (Qu and Dumay, 2011). An interview has been defined by Sheppard (2004) as a conversation with a purpose that allows the researcher to gain insight into the interviewees' account of their experience, perceptions and circumstances in relation to the specified research questions the interview is addressing. In making a more plausible case for an interview approach, Gray (2006) indicated that the adoption of interviews becomes necessary in the following situations, where:

- there is a real need for the researcher to obtain greater personalised information;
- there is a need for adequate probing of issues;
- a good response rate is required;
- the respondents have difficulty with writing.

According to Qu and Dumay (2011), the application of interviews provides a powerful means to discover new knowledge and capture the accounts of experts in the field in a more open, consistent and systematic manner, which the standardised methods, such as questionnaires, are unable to do. Unlike a questionnaire approach, where the objective is to obtain definite responses from a large sample, personal interviews essentially seek to obtain rich, in-depth information from interviewees within a well-controlled setting (Naoum, 2007). Fundamentally, most qualitative interviews are conducted on a face-to-face basis. Accordingly, this practice offers enormous opportunity for both parties to engage effectively and talk through the issues freely in greater detail without any doubt or ambiguity. Such

engagement allows interviewers a great deal of latitude to probe various aspects of the issues at hand (Naoum, 2007; Denzin and Lincoln, 2008). Saunders *et al.* (2009) argued that a personal interview approach involving such one-to-one interactions can also be beneficial to researchers. One advantage is that they provide an opportunity for researchers to take a record of the interviewees' non-verbal communications (Saunders *et al.*, 2009). They also help to create a platform for researchers to explain the purpose of the study. This also allows follow-up questions to be asked to get interviewees to expatiate further on their responses. Interviews have also been criticised for their lack of a standardised approach often adopted to elicit information, which in some instances leads to a lack of rigour and reliability in the findings (Saunders *et al.*, 2009). It is also argued that data collected through such an interview approach may take some time for the researcher to transcribe and, in some cases, may be difficult to code and analyse, especially when a large number of interviewees is involved (Gray, 2006). Again, inadequate probing and long conversations on issues during the interview process can lead to insufficient and superficial responses from interviewees (Castro *et al.*, 2010).

Various forms of interview technique are available for conducting a social science research; however, the choice of any particular type must be grounded on the nature of the research questions, as well as the objectives set out for the study (Gray, 2006; Saunders *et al.*, 2009). The most commonly used ones are: *structured*, *semi-structured* and *unstructured* (Naoum, 2007). Recognising the purpose of each of these interview types, in Berg's (2007) view, forms the basis for starting the data-collection process using interviews as the main data-collection tool for the study. A commonality associated with their objectives is to obtain primary information from interviewees (Bryman, 2001). However, a major distinction identified with these forms of interview, as explained below, is their degree of rigidity in relation to their mode of presentation (Berg, 2007). Table 3.5 presents the characteristics of the structured, semi-structured and unstructured interviews.

Table 3.5 The characteristics of interview types

<i>Structured interview</i>	<i>Semi-structured interview</i>	<i>Unstructured interview</i>
Mainly for quantitative data Captures data speedily	Mainly for qualitative data Captures data slowly and is time-consuming	Mainly for qualitative data Captures data slowly and is time-consuming
Uses random sampling	Uses purposive sampling	Uses purposive sampling
Uses strict interview format	Uses flexible interview format or schedule	Uses flexible interview format or schedule
Data usually easy to analyse	Data may sometimes be difficult to analyse	Data usually difficult to analyse
Tends to positivist view of knowledge	Mixture of positivist and interpretivist view of knowledge	Mixture of positivist and interpretivist view of knowledge

Source: Adapted from Gray, 2006

3.5 Illustrating the process of choosing appropriate research method

Table 3.6 illustrates the process of choosing an appropriate research methodology using a topic example.

Table 3.6 Illustrating the process of choosing appropriate research methodology

<i>Research topic: The role of organisational leadership in promoting sustainable construction practices in construction organisations</i>		
<i>Research aim: To investigate the link between leadership and sustainability and produce a support framework towards the promotion of sustainability practices in the delivery of construction projects through leadership within construction organisations</i>		
<i>Research process</i>	<i>Selected research tools and procedures</i>	<i>Reasons for the choice</i>
The philosophy of the research	<i>Pragmatic philosophical stance:</i> pragmatic research adopts both positivist and interpretivist paradigms using quantitative and qualitative methods to match specific research questions	Leadership and sustainability are best understood through diverse theoretical positions, research methods and the examination of a great variety of research contexts and settings
Research approach	<i>Abductive reasoning</i> (logic of the research): abductive reasoning takes the middle ground between deductive (theory testing) and inductive (theory building) involving a piecemeal set of observations and proceeds to the best possible solution with information at hand	Leadership and sustainability have many dimensions, and, therefore, it is asserted that different research approaches must be used to reveal relevant data for each research question under exploration
Research strategy	<i>Multiple strategies:</i> literature review, interviews and survey	No single strategy can solve the leadership and sustainability research problem, hence the use of multiple strategies
Research choices or methodology	<i>Mixed method:</i> a mixed method research approach combining both qualitative and quantitative methods helps in carrying out an in-depth study of the 'leadership and sustainability' phenomenon	A mixed methods research approach provides both qualitative and quantitative evidence, which gives a more complete picture of the link between leadership and sustainability in the UK construction industry
Time horizon (if applicable)	<i>Cross-sectional:</i> time is predetermined for data collection, data analysis and other research tasks	The time horizon adopted for the topic is cross-sectional and has to be completed within a specified timeframe, like any academic research

Table 3.6 Continued

Research process	Selected research tools and procedures	Reasons for the choice
Method(s) used for data collection	<i>Questionnaire and interview:</i> because of the broad scope and the context of this study (leadership and sustainability), a mixed methods approach for data collection, using both interview and questionnaire research techniques, was adopted to achieve the research aim and objectives	The interview provides in-depth understanding of the state of the art in practice, and the questionnaire survey provides a wider view of leaders in construction organisations with the role of leading the change towards the adoption of sustainability practices in construction project delivery
Unit of study	The unit of analysis in this study is <i>leadership within contractor and consultant organisations</i> in the UK construction industry	To establish organisational leadership role in promoting sustainability drivers, challenges, roles, styles and engaged sustainability practices
Data analysis technique	The questionnaire data collected are analysed using <i>Statistical Package for Social Sciences (SPSS)</i> and Excel, and data from the interviews are analysed with <i>Nvivo data management software</i>	The SPSS will be used to examine any cross-tabulation or associations or grouping that emerge from the survey data through factor and coding analysis, and the qualitative Nvivo software will be used to assist coding and derivation of themes from the interview data

3.6 Conclusions

This chapter presents research methodologies and procedures that can be adopted in order to achieve the research aim and objectives. It highlights the advantages and disadvantages, and the strengths and weaknesses, of the three research methodologies: qualitative, quantitative and mixed method. Whereas the traditional characteristics of quantitative enquiry are based on deductive reasoning, statistical analysis and hypothesis testing, the traditional characteristics of qualitative enquiry, on the other hand, are based on inductive reasoning and hypothesis generation. Given that construction processes are fundamentally complex, with diverse players and rapid technological changes, both deductive and inductive reasoning have crucial roles to play in ensuring the successful exploration of these issues. Combining both qualitative and quantitative methods helps in carrying out an in-depth study of the phenomenon under investigation. It is normally the practice that researchers associate small samples with qualitative research and large samples with quantitative research; however, the size of the sample should primarily be guided by the research objective, research question(s) and the research design. Although questionnaire surveys present a convenient way of gathering data much faster from larger population, they are said to be most useful and beneficial when complemented by other data-collection techniques, such as interviews.

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