

SELECTION OF RESEARCH METHODOLOGY FOR PHD RESEARCHERS WORKING WITH AN ORGANISATION

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The issue of management research methodology is a highly debated one. Different perspectives and thought processes are available, both from the scientific and the sociological fields of research. This paper is prepared in context of a full time PhD research, which has to be finished within a specific time limit (with minimal flexibility), in most cases with limited resources, and has to attain an acceptable quality. The paper first discusses the range of methodologies that are available to a full time PhD researcher, giving particular attention to working with an organisation. The paper argues that the research methodology, for a PhD researcher working in management related areas in construction, is significantly influenced by several factors, including the desire and skills of the researcher, the influence of the supervisor, the influence of the collaborating organisation, the state of development of the research area and a comprehensive risk assessment. These factors collectively decide the context and the content of the research thus guiding the methodological choices. These factors are explored in brief to highlight their importance while examining a research methodology. Given the unlimited range of potential diversity achievable for these factors, the paper demonstrates the necessity of considering feasibility and risk as well as academic acceptability while examining methodological choices.

Keywords: PhD research, research methodology, research project management

INTRODUCTION

A PhD degree obtained from a UK University implies that the researcher has attained an acceptable level of knowledge and research expertise. The objective of the paper is to look into the issues related to the process of selecting the research methodology. The particular focus of the paper is the situation where a full time PhD researcher is working with an organisation, which is the 'field' for the research topic.

The selection of research methodology is examined in its entirety, both from the perspective of academic acceptability and feasibility. This paper aims to outline the key factors that influence the adaptation of a research methodology and to demonstrate issues that are relevant to the decision-making process for methodological choices.

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TYPES OF RESEARCH

The area of construction management research is perhaps as varied as the nature of the construction industry itself. Any attempt to classify the research areas may be too simplistic. However, looking at the process of research topic identification (Gill and Johnson, 1997), the vast array of construction management research projects may be categorised into three broad areas –

Type 1: Research is undertaken to investigate an identified or forecasted phenomenon. In this type of research, the research topic is fairly well focussed, the research parameters may be well defined and the main purpose of the research is to produce answers to pre-existing questions. This type of research perhaps is industry-driven or consultancy-oriented.

Type 2: Research is undertaken in continuum within an already established research area. This type of research may be an extension or diversion of a continuing research area, or sub-specialising research within a broad area. The research topic may or may not be well defined and the end product may also be uncertain. Development of this type of research may be an outcome of industry phenomenon or consultancy services.

Type 3: Research is undertaken on an exploratory basis, conducted in real time and with uncertain outcomes. This perhaps exemplifies a significant amount of academic research, where the research parameters at the beginning are fairly flexible and the nature of the end products are also uncertain.

To cite a hypothetical example, Key Performance Indicators (KPIs) have been subject to significant research for the past few years. Organisation X may have a research contract with University Y to develop and integrate KPIs for X. Any researcher working in this project will have definite research plan and targets (type 1 research). A sub-research in this broad area may well be to look into the risk identification process and ways to integrate that with the KPIs. Though the primary research (development of KPIs) has a definite outcome, the outcome of the sub-research is difficult to conceptualise (type 2 research). If a researcher wishes to explore the actual process of implementation of the KPIs and the effects they might have on the projects or any relevant processes, both the objectives of the research and the end products are not easy to structure at the commencement of the research (type 3 research).

TYPES OF RESEARCH METHODOLOGIES

The task of carrying out research is perhaps further complicated by the fact that there is no overall agreement about how to conceptualise the research design and the research plan. There are, for example, different views about the sequence and relationship of the activities involved within a research methodology. One model emphasises collecting data before analysing it. A different one has data collection and analysis intertwined. These differences fall within two main traditions – one is variously labelled as positivistic, natural science-based, hypothetico-deductive, quantitative or simply scientific; and the other as interpretative, ethnographic or qualitative, among other labels.

Spradley (1980) compares positivistic and interpretative researchers to petroleum engineers and explorers respectively. To quote,

The [petroleum] engineer has a specific goal in mind; to find oil or gas buried far below the surface. Before the engineer even begins an investigation, a careful study will be made of the maps which show geological features of the area. Then, knowing ahead of the time the kinds of the features that suggest oil or gas beneath the surface, the engineer will go out to find something 'specific'. (Spradley 1980: p26).

Positivistic research methodology

The positivistic research methodology has an emphasis on the importance of grounding research upon systematic protocol and technique. This is the predominant methodology used in natural sciences, focussing upon, for example, the testing of hypotheses in accordance with the standards of scientific rigour. The causal argument (A causes B, or variation in A causes variation in B, that is stimulus A causes response B) is emphasised, where the element of motive/purpose/meaning/context is lost, because of the need for precise models and hypotheses for testing (see Burrell and Morgan, 1979; Spradley, 1980; Bryman, 1988; Perry and Coote, 1994).

Interpretative research methodology

The interpretative research methodology, which comes from the domain of social sciences, emphasise the analysis of subjective accounts that one generates by getting inside situations and involving oneself in the normal flow of activities. In order to gain explanation or understanding, the subject's meaning and interpretational systems are taken into account and the theory is grounded in such empirical observations (see Burrell and Morgan, 1979; Seymour and Rooke, 1995).

A brief comparison of these two methods is illustrated in Table 1.

Table 1 A comparison of the deductive and inductive methods

| | | |
|--|-------------------|--|
| 1. Deduction | vs. | Induction |
| 2. Explanation via analysis of causal relationships | vs. | Explanation of subjective meaning |
| 3. Generation and use of quantitative data | vs. | Generation and use of qualitative data |
| 4. Use of various controls, physical or statistical, to allow hypothesis testing | vs. | Real world research, attempts to minimise reactivity among the research subjects |
| 5. Highly structured to ensure replicability of 1,2,3, & 4 | vs. | Minimum structured to ensure 2,3, & 4 (and as a result of 1) |
| ←-----> | | |
| Lab experiments | Quasi experiments | Surveys |
| | | Action research |
| | | Ethnographic study |

Source: Gill and Johnson, 1997, p. 37

Bechhofer (1974) notes that the research process is never a clear-cut sequence of steps or procedures following a predetermined, neat pattern, but a tangled interaction between the conceptual and empirical world, where the processes of deduction and induction occur at the same time.

Bryman (1988) suggests that many of the differences between the two traditions are in the minds of the philosophers and theorists, rather than in the practices of researchers. The view that the differences between the two approaches can be best viewed as technical rather than epistemological, enabling the researcher to 'mix and match' methods according to what best fits a particular study, is also strongly supported by a

significant number of authors including Robson (1993), Raftery *et al.* (1997), Scandura and Williams (2000) and Partington *et al.* (2000).

Research Strategies

McGrath (1982) categorised research ‘strategies’ into eight types: formal theory, sample surveys, laboratory experiments, judgement tasks, computer simulations, experimental simulations, field studies, and field experiments. These eight types can be further squeezed to fit into three broad research ‘strategies’ (see, for example, Robson, 1993; Yin, 1994; Gill and Johnson, 1997). These are:

- Experiments: measuring the effects of manipulating one variable on another.
- Survey: collection of information in standardised form from groups of people.
- Case study: development of detailed, intensive knowledge about a single ‘case’ or of a small number of related ‘cases’.

PHD RESEARCH METHODOLOGIES

PhD research, which implies undertaking research for the purpose of acquiring a University degree, can theoretically adopt any of the research methodologies stated above, as well as utilise any number of research strategies.

As Hoare (1996) has pointed out, PhD research, at commencement, may have:

- A clear goal and a clear methodology
- A clear goal but no clear methodology
- No clear goal but a clear methodology
- No clear goal and no clear methodology

Types (a) and (b) can be seen as type 1 or even type 2 research, where the end product can be conceptualised, but the ways of achieving it is not certain. Types (c) and (d) may fall into type 3 or perhaps type 2 research, where the end product is grounded within the research process.

In types (a) and (c), where a clear methodology is pre-determined or pre-selected, that perhaps signifies situations where:

- The researcher is predetermined about the ways he wants to conduct the research – this may be due to the researcher’s own judgments or the topic of research which can be pursued using a specific methodology.
- The PhD research is part of an ongoing broader research project, which imposes a specific methodology on the research.

However, the choice of the research methodology assumes more significance in type (b) or (d), where the path the research is to follow is not very clear at the commencement of the research.

Requirements for a successful PhD research

To acquire a PhD degree, a typical University regulation may require a researcher to:

- devote typically 3 years (in the range of 2-4 years)
- undertake advanced study and training in research under supervision
- produce original work

- produce work worthy of publication in a learned journal.

In general it is expected that a PhD research shall be reasonably completed within a time scale of 3 years. Time is perhaps not of that much significant for research that has a specific methodology and goal. However, for those who fall into type (b) or type (d) (Hoare, 1996) within a period of three years they have to design, produce and publish the research with little scope for flexibility in the time scale.

The quality of output at the end of three years research determines the success of the research. The examiners have to determine whether the product, and the way it was produced, add original knowledge to the existing knowledge base and is worthy of publication in the academic community. However, the subjectivity grounded within this process implies that the difference of opinion amongst the academicians on the applicability of different methodologies will itself influence the acceptability of the research work.

When a PhD researcher is trying to find out which research method is suitable for the research to be undertaken, all the decisions have to be taken keeping these criteria in mind. And here lie the majority of problems while selecting the research methodology. Using a scientific, causal, positivistic methodology does not perhaps do justice for the majority of construction management research topics (see Seymour and Rooke, 1995). On the other hand, using interpretative methods, within the parameters existing for PhD research, may not be entirely suitable (see Hoare, 1996). For successful PhD research, at the end of the period the researcher has to clearly state what the research has looked into and what is the end product. Setting aside issues of reliability and validity, interpretative methodology does not necessarily ensure completion of enquiry within a fixed time frame.

If the process of 'mix and match' is used, that again makes the research methodology open to a potential minefield of questions related to areas including justification, replicability and generalisation.

Working with the industry – forging a collaboration (partnership)

Many of the research projects within the area of construction management require the researcher to interact with one or more organisations in the construction industry. If the research is to investigate a particular phenomenon prevailing or forecasted and the organisations do 'buy into' the research, risks of conducting such research (in terms of access to information/ key people, confidentiality issues, commercial sensitivity and similar issues) are significantly reduced. Even in that case, any change in the settings of that organisation(s) (for example, change in contact personnel), often inevitable over a period of 2 – 3 years and beyond the control of any individuals, may lead to disruption in the research.

In the case of type 1 research, where the research is looking into a phenomenon (which may be perceived as a 'problem' or a 'challenge' or simply something requiring further attention) perhaps achieving a 'partnering' or collaborative research project is made simpler by the fact that the organisation possibly has a substantial interest, in the success of the research. The allocation of risk towards the successful completion of the research project (i.e. the PhD research) is fairly even and it can be argued this is the minimal risk option for a PhD research provided the collaborative environment is maintained throughout the research period.

For type 2 research, the relationship between the organisation and the academic institution has already been achieved (presumably established by the supervisor

through a broader research project). The researcher has to 'fit into' the broader project and work through it. However, in this type of research, it may prove to be difficult to maintain the individuality of the researcher as opposed to a collective venture.

It is the type 3 researches, which present a significant number of challenges to a PhD researcher working with an organisation. In the absence of any conceptual framework, the organisation may often find it difficult to understand the utility of the research and the potential benefit that might be achieved through the research. It can be argued that this type of research perhaps has potentially the maximum risk allocated towards the researcher.

A useful methodological framework for working with external organisations has been developed by Gill (1980) in Gill and Johnson (1997, p 63).

Whichever type of research is undertaken, the organisation(s) that are collaborating have to be considered as key stakeholders as they permit access to their resources. The content of the research should be flexible enough to subsume changes that might occur after commencement of the research. The context of the research has to be robust enough to survive for 2-3 years in a dynamic organisational and industrial setting. It is the researcher's responsibility, guided by the supervisor, to work with the organisation to ensure successful project management of the task. This is a challenging task for the researcher, often working in a dynamic situation where most of the variables are beyond the specific control of the researcher (and the supervisor).

GETTING THE RIGHT CHOICE

Many good practice guides on research in general and PhD research in particular strongly advocate choosing a methodology that is *feasible* and *appropriate*. The question is, for a PhD researcher, what are the criteria to be used in determining what is feasible and what is appropriate? Supervisors may be able to guide the researcher in understanding the basics of the choices available, but at the end of the day, it depends upon the judgement of the researcher to decide which way to go. The term 'dilemmatics' (used by McGrath 1982) to describe the study of research choices aptly reflects the difficulties involved in the process.

Denscombe (1998) states that research methodologies are *selected* because they are *appropriate*. It is the understanding of the *appropriateness* that requires much thought and brainstorming. All research approaches have something to offer. Morgan (1983) describes different approaches to select a research methodology based upon the works of Churchman (1971), Feyerabend (1975), and Mason and Mitroff (1981). However, selecting a research methodology is not just a question of academic validity –the feasibility of it must also be considered given the constraints of the research project.

Several factors play a crucial role while making the methodological choices in a PhD research (see figure 1). These factors are:

The desires of the researcher: this might include preferences for any specific research area and research methodology, guiding the direction of the research. The personal (and professional) intentions of the researcher, together with the individual skills decide the direction in which the researcher wishes to proceed.

The skills of the researcher, including the researcher's academic, professional, research and social experiences. PhD researchers in construction management may come from a variety of backgrounds, including engineering, project management, finance and social sciences. For example researchers who do not have prior

experience of using statistical models may not find it easy to use quantitative methodology that relies on statistical data analysis, or students not familiar with the concepts of social studies may face difficulty accepting the framework of ethnographic studies.

Conceptualising the design of the PhD research is another area where the desires and skills of the researcher play an important role. Someone with a few years of experience in the industry perhaps will be able to identify the potential problems, will know the right questions to ask while interviewing or will be able to establish the important points while using observational techniques, perhaps quicker than someone starting with a cleaner slate.

The influence of the supervisor: The role of the supervisor can never be underestimated in the success of a PhD research. Supervisors have a dual function – they have a responsibility to facilitate the successful completion of the research through guidance and help; also, they have to ensure that the research is being carried out to an acceptable standard.

PhD researchers are guided (if not influenced) by their supervisors in almost all the areas starting from the choice of the subject, securing industrial collaboration, designing research and all-round problem solving and support. If the supervisor has a specific inclination towards any specific research methodology, as in case of a ‘readymade project’ (type 1 or even type 2 research), associated researchers will normally tend to follow that methodology. However, the influence of the supervisor is not, or rather should not be, the sole factor while making methodological choices.

These three factors may be termed together as internal factors to the research project or internalities.

The influence of the collaborating organisation(s): the dynamic nature of organisational activities makes maintaining a collaborating relation intensely challenging. The design and carrying out of the research project significantly depends upon the way the collaborating organisation(s) (and the main research contacts within that organisation) sustains their contribution.

The collaborating organisation(s) is, in effect, a partner and stakeholder in the research project and may also be “the client”. When the research is being carried out in collaboration with an industrial organisation, the dynamics and the requirements of that organisation often decides the directions of the research. The research methodology is also perhaps influenced by the collaborative organisation, as the process of data collection has to be mutually agreed upon.

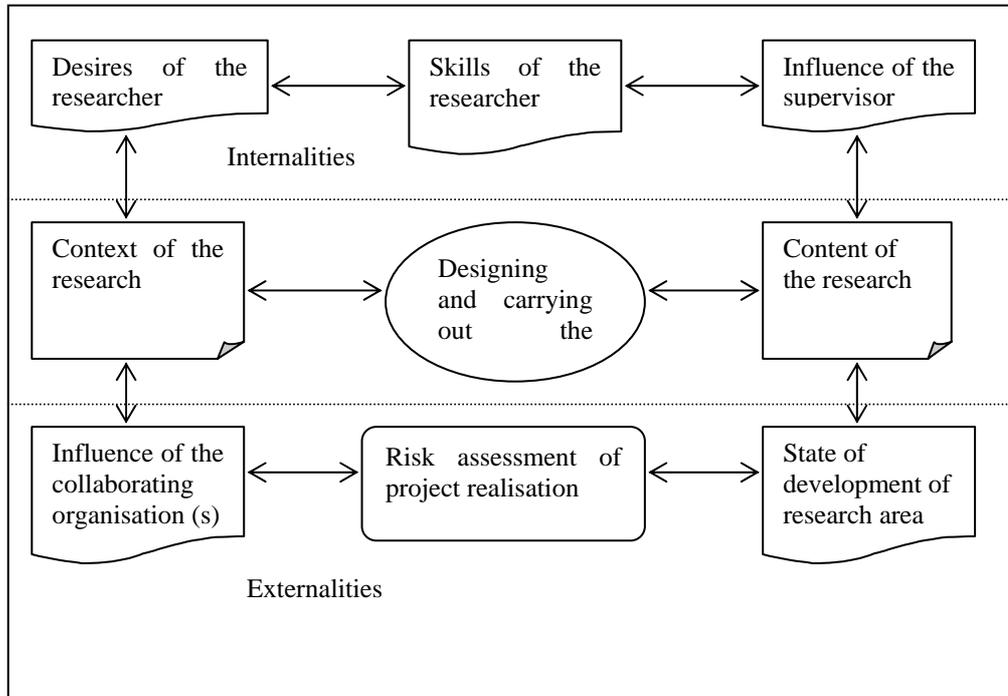
The state of development of the research area, including availability of background literature, research work and expertise in the research area. For example, if the PhD research is undertaken in a relatively new field, there may not be sufficient availability and documentation of frameworks, models, expertise or theories relevant to the topic and the researcher may find difficulty in judging the feasibility of the intended research plan.

A comprehensive risk assessment based on these factors, which may be carried out at various stages starting from the very beginning of the research project, may help to narrow down the methodological choices for project realisation. Further, at the commencement of research if one is uncertain which way to go, the risk analysis will also help to narrow down the choices as well. The risk register, thus prepared, will help at later stages of the research, if things do not go smoothly.

These three determinants are external to the research project and hence perhaps be considered as externalities.

The six factors described above are interrelated and influences one another. They also contribute to the formation of the ‘content’ and the ‘context’ of the research project, which guides the designing of the research plan and carrying it out.

Figure 1: The influences on selection of research methodology



Adapted from Gill and Johnson, 1997: p 152

Content of the research: The area of the research is another important aspect while determining the research methodology. For example, exploratory research (as defined by Robson, 1993; Yin, 1994) is usually (but not necessarily) carried out by qualitative methods; whereas explanatory or descriptive research can be undertaken using either qualitative or quantitative means (Robson, 1993; Yin, 1994; Gill and Johnson, 1997). The importance of considering the content lies in the process of data collection and subsequent analysis. Whatever methodology is adapted (interview/survey/ participant observation/non-participant observation etc.) a thorough risk analysis should help to identify the potential risks of adopting that methodology.

Context of the research: The context of the research includes factors that are related to the setting of the research, including the needs of the stakeholders (for example, the collaborating organisation) of the research. As mentioned at the very beginning of this paper, construction management research may be broadly categorised into three types. For PhD research, these three types signify three different contexts that have to be thoroughly understood while making the methodological choices.

For type 1 research, where the goal is clear at the commencement of the research, the methodology depends mainly upon the content of the research. In type 2 research, the PhD research methodology is usually part of the broader research project and hence the decision making process is usually in place prior to commencement of the PhD research. However, in type 3 research, the methodological decision-making is perhaps most difficult. Keeping in mind the constraints or requirements present within a PhD

research it is perhaps advisable to avoid this type of research unless the researcher is flexible in account of resources. However, if one decides to undertake type 3 research for PhD studies, the methodological choices become a series of *compromises* (McGrath, 1982). An excellent example of making a methodological decision that may be followed in this type of research is present in the works of Mintzberg (1973).

Getting the choice as opposed to making the choice

The purpose of the above discussion was to establish the fact that methodological choices are more often determined by the factors surrounding the research. The PhD researcher usually does not control the selection of the methodology – it is more or less made reacting to the circumstances prevailing under the guidance of the supervisor. Having said that, it is the responsibility of the researcher to outline the circumstances which decided the methodological options so as to present a clear picture to the examiner.

For type 1 or type 2 research, determining the methodology and carrying out research contain significantly less risk as against type 3 researches. In other words, type 3 research can prove to be much more challenging in establishing a methodology and complying with the constraints of PhD research. Some of the present acceptable methodologies, for example action research (Rapoort, 1970; Checkland, 1981; Baskerville, 1999) or grounded theory research (Glaser and Strauss, 1967; Strauss and Corbin, 1990; also see Gibbons *et al.*, 1994) offer some methodological flexibility that needs to be accepted and developed upon in construction management research.

CONCLUSION

The underlying theme in this paper has been to approach a PhD research as a project and utilise project management techniques to successfully achieve the objectives of a PhD research while working with a collaborating organisation.

The background of the researcher, the content of the research and the context of the research are the three key areas, in conjunction with the guidance provided by the supervisor, which influences the feasibility of the research methodology chosen. Present rules and regulations for PhD research are not very clear on the feasibility aspect; academic rigour remains the main focus and contextual issues are left upon the best judgement of the examiners (which are necessarily to some extent subjective).

REFERENCES

- Baskerville, R L (1999) Investigating Information Systems with action research. *Communications of the Association for Information Systems*, 2, article 19, www.cis.gsu.edu/~rbaskerv/CAIS_2_19.html
- Bechhofer, F (1974) Current approaches to empirical research: some central ideas, In: J Rex (ed.) *Approaches to sociology*, London: Routledge
- Bryman, A (1988) *Quality and Quantity in Social Research*. London: Unwin Hyman
- Burrell, G and Morgan, G (1979) *Sociological paradigms and organisational analysis*. London: Heinemann
- Checkland, P (1981) *Systems Thinking, Systems Practice*. UK: J Wiley
- Churchman, C W (1971) *The design of inquiring systems*. New York: Basic Books
- Denscombe, M (1998) *The good research guide*. Buckingham, Philadelphia: OUP

- Feyerabend, P (1975) *Against method*. London: New Left Books
- Gibbons, M, Limoges, C, Nowotny, H, Schwartzman, S, Scott, P and Trow, M (1994) *The new production of knowledge: the dynamics of science and research in contemporary societies*. London: Sage
- Gill, J and Johnson, P (1997) *Research methods for managers*. London: Paul Chapman
- Glaser, B and Strauss, A (1967) *The discovery of grounded theory*. Chicago: Aldine
- Hoare, D J (1996) Construction management research methodology: a personal view of recent developments. In ARCOM 96 – 12th Annual Conference and Annual General Meeting, Conference Proceedings, Sheffield Hallam University, 478 – 87
- Mason, R O and Mitroff, I I (1981) *Challenging strategic planning assumptions*. NY: Wiley
- McGrath, J E (1982) Dilemmatics: the study of research choices and dilemmas. In McGrath, J E, Martin, J and Kulka, R A, *Judgement calls in research*. London: Sage
- Mintzberg, H (1973) *The nature of managerial work*. New York: Harper and Row
- Morgan, G (ed.) (1983) *Beyond method*. London: Sage
- Partington, D (2000), Building grounded theories of management action. *British Journal of Management*, **11**, 91-102
- Perry, C and Coote, L (1994) Processes of a new case study research methodology: tool for management development? In *Australian and New Zealand Association for Management (ANZAM) Conference*, Victoria University of Wellington, Wellington
- Raftery J; McGeorge, D and Walters, M (1997) Breaking up methodological monopolies: a multi-paradigm approach to construction management research. *Construction Management and Economics*, **15** (3), 291-97
- Robson, Colin (1993) *Real World Research*. Oxford: Blackwell
- Scandura, TA and Williams, EA (2000) Research methodology in management: current practices, trends, and implications for the future. *Academy of Management Journal*, Mississippi State, **43** (6), 1248-64
- Seymour, D and Rooke, J (1995) The culture of the industry and the culture of research. *Construction Management and Economics*, **13**, 511 - 23
- Spartley, J P (1980) *Participant Observation*. New York: Holt, Rinehart and Winston
- Strauss, A and Corbin, J (1990) *Basics of qualitative research: Grounded theory procedures and techniques*. London: Sage
- Yin, Robert K (1994) *Case Study Research: Design and Methods* (2nd ed.), London: Sage