RESEARCHING "CONSTRUCTION CLIENT AND INNOVATION": METHODOLOGICAL PERSPECTIVE

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ABSTRACT: It is generally accepted that innovation is the implementation of significantly new processes, products or management approaches in order to increase efficiency. Clients or users of products, processes or services are being identified as potential sources of innovation in research conducted in various sectors (e.g. IT, aviation, and laboratory equipment). At present there is concern regarding the construction clients' potential to be an innovation promoter within the construction industry. Several researchers have recommended proactive client involvement in construction. Within this background, authors have designed a research methodology with the aim of 'Improvement of the role of the clients in promoting innovation'. In this context, this paper is an attempt to elaborate the philosophical stances taken and methodologies adopted to fulfill these aims.

Keywords - Construction Industry, Innovation, Research Methodology.

1 INTRODUCTION TO BACKGROUND OF THE RESEARCH

Literature shows that there have been concerns regarding the level of innovation in construction industry for some time. These concerns have motivated a number of researchers to conduct research on innovation related issues in construction to identify solutions (Gann & Salter, 2000). Despite being low in the level of innovation comparative to other industries, it is also acknowledged that construction industry does have the potential to be innovative (Pries & Janszen, 1995; Slaughter, 1998).

In the recent era, especially after the Latham Report (1994) and the Egan Report (1998), the construction client is looked upon as a person who can coordinate and direct the construction process towards innovation. "The traditional assumption that clients only need projects, which are completed within budget, on schedule and with a reasonable quality should start to change" (Egemen & Mohamed, 2006). Egan (1998) believes that this "direction and impetus for change must come from major clients". The reduction of interfaces between the client and the construction industry is also encouraged by promoting client leadership in construction innovation

Within this background authors have formulated a research with the aim of "improving the role of the clients in promoting innovation" (see Kulatunga et al, 2006). It is expected to derive answers to three main research questions: 'what are the characteristics of the client that favour innovation', 'how do the identified characteristics effect innovation' and 'what are the best practices that can be derived to promote innovations in projects'?

For this study, the scope is limited to clients of partnering contracts. The partnering contracts provide an opportunity for better communication, learning and innovation across supply chain (Kumaraswamy and Dulaimi, 2001). The innovation benefits of partnering are well established in the literature (Bresnen and Marshall, 2000). Therefore it can be argued that such an environment provides clients with a better opportunity to participate in innovation processes

more actively; thus there is a greater scope to study and reveal hidden knowledge regarding clients' roles and responsibilities towards innovation in such environment.

Within this research background the authors identified the next step as developing sound research methodology to conduct the research. The objective of this research paper is to discuss the process of the research methodology selection, undertaken to conduct the study. Authors have made efforts to identify available alternative approaches to the formulation of research methodology through thorough literature review. The alternatives were then analysed to select or create the most suitable research methodology to conduct the research.

2 RESEARCH METHODOLOGY – LITERATURE REVIEW

Saunders et al (2003) equate research approach to an 'onion', where the outer layer is research philosophy. Beyond research philosophy the research approach lies which will lead the researcher in to the third layer - research strategy. After the definition of research strategy, the researcher will be able to move to the data collection stage by determining 'time horizons' for the research. The Saunders et al (2003) model coincides with the three stage hierarchical model of Kagioglou et al (1998) though terminologies used are slightly different. Kagioglou et al (1998) proposes a nested approach that flows from research philosophy to research approach and then to research techniques (or data collection methods). However, Saunders et al (2003) have improved the model of Kagioglou et al (1998) by identifying further two layers within the process of research (Figure 1).

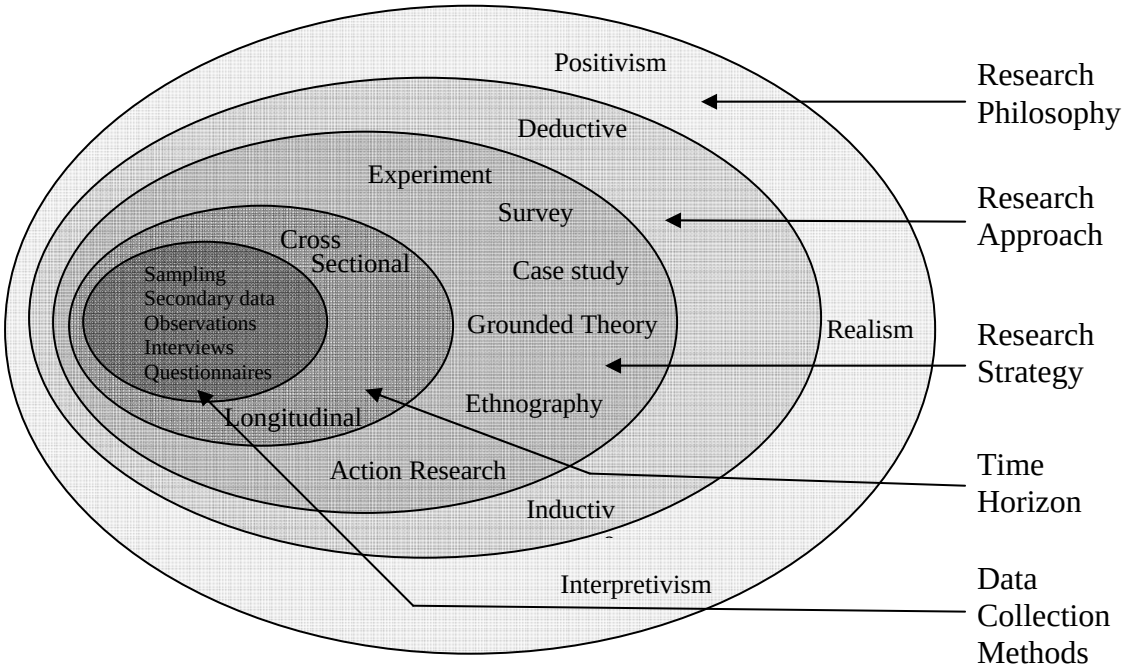

Figure 1 - The Research Process 'Onion' (Saunders et al, 2003)

In the text below the layers of the 'onion' are discussed in detail to gather a sound knowledge regarding the research methodologies.

2.1 Philosophy of research

Numerous researchers have pointed out the importance of paying heed to the research philosophies. Easterby-Smith et al. (2002) stated that failure to understand and think through philosophical issues can have a detrimental effect on the quality of the research outcome. Thinking through philosophies can help to determine the most suitable method to conduct the research at the very early stages. Research philosophy can help to identify the type of evidence required, how to gather it and how to interpret it in order to find an answer to the basic problem under investigation. Reference to research philosophies will enable the researcher to resolve the research questions by identifying, adapting or even creating research designs that projects beyond ones own experience and knowledge (Easterby-Smith et al, 2002).

According to Baker (2001) there are basically two contrasting extremes in research philosophies known as positivism and interpretivism. However Saunders et al, (2003) expands the categorization of philosophies by identifying another dimension of philosophy, named realism which falls within the two extremes (note: not to be confused with the realism ontology explained below). Sexton (2003) argues that contrasting viewpoints on research philosophies are characterized by contrasting views taken on the ontological, epistemological and axiological assumptions (explained bellow).

Ontological assumption: Whether reality is external to the individual and imposes itself on individual ('realism ontology') or the reality is an objective nature, i.e. product of the individuals, cognition (normalism or idealism) (Burrell & Morgan, 1979)

Epistemological assumption: This assumption is about 'how one will understand the world'. In one extreme it is the search for regularities and causal relationships between its constituent elements (positivist). Other extremes (anti-positivists or interpretivist) hold the view that the "world is essentially relativistic and can only be understood from the point of view of the individuals who are directly involved in the activities which are to be studied" (Burrell & Morgan, 1979, pp5).

Axiological assumption: This assumption is about the nature of values and the foundation of value judgments (Sexton, 2003). The spectrum extends from 'value-free' where the researcher does not impose any value judgments on the subject of research to 'value-laden' where value judgments are involved.

In the following sections, the main research philosophies of positivism, interpretivism and realism is discussed in detail

2.1.1 Positivism

Positivism takes the ontological assumption that the reality is external and objective. Based on the aforesaid ontological assumption; positivism takes the epistemological stance that the subject under research should be studied through objective methods rather than by subjective methods such as sensation, reflection or intuition. (Easterby-Smith et al, 2002). Positivists sought to explain the behaviour of the subject under research by identifying fundamental laws through observable reality. (Saunders et al, 2003; Easterby-Smith et al, 2002). Throughout the study

independence of the observer and subject should be maintained and questions like what, and how to study, should be determined by value free objective criterion rather than human beliefs and interest. Saunders et al (2003, p84) also agree by stating that in positivism "the researcher is independent of and neither affects nor is affected by the subject of research".

2.1.2 Interpretivism (Social Constructivism)

In contrast to positivism, interpretivism takes the idealism and relativist stances in respect of ontological and epistemological assumptions. Interpretivists view reality as socially constructed (Saunders et al, 2003) thus it is also named social constructivism. According to interpretivism "reality is determined by people rather than by objective and external factors" (Easterby-Smith et al, 2002, p30). Actions of people will be affected by the interpretations that they themselves place on different situations. In social constructivism emphasis is placed on the different constructions and meanings placed by people upon their experience because people interact with the environment and try to make sense of situations through their interpretations (Easterby-Smith et al, 2002; Saunders et al, 2003).

2.1.3 Realism

In essence this branch of research philosophy is named 'realism' because it takes the ontological stance of 'realism' as in the case of research philosophy of positivism (i.e. reality is external to the individual). However in contrast to positivism philosophy, realism takes the epistemological stance of anti-positivist. Under the philosophy of realism, truth is sought through triangulation of methods and through survey viewpoints as the truth is not directly comprehensible (Easterby-Smith et al, 2002). Saunders et al, (2003) also agree with this third important philosophical stance that lies between those two extremes, which is distinguished from positivism as it identifies the importance of interpretations of the socially constructed environment. Further realism is to be used exclusively on human subjects and takes the view that people are likely to share interpretations of their socially constructed environment.

These philosophies are plotted in the following diagram to represent their relation ship to underline ontological, epistemological and axiological assumptions

		Epistemological Assumption	
		Positivist	**Anti-positivists**
Ontology	**Realism**	Positivism	Realism
	Idealism		Interpretivism (Social Constructivism)
		Value Free	**Value Laden**
		Axiology	

Figure 2 - Relationship among ontology, epistemology, axiology and research philosophies

Under this section the main streams of research philosophies were discussed. In the following section the next layers that are research approaches and research strategies are discussed in detail.

2.2 Research Approach & Research Strategies

2.2.1 Research Approach

The research approach can be divided into two broad groups known as deductive approach and inductive approach. Easterby-Smith et al (2002) argue that positivist research are more biased towards deductive approach while the social constructivist research is more biased towards inductive approach, due to the philosophical stances taken by positivists and social constructivists. Gill & Johnson (2002) distinguish these two approaches with reference to Kolb's (1979) experiential learning cycle.

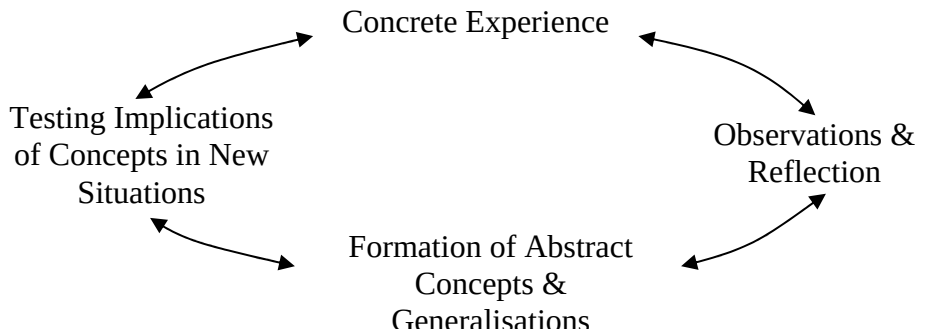

Figure 3 - Kolb's (1979, p38) experiential learning cycle (Cited in Gill & Johnson, 2002)

Gill & Johnson (2002) argue that the deductive approach represents the part of the cycle where formation of abstract concepts lead to 'concrete experience' through empirical testing or observations. The deductive approach is used to search for causal relationships between variables through deducing a hypothesis (Saunders et al, 2003). Gill & Johnson (2002) also agree with, and emphasises the importance of determining which concepts present important aspects of the theory or problem under investigation. After identifying these important concepts they are required to be transformed into observables or indicators to facilitate quantitative empirical testing (Gill & Johnson, 2002; Saunders et al, 2003). Research is expected to pursue the principles of scientific rigor and to maintain the independence of the observer in a deductive research approach. At the end of the study the results are expected to be generalised to the population (Saunders et al, 2003).

In contrast to deductive approach; inductive approach represents part of the cycle (Figure 3)) where 'concrete experience' are being observed and reflected upon to form abstract concepts (Gill & Johnson, 2002). Under the inductive approach the independence of the observer is not strictly observed, instead the researcher is considered to be part of the research process. Generalisation of the theory will not be expected as the inductive approach would be particularly concerned with the context of the research (Saunders et al, 2003). Because of the context specific

nature “theory that is inductively developed will be fitted to the data, thus more likely to be useful, plausible and accessible to practitioners” (Gill & Johnson, 2002, p40).

Even though the research approaches are divided in to two main groups, Saunders et al (2003) stress the importance of not considering them as two rigid divisions in approaches to the research. Saunders et al (2003) further states that combining the two approaches is possible as it will enable the researcher to reap benefits from both - which is also attested to by Yin (2003) and Gill and Johnson (2002).

2.2.2 Research Strategy

The literature on research methodology identifies experiments, survey, case study, grounded theory, and ethnography and action research as major research strategies within the spectrum from deductive to inductive research approaches (See Saunders et al, 2003; Yin 2003; Easterby-Smith et al, 2002; Gill & Johnson, 2002).

Generally experiments are undertaken on the sample of the population and within a controlled environment to test whether there is causal relationship between the variables under investigation (Baker, 2001). In contrast, surveys are conducted on a wider population using economical data collection methods such as questionnaires (Saunders et al, 2003).

The case studies provide an opportunity to use multiple sources of evidence to empirically investigate a contemporary phenomenon. Case studies allow us to find answers to ‘what’, ‘why’ and ‘how’ types of questions. Data can be collected using a number of methods that may include questionnaires, interviews, observations and documentary evidence.

Grounded theory is a strategy where data is collected without an initial theoretical framework. Theory is developed from the collected data itself and these theories are further tested to derive conclusions.

Ethnography and action research are highly rooted in social science and characterized by the high level of involvement of the researcher, with the subject of research.

Saunders et al (2003) map the concepts discussed so far within the research process onion with reference to their relationships as below (Figure 1)

2.2.3 Time horizon and data collection methods

Before data collection it is important to determine whether the objective of the research is to study a phenomenon in a snap shot of time (cross sectional) or study an ongoing phenomenon (longitudinal) (Saunders et al, 2003). Depending on the requirement the researcher can devise data collection methods such as analysis of secondary data, observations, interviews and questionnaires within the selected research strategy.

In the section above the research philosophies and underlying assumptions, research approaches and research strategies are discussed in detail with reference to their mutual relationship. In the section below authors formulate an appropriate methodology to fulfill the aim of the research on client’s role in construction innovation based on existing theories and literature.

3 RESEARCH METHODOLOGY – CLIENT'S ROLE IN CONSTRUCTION INNOVATION

Under this section authors argue the best fit research methodology to conduct the study. Initially the philosophical stance of the study on clients' role in innovation is determined. Afterwards argument is extended towards identification of most suitable research approach and strategy.

The research is approached with the objective of finding best practices that are required by client to manage innovation within the project. In this approach it takes the concept of finding underline fundamental truth. The concept of finding fundamental truth places the research under realism ontology. However, researcher also acknowledges the fact that the subjects of research are practitioners in the construction industry. The nature of the research requires gathering knowledge and experience held by practitioners within the context of construction innovation that can give a value-laden aspect to the research in respect of axiology. The involvement of human beings and reference to context limits the use of objective methods to gather information as in the case of positivistic research. Therefore, research should take anti-positivistic stance in relation to epistemological assumption. Therefore, authors argue that the research should take the realism (philosophy) as the underline philosophy of the research to satisfy ontological, epistemological and axiological assumptions (refer to Figure 2).

Once the philosophy is determined the next step is to determine the most suitable research approach and strategy from the options available (refer Figure 1). The authors devised a deductive approach to eliminate ill fit research strategies to filter the best fit research strategy.

Yin (2003) proposes three conditions to determine the most suitable research strategy. They are:

1. Type of research question
2. The extent of control over actual behavioural events
3. The degree of focus on contemporary as opposed to historical events

When looked at, the type of research questions of this particular research, it is evident that they are exploratory 'what' questions and 'why' questions. At this point surveys have to be discarded due to their limited ability to cater for the exploratory type of research questions being posed. Exploratory 'what' questions are generally favoured by any of the research strategies and 'why' questions are generally favoured by experiments and case studies (Yin, 2003). However, it should also be acknowledged that grounded theory, ethnographies and action research also have the ability to cater for 'why' type questions.

The nature of study requires constant reference to the context of phenomenon. Experiments generally being conducted under controlled environments, their ability to refer the context are being limited whereas case studies, ethnographies and action research provides better ability to deal with the context (Yin, 2003). Further, the aim and objectives of this study do not demand the degree of control over the environment that is required for experiments. On the other hand when considered from the aspect of the research philosophy pertaining to this study, it is evident that the experiments are not the most favoured option. The rejection of the extreme positivistic stance eliminates the use of 'deductive' research approaches and associated techniques such as experiments and surveys.

Experiments and surveys being discarded, the researcher is left with case study, grounded theory, ethnography and action research as possible options to conduct the research. Out of remaining four, ethnography is a strategy that is used to interpret the social world of research

subjects (Gill & Johnson, 2002). Action research is a technique involving higher level of researcher involvement with the intention of implementing change within the organization under consideration (Saunders et al, 2003). In this particular research on client and innovation the researcher does not intend to interpret the social world of research subjects or implement change within the organisation. Further, ethnography and action research are strongly routed in interpretivism that is a philosophy already rejected (Figure 1). Therefore, it can be argued that ethnography and action research is ill suited for this particular research and can be discarded from the list of options.

When innovation is considered there have been a considerable amount of studies conducted even though there are a lot more to explore. Further, some studies regarding client and innovation had also taken place in non-construction sectors (Egemen & Mohamed, 2006; Ivory, 2005; Blayse, 2004; Hillebrandt, 2000; Gann and Salter, 2000; Green, 1999; Egan, 1998; Nam and Tatum, 1997; Gardiner and Rothwell's, 1985). The existing knowledge with regard to client and innovation facilitates the development of theoretical framework for the data collection. Therefore, adherence to pure grounded theory as a prime research strategy is not required nor justifiable.

In the above discussion authors have discarded five of the identified research strategies based on the grounds of their suitability. IN the end, the case study approach remains the approach with a higher degree of suitability. In the next stage, the author discusses the case study method to determine the advantages that it can provide for this particular research on clients' involvement in innovation.

3.1 Suitability of case study method for this research: strengths & weaknesses

Case study is defined as 'a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence' (Robson, 2002, p178, cited in Saunders et al, 2003). Yin (2003) also agrees with Robson (2002), but takes the definition further by emphasizing the suitability of the case study to investigate phenomenon at the instance when boundary between phenomenon and the context is not clearly evident. As case study method enables the evaluattion of multiple sources of evidence and thus can cope with situations with many variables of interest (Yin, 2003).

The authors identify the above characteristics of the case studies as the main strengths which will be of greater advantage towards the study on client and innovation. Initially the partnering contracts were identified as the research boundary on the basis that the partnering environments provide better grounds to promote innovation. Within this boundary a close relationship exists between phenomenon, that is the innovation and the context that is the partnering arrangement. Therefore, it can be argued that case study method is suited for this study as it have the ability to cater for this sort of scenario where boundary between phenomenon and the context is not clearly evident and the context is required to be understood. To understand the context it is required to collect data from various stakeholders to the innovation, i.e. from multiple sources of evidence, which case studies allow.

In the above sections authors analysed the strengths of the case study method and the advantage those strengths can give to the research on clients' involvement in innovation. However, it is also acknowledged that there are some traditional prejudices against case studies. Yin (2003) identifies the main prejudices as a lack of rigor, an allowance of biased views to

influence the direction of findings and conclusions and an inability to generalize the findings. Yin (2003) acknowledges that these prejudices are valid in certain case studies but attribute it to the poor case study design and reject the idea that they are inherent deficiencies of the method. Regarding the ability to generalize, it is argued that both case studies and experiments that have higher degree of scientific rigor, are only generalisable within theoretical propositions, and not to the population or universe (Yin, 2003).

4 SUMMARY AND WAY FORWARD

In this paper authors have made an effort to discuss the existing literature related to research methodology. Research philosophies, strategies and data collection methods are discussed in detail with the aim of filtering out the relevant philosophies and strategies to conduct the research on client and innovation. Through the discussion the authors have argued that this particular research on client and innovation takes the philosophical stance of realism and had selected case study method as the most suitable research strategy with brief analysis of strengths and weaknesses. As way forward, it is envisaged to develop a detail case study design for the research. Within the process heed will be paid to existing prejudices against case studies as mentioned above and measures will be taken to eliminate those deficiencies from the case study design.

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