



The constructive research approach in project management research

Adekunle Oyegoke

University of Salford, Manchester, UK

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Abstract

Purpose – Project management (PM) is a diverse discipline which covers the study of management practices. Different research approaches have been used in the study of PM but not much emphasis has been given to the constructive approach which is implicitly applied in most cases through managerial constructions. The purpose of this paper is to support the application of the constructive research approach to the construction PM discipline. It is also aimed at showing the rigour of the constructive research approach that satisfies the requirements of applied studies research.

Design/methodology/approach – The study is carried out via extensive literature review and a demonstrative example of the development of the Specialist Task Organisation procurement approach through the six stages of the constructive research approach.

Findings – The paper shows the applicability of the constructive research approach to construction and PM. The paper also highlights some criticisms that the constructive approach has not been firmly rooted in PM research and suggests some solutions.

Research limitations/implications – The constructive research approach is applicable to the PM discipline because most research in this field is applied and practical. The paper specifically scrutinises and promotes the constructive research approach.

Originality/value – The paper will provide an additional research tool in the PM discipline that produces innovative solutions which are grounded by valid research instruments. The impact of this paper will increase the popularity of this research methodology, generate and stimulate a debate to further explore its application and the development in the PM discipline.

Keywords Constructive research, Project management, Validation, Triangulation, Task specialization

Paper type General review

Introduction

According to Shenhar and Dvir (2007), project management (PM) is one of the growing disciplines in organisations today. However, many projects still fail and many projects do not accomplish their business results. They argued that this presents a unique opportunity for improvement through research activities. A great amount of debate has been ranging about the soundness of the PM theoretical foundation and theories (Packendorff, 1995; Soderlund, 2004a; Morris, 2002). Soderlund (2004a) traces the two main theoretical traditions in PM research to those with intellectual roots in: the engineering science and applied mathematics (planning techniques and methods of PM) and others from the social sciences (organisational and behavioural aspects of project organisations). From the theoretical viewpoint Packendorff (1995) categorised PM into three sides/types: the planning side; the human side (control, structure and leadership); and the performance side (goal-fulfilment and evaluation). Morris (2010) argues for the need to focus on the study of projects as purposeful organisations and the role of management in their creation and delivery. PM therefore seems to be a research



field with the potential for bringing different disciplines to focus on a focal phenomenon of study, that is, projects (Soderlund, 2004a).

The normal sequence in carrying out research work in PM is to define problems and learn surrounding facts that can result in a better understanding of targeted problems. A researcher can devise her or his own workable methods as far as a reasonable, logical and convincing explanation can be given to support this approach. It is the responsibility of a researcher to choose a model or a strategy that both fits the problem to be solved and/or fits other research objectives, and that will produce reliable results (Bell, 1999). Walker (1997) provides six criteria for a well-developed research project: novelty of the subject, state-of-art knowledge, identification of gaps in current knowledge, a grasp of research techniques and their limitations, well-communicated results and the internationalization of the work for wider credibility.

In general, a research design consists of five interrelated aspects: what is the aim or purpose, what theory informs the study, what research questions are to be posed, what method is employed in the collection of the data and what is the sampling strategy of the data (Robson, 2002). The aim of the research design is to guide a researcher in the process of collecting, analysing and interpreting the data as well as to avoid situations where the evidence does not address the initial research questions (Yin, 1989).

Constructive research approach is a problem-solving method that both relies on different research tools and is also associated with interpretive epistemology, positivist epistemology and empiricism. The question-driven research design is a logical sequence that connects the empirical data to a study's initial research questions and ultimately to its conclusions. Constructive research aimed at producing novel solutions to both practical and theoretical problems. Solutions are often suggested through managerial problem-solving techniques through the construction of models, diagrams and plans. Pollack (2007) referred to Wooley and Pidd (1981) who acknowledged that problem solving and problem-structuring methodologies have been applied in the field of operational research practical methodologies based on both the hard and soft paradigms. Pollack (2007) emphasises that at practical level, PM tends to adopt a problem-solving rather than a problem-structuring approach to projects.

It has been established that the PM discipline is an applied and practical field which implies that the PM discipline requires problem-solving solutions through the construction of organisational models, procedures, diagrams and plans. Constructive research methodology is not a new method but its application to PM discipline has been limited to date. Therefore, this paper is aimed at exploring the possibility of applying the constructive research approach to the construction PM discipline and highlights some constraints and suggests some solutions. This study is focusing on construction PM, however, it is envisaged that the lessons learned from the study will be applicable to PM disciplines. According to the Project Management Institute (2000), PM is "the application of knowledge, skills, tools, and techniques to a broad range of activities in order to meet the requirements of the particular project."

Some research approaches in the PM field

Consensus around management research methodologies

There has been a great deal of debate in assessing the most appropriate research methodology for PM-related research problems. According to Winter *et al.* (2006), the most dominant strand of PM thinking is the "hard" systems model which is a rational,

universal and deterministic model. However, pure and applied sciences have their places in PM, as PM work involves different processes and procedures on both demand and supply chains. This broadens the scope of PM-related research so that it demands multidisciplinary thinking and actions. Research, therefore can be of many types: some are focused strongly on scientific experimentation and discovery, while others might be pursuing behavioural questions.

Qualitative and historical studies are seen as making a valuable contribution to research, while comparative and quantitative studies provide a distinct, complementary addition to knowledge (Donaldson, 1988). Tobin and Begley (2004) advised that the qualitative researchers need to be explicit about how and why they choose specific legitimizing criteria in ensuring the robustness of their enquiries. There should be a shift from a position of fundamentalism to a more pluralistic approach as a means of legitimizing naturalistic (qualitative) inquiry.

It is also important that any piece of research must have a stated scope and limitation, as a single research project cannot solve all problems associated with a given study. A good piece of research should conclude with a discussion based on actual findings. The type of research question and a degree of control a researcher has over the implementation of tools and techniques determine in large part the strategy to be adopted in carrying out the study. The extent of control an investigator has over the actual behaviour of events and a degree of focus on the contemporary as opposed to the historical events is key conditions for the use of a particular strategy (Yin, 1989).

Seymour and Rooke (1995) assumed that the reality of management practice can be captured in the form of a single objective account, taking the form of a generic causal representation of the “system”. Alternatively, the interpretative approach yields an investigation that is primarily concerned with meaning rather than causality, and produces an account that recognizes the respective viewpoints of practitioners in the process. Holt and Faniran (2000) suggested that management research required a hybrid approach based on ontological and epistemological concepts. Consensus is forming around this line of thought as Love *et al.* (2002), Soderlund (2004a) and Pollack (2007) concurred that effective management research methodologies can embody both of these paradigms to varying extents, often simultaneously. Robson (1993) advised against relying on a singular methodological approach and advocated a variety of methods.

Philosophy underpinning PM research

The evaluation of whether recent research is applying methodologies appropriately in terms of epistemology, integrity of the methodologies and the context in which they are being applied was carried out by Smyth and Morris (2007). They postulate that the key epistemological aspects of dominant methodologies used in PM research include positivism and empiricism, critical realism and other methodologies. Smyth and Morris (2007) postulate that both positivism and empiricism are applicable to PM and argue that positivism and empiricism are closely aligned traditions because they explain events based on the Humean law of causality – linear thinking. Positivism, in its various forms, creates closed cause-effect models, relies on deduction and pursues generalisations in order to establish principles or laws to govern its object. Conversely, empiricism is an open system and acknowledges that insufficient is known about something to conceptualise or generalise. Empiricism places primacy upon observation and data, relies on induction, usually seeking to observe without theory, using evidence

to induce generalisations and build theory. Empiricism has been used where researchers are trying to decouple themselves from existing belief systems – theist or paradigmatic (Smyth and Morris, 2007).

Pollack (2007) confirms strong links between the hard paradigm and PM and suggests a growing acceptance of the soft paradigm in PM research. The hard paradigm is commonly associated with a positivist epistemology, deductive reasoning and quantitative or reductionist techniques, attributes which are often associated with rigour and objectivity. The soft paradigm is commonly associated with an interpretive epistemology, inductive reasoning and exploratory, qualitative techniques, which emphasise contextual relevance rather than objectivity (Pollack, 2007).

Smyth and Morris (2007) argue that there is a lack of epistemological care taken in the selection and application of research methodologies in PM. They further emphasised that epistemological issues that address context, and which seek both general and particular explanations, are not typically found in the positivist or empiricist traditions. They wonder why critical realism, which addresses both the general and the particular, seems so under applied. Critical realism recognizes the value laden nature of all science and the interpretative nature of scientific endeavour and incorporates a normative viewpoint for optimising and addressing critical factors.

Seymour *et al.* (1997) postulate that construction management is dominated by research carried out under a “rationalist (quantitative) paradigm” and a positivist epistemology but argued in favour of “naturalistic (qualitative) paradigm” that is, interpretative research method and nominalist ontology. The difficulty in understanding the relationship between rationalistic and naturalistic paradigms arises because of the tendency to discuss philosophical (epistemology questions which are theoretical) and technical (appropriateness of methods which are intensely practical) issues in the same context. Love *et al.* (2002) focus on the interaction of ontological (metaphysical nature of being) and epistemological (the theory of method or grounds of knowledge) concepts.

The constructive research question can be phenomenon driven or theory driven or the combination of the two. The objective is to identify and solve real practical problems. Constructive research as a methodology begins with strong grounding in identifying a practical problem from practice complemented by related literature. The identified research problems are used to propose research questions that address the problem. The questions are solved by developing or constructing a solution which will be operationalised to determine its workability and appropriateness.

Therefore, the constructive research approach is related to rationalist (quantitative) and naturalistic paradigms. It assumes that reason and experience rather than the non-rational are the fundamental criteria in the solution of problems. In naturalistic context, constructive research assumes that there are multiple interpretations of reality and the need to understand how individuals construct their own reality within their social context.

In terms of epistemology, constructive research relied on positivism which differentiates it from consulting. Constructive approach process entails six phases that meet scientific study. In terms of ontology, constructive research relied on interpretative method by assuming that people construct and test solutions based on their interaction with the world around them. Constructive approach also aligned with pragmatism, a philosophy emphasising practical applications: by the testability of the idea in real life

through straightforward practical way of thinking about things or dealing with problem. The pragmatism philosophy also extends to validation stage where solutions are demonstrated by practical applications and theory testing. The validation phase combines rationalistic and naturalistic paradigms for multiple testing through triangulation. According to Jan (2006), pragmatism offers a criterion of usefulness for constructivism which is spread across epistemological and normative dimensions. When using constructive research approach it is better to justifying why the research question is better addressed by constructive approach rather than other methods.

The need for methodological rigour

One of the vital issues in PM research is to instil methodological rigour within an interpretive framework in order to demonstrate the robustness of qualitative research. The attributes of rigour span across all research approaches, are applicable regardless (positivist and interpretative) of paradigm and they deserve particular attention in PM research in order to confirm legitimacy, integrity and competence. According to Tobin and Begley (2004), this has been questioned by those working in the naturalistic paradigm most especially the issues of validity, reliability and generalisability. They argued that the rejection of rigour undermines acceptance of qualitative research as a systematic process that can contribute to the advancement of knowledge. One way to do that is through triangulation in order to demonstrate conformity and completeness and to ensure acceptability across paradigms. Other arguments put forward are: it will enable the researcher to gain complete understanding of a given PM research phenomenon because it comprises of a “blend” of methods that are different from each other (Love *et al.*, 2002); it allows testing, or understanding of the research proposition (Todd, 1979); a means of combining rationalistic and naturalistic paradigms, and to present multiple perspectives upon the phenomenon being studied.

The need for juxtaposition of techniques and tools

In order to increase the level of credibility of a research work, there may be the need for cross-verification from different sources. According to Tobin and Begley (2004), there are different types of triangulation: data triangulation, investigator triangulation, theoretical triangulation, methodological triangulation, unit of analysis triangulation, interdisciplinary triangulation, triangulation of communication skills, conceptual and collaborative triangulation. This blend of research methods typically involves different research strategies. A research strategy may include an experiment, a survey, an archival analysis (economic study), a history and a case study. These strategies answer questions on why, who, where, how, what and when (Yin, 1989).

Qualitative research involves many relevant ways of exploring and describing, explaining and predicting, ordering and explaining as well as drawing conclusions and verifying (Miles and Huberman, 1994). Interviews also play a vital role in qualitative research. There are three qualitative interview types, that is, structured, semi-structured and unstructured. In a structured interview, the same question types and the given alternatives (by using the same words) are asked in the same order among the interviewees. In a semi-structured interview, the topics, the sample sizes, the interviewees and the questions have been determined beforehand. An unstructured interview has no predetermined set of questions: both interviewer and interviewee interact freely (Rogers and Bouey, 1996; Ghauri and Gronhaug, 2002).

The juxtaposition of techniques and tools improve the confirmability (objectivity and neutrality) and authenticity of the process, and establishes data correctness and correct interpretations of the findings. The triangulation research approach deals with the pragmatists' dilemma of relativism, that is, the association of perceptual input to cognitive concepts (Jan, 2006), false dichotomy between qualitative and quantitative approaches (Creswell, 1994) and also satisfies their notion of knowledge acquisition "to gain an understanding which is necessary to deal with problems as they arise" (Dewey, 1988).

The future research directions in the PM research

According to Winter *et al.* (2006), the issues facing both researchers and practitioners in PM now seem to be well beyond the hard systems perspective. They provided a step change that will help in developing the practice that best help in managing projects and other areas such as commercial, technological, human behaviour and other broader aspects of the subject. The directions for future research in PM provided five key step changes (Winter *et al.*, 2006) which are compatible with constructive research approach:

- (1) *Theories of the complexity of projects and PM.* The constructive approach can be used to move from a classical lifecycle model of PM towards the development of new solutions (models) at projects and PM levels. However, theories can be developed or extended from empirical work as described by Eisebhardt and Graebner (2007).
- (2) *Projects as social processes.* The constructive approach is a tool that can be used to develop social interaction among people, illuminating the flux of events and human action within the array of social agenda, practices and stakeholder relations.
- (3) *Value creation as the prime focus.* The constructive approach can be useful in moving from the concepts and methodologies based on product creation towards concepts and frameworks which focused on value creation.
- (4) *Broader conceptualisation of projects.* The constructive approach can be used to define projects as a multidisciplinary that have multiple purposes.
- (5) *Reflective practitioners.* The constructive approach can be used to move the paradigm from practitioners as trained technicians towards learning and development which facilitates the development of reflective practitioners who can learn, operate and adapt effectively.

The constructive research approach

Constructive research is used to define and solve problems, as well as to improve an existing system or performance, with the overall implication of adding to the existing body of knowledge. Constructive research can be characterized as applied studies which often result in new knowledge in the form of normative applications. Although many studies can be categorised under applied studies, what differentiate them is their end results. For instance, basic studies assist in knowledge enhancement without any explicit normative purposes and form, while development techniques help to improve skills and means. Analytic model building produces an elegantly proven problem solution which works in principle but whose actual practical adequacy usually remains unclear. In addition, the constructive research approach is not a consulting exercise

because scientific methods are not an inevitable condition for successful consulting work (Kasanen *et al.*, 1993).

Although some work may fit with the principles of the constructive approach it cannot automatically be classified as such. Especially if the aim is just to observe and analyse what others have done either in research or practice but not to solve problems. Kasanen *et al.* (1993) postulate that it is difficult to differentiate between scientific problem solving and the constructive method because in scientific problem solving, the decision maker gives the aims and the researcher produces a unique recommendation for action and uses scientific methods in developing the recommendation.

The constructive research approach is not a new concept as there are several applied constructive studies in technical sciences (new product development), clinical medicine (creation of a new treatment), finance (option pricing), philosophy (creating artificial language), management accounting (a new budgeting system) and operations research. Theoretical constructive research has been applied to mathematical algorithms and new mathematical entities as well.

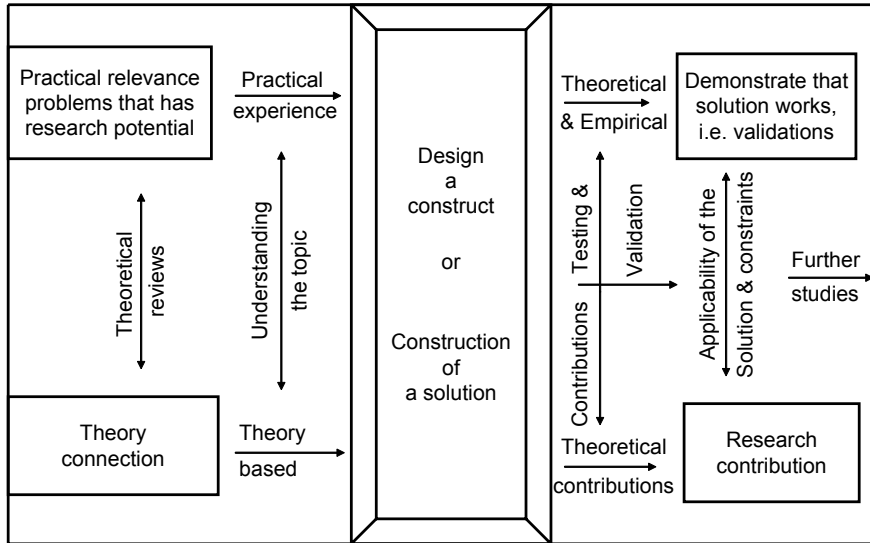
The constructive approach is based on a design of constructs or constructions of a solution. Kasanen *et al.* (1993) refer to constructions as a way of producing solutions to explicit problems: a change process, something which is profoundly different from anything which existed before it is created, something that produces new reality and its usability can be demonstrated through the implementation of solutions.

Constructive approach is applicable to the PM disciplines. Shenhar and Dvir (2007) proposed some research directions for the future of the PM under the central theme of the problem driven perspective: the strategic business view, operational process view and the team leadership view. The constructive research approach is most relevant to the PM discipline in a form of managerial constructions either in project, firm or industry levels. Morris (2010) argues for appreciating the relevance of theoretically based and empirically grounded PM research that is focused upon project outcomes. Constructive research can be qualitative or quantitative or both, an inherently goal-directed problem-solving activity normative in nature and typically applied case method through a normative case study approach.

According to Kasanen *et al.* (1993), not all the problem-solving exercises pass as constructive research. In the constructive approach, it is essential to tie the problem and its solution together with accumulated theoretical knowledge. The core element of the constructive approach is the innovation/design construct phase which is often heuristic by nature with stricter theoretical justification. The novelty and the actual working of the solution need to be demonstrated. The constructive approach is a rigorous research approach which spans through construction, application and operationalisation that requires innovation, creativity and transparency.

Figure 1 shows working mechanisms of the constructive research approach. It begins with identifying practical relevance problems that have research potential through theoretical literature reviews and substantiated with practical experience. This comprises epistemology, theory and technical issues which provides the philosophical stance and gives context to and informs the study. This enables the researcher to understand the topic. Both the theory-based connection and practical experience inform a better design of a construct. The construct can be validated through triangulation of different approaches depending on the work at hand. Testing, justification and validation can be empirical or theoretical, or quantitative or qualitative or both,

Figure 1.
The features of the
constructive research
approach



in order to demonstrate that the solution works. The study should also cover the applicability of the solution, the constraint in its application and further studies if applicable. Both the theoretical and research contributions should be highlighted. It is important to note that this process is not a linear as presented or *post hoc* standard but a dynamic and interactive process between different phases.

Demonstrative example of application of constructive approach

One good example of where constructive approach was used in PM practice is in the development of Specialist Task Organisation (STO) procurement approach (Oyegoke, 2007; Oyegoke and Juhani, 2009) which is used for the demonstrative example to show the rigour and application of the constructive research approach. It follows six phases of the constructive research process.

Phase one: finding a practical relevant problem that has a research potential

Finding a problem that has research potential can be driven by an existing problem in the industry, for instance, owner or client dissatisfaction in terms of prolonged delivery times, exceeded budgets and the non-attainment of quality standards. Problem identification phase relied on pragmatism approach with the consequences on beliefs/practices and theories. Practical problems should be substantiated by the literature study. Problems can also be found from proposition testing which will indicate knowledge gaps via literature review. However, there are three major approaches which can be used in generating problems in constructive research as shown in Figure 2:

- (1) anecdotal evidence;
- (2) evidence based on practical experience from practice or from the practitioners; and
- (3) evidence from peers' theoretical work.

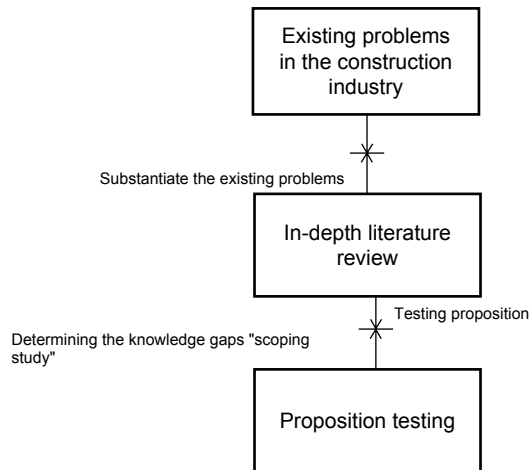


Figure 2.
Basic step in finding
practical relevant
problems in constructive
research

Constructive approach encourages co-production of knowledge between the industry practitioner and the researcher in all the six phases.

Finding a practical problem in the development of the STO approach was driven by the existing problem in the construction industry as highlighted in many reports. Originally, Latham (1994) recommended the formulation of effective construction processes that will result in improved project performance in the UK context. Many studies have proposed integration and partnering, taking a single point of responsibility in order to avoid fragmentation that is believed to be the root cause(s) of the construction industry's ills (Latham, 1994; Egan, 1998). However, Cox and Ireland (2002) emphasise that the Latham (1994) and the Egan (1998) reports suffer from inappropriate methodology in analysing the causes of inefficiency in construction procurement as well as choosing the subjective preference for partnering solutions. Readily, some of the flaws in partnering (the false dichotomy between the points of responsibilities) are well demonstrated in the repeated formation and the subsequent break-up of project teams when in most cases the fragmented construction is one-off or seldom repetitively embarked upon. When contractual processes are in disarray, owners' risks become bigger and more likely.

It is obvious that owner dissatisfaction and its links to contracting and procurement processes need to be explored, described and discussed. Hence, there are problems in this area of study which has research potentials.

Phase two: obtaining a general, comprehensive understanding of the topic

After the problem is defined a general understanding of the topic is carried out through the theoretical understanding of what has been done to date (literature review). A thorough examination of a number of studies proposing innovative and incentive ways of solving the problems are documented. In order to have a comprehensive understanding of the topic the line of enquiry should be further extended to related disciplines and practices where comparison and synthesis should be carried out.

In developing the STO approach, a comprehensive literature review was undertaken into the contracting practices of the USA, the UK, Japan and Finland. The aim was

to understand the practices as related to the topic. A comparative study was carried out and the positive and negative aspects of the contracting practices are compiled. The positive and negative attributes are derived through the theoretical analysis via the reviews of the extensive empirical and theoretical information (literature) on the practices in the four countries. The dissatisfaction in project performance among owners is reviewed *vis-à-vis* the three contracting practices of the UK, the USA and Finland in order to understand the wider context of the problem from different contracting perspectives.

In the UK context for instance, the construction industry has faced many severe problems related to product development processes (client dissatisfaction), stakeholders (industry dissatisfaction) and contracting processes (supply chain problems) as outlined in the Latham (1994) report and supported by the Egan (1998) report. Overall, client dissatisfaction is related to late deliveries, exceeded budgets and poor quality among both public and private clients. The Latham (1994) report proposed changes toward a more collaborative culture. Alliances (partnering) all the way through the contract chain were seen to be the most effective way of rethinking the construction delivery process. The Egan (1998) report identified the five key drivers of change needed to set the agenda for the construction industry at large: committed leadership, client focus, integrated processes and teams, a quality-driven agenda and commitment to people. All these have resulted in a number of studies proposing innovative and incentive-driven ways of carrying out construction projects such as partnering and alliances (Stephenson, 1996; Hellard, 1997) and effective design management (Gray and Hughes, 2001; Ballard and Koskela, 1998).

Typically, Male and Mitrovic (1999) suggest the outsourcing of non-core activities through the establishment of sourcing alliances in the UK. For instance, the prototype design approach is emerging in order to increase the volume of standard components and to enhance partnering between contractors and suppliers. Similar new approaches save bidding costs, allow co-ordinated bulk materials purchases and provide economies of scale. In addition, industrial owners and utilities (using the opportunity of the deregulated infrastructure market to achieve globalisation) are opting for the “flash-track” approach by undertaking just-in-time design and construction in parallel (Male and Mitrovic, 1999). The private finance initiative encourages private participation in public sector projects (Akintoye *et al.*, 1998; Zhang and Kumaraswamy, 2001). Shared responsibility in construction management (SR-CM) encourages the CM equity involvement in projects in a form of equity stakes or guarantee trusts by third parties.

In the context of the USA, the construction industry is faced with numerous problems among which are the inability to finish on time, on budget, and to meet the expectations of building owners/users (Post, 2001, 1989). The key problems of non-performance can be linked with contractual and product development processes. Kashiwagi (2002) proposes best value procurement that uses information systems to minimise risks and to increase performance and efficiency. He promotes a performance-based procurement system known as the performance information procurement system (PIPS), which is a simplified, non-technical and logical process. The PIPS process consists of seven steps as follows: setting up the process and the education, selecting a test project, collecting the past performance information, submitting and analysing the bids, selecting the best

value contractor, minimising the pre-award phase risk as well as implementing the construction works and rating the construction performance.

In addition, Dorsey (2004) deals with the delivery methods involving financing or operations and maintenance of the facility. The resultant effect is an increment in the number of variables such as the consideration for lease rate, the lease duration and the operating expenses that are factored into the evaluation process especially at the stage when the contractors are selected. Dorsey also examined the impact of the financing on the procurement process. The primary driver for third party involvement depends on the owner's knowledge and experience with construction financing as well as the scope for which funding is required.

In the context of Finland, Lahdenperä (1998) has suggested the modification of the operational modes of the construction industry for the common good. Lahdenperä proposed nine principles that assist in the renewal of the operational modes: a consumer-oriented phased approach, a distinction between the shell and interior of buildings, a performance approach in planning and specification, competition based on implementers' technical solutions, the extended commercial means of competition, the establishment of system units for assigning the scopes of liability, system-unit-skilled teams, industrial component production and the activation of research and development.

Across these three national contexts, it seems that most of the new initiatives can be placed under the umbrella of the re-engineering of contracting processes. In practice, there are only limited landmark breakthroughs. Overall, the problems of owners' dissatisfaction remain especially in supply chain management. The temporary and multi-organisational nature goes hand-in-hand with the fact that new buildings are procured before they are built and no two projects are entirely the same. Various task organisations are engaged in the execution of projects. Task organisations establish links among themselves to form project teams guided by the owners' managers and by legal and contractual parameters.

This level of review as required by the constructive research enable the author to obtain a general, comprehensive understanding of the topic, to acquire knowledge on the types of solution that are in existing and to develop a theoretical construct. Hence, the STO study was based on the key premise that owner dissatisfaction in project performance can be causally linked with the contractual and product development processes. In principle, task organisations can contribute to better procurement arrangements via the re-engineering of total supply chain processes. The emergence of management integrators is proposed to solve problems inherent in both integrated product development and fragmented project execution. The second premise is that an innovative understanding of contracting processes results in new and better organisational approaches to design and construction.

Phase three: innovating – designing a new construct

The constructive approach requires that the design of a construct should be based on an in-depth interpretation and synthesis of the contextual literature review and the practicalities of the problems. These extensive literature reviews should help the researcher to gain a thorough pre-understanding of the targeted phenomenon.

In the case of the STO, having gone through different theories and practices it was envisioned that construction projects with their distinct procurement and implementation processes can be better managed through the combinations of new

solutions for the management of project development, building design and construction production (value chain). New combinations may readily exploit the existing principles guiding both integration (D-B contracting) and fragmentation (agency CM). New combined solutions contradict the work of proponents of exploiting either extensive fragmentation or full integration. Combinations can be innovative and fragmented/differentiated under the integrated management system. They align all project parties with the common goal of producing economic, on time and high-quality construction projects. Internal decision makers and other key actors who influence decision making processes within clients' organisations can be replaced or complemented by various external specialists who, in turn, act on behalf of clients on a contractual basis. Alternatively, a contractor or a consultant may become engaged with responsibilities of contracting, procurement, design and construction.

Constructive approach demands that the targeted advantages of the proposed construct should be stated as well as the limitations in its usage. In the case of the STO route the targeted advantages are as follows:

- it allows competition among many alternative designs of STOs;
- it shifts competition to design, life cycle management, materials and maintenance solutions;
- it exploits expert knowledge in shaping construction processes project-by-project;
- it adds more value to project implementation processes due to short feedback loops and clearly defined users' requirements;
- it prefers specialisation over generalisation;
- it eliminates paradoxically the weaknesses of the fully fragmented approaches and the fully integrated ways by utilising the biggest merits of both of them; and
- it enhances construction productivity and eliminates the waste of construction resources by integrating the demand chain and the supply chain.

The STO route is more applicable to building projects where prefabricated elements and standardised materials are used as well as to large and complex building (and infrastructure) projects.

At this phase, the constructive approach requires that the new construct should focus on the key aspects that will show its workability. The proposed STO route was designed and elaborated from many perspectives found in the literature including:

- the attainment of project objectives such as finished product quality, time and costs;
- an operational mode;
- contractual arrangements;
- integrated communication, coordination and cooperation systems;
- balanced risk allocation, responsibilities distribution and compensation methods;
- the integrated value adding project chain; and
- some constraints.

Phase four: demonstrating that the new construct (solution) works

In constructive research, both the hard and soft paradigms can be used to demonstrate the workability of the new construct because the constructive approach closely links theory and practice together. According to Pollack (2007), practice based on a hard research paradigm tends to emphasise efficient, expert-led delivery, control against predetermined goals and an interest in underlying structure. Conversely, practice based on a soft research paradigm emphasises learning, participation, the facilitated exploration of projects, and typically demonstrates an interest in underlying social process.

The applied nature of the study is determined by combining the theory-based design process (phase three) and its validation process (phase four). The most appropriate method to test and improve a construct will be via a pilot case study. Regrettably, in most cases pilot case studies are not a realistic means of demonstrating the workability of the construct, for instance, in the construction industry because of the risks and costs involved. Hence, the alternative approach should be based on triangulation where different research tools and techniques can be used to demonstrate that the construct works and to improve on the construct. In general, there are four triangulation types:

- (1) Data source triangulation when the data are expected to remain the same in different contexts.
- (2) Investigator triangulation when the same phenomenon is examined by several investigators.
- (3) Theory triangulation where investigators with different points of view interpret the same results.
- (4) Methodological triangulation where several approaches are utilised in order to increase confidence in the interpreted and synthesized concept (Feagin *et al.*, 1991). Yin (2003) postulates that the reliability of studies can be improved with multiple sources of evidence.

In the absence of pilot projects, analogical validation can be carried out in the form of a review of the existing project case surveys. One approach to empiricism is case study research, which is used extensively in research into management and the management of projects (Smyth and Morris, 2007). If any review-generated evidence reveals differences in achieving project success between the construct and the existing solution, the author then can only infer an association between the higher success and the particular concept(s). This is so because review-generated evidence cannot rule out other variables confounded with the study characteristics of interest as possible true causes. Only primary source-generated evidence based on empirical or experiential research allows one to make statements concerning causality. Thus, only the existence of the explicit (implicit) relations can be recognized within the secondary data (Cooper, 1998).

Theoretical validation is another way to demonstrate that the construct is theoretically compatible with the existing lower or higher theories or both. According to Packendorff (1995), PM is seen as a general theory and a theoretical field in its own right. The PM theories evolved over time covering project-related research concerning organisation theory, optimisation theory, human resource management and leadership as well as operational research in the information management discipline.

In the case of the STO, three-part validation of the STO route consists of the theoretical validation (mapping the STO route against the selected organisational theories), the empirical validation (project case survey/questionnaires) and the analogical validation (case study examples).

Theoretical validation against organisational theories. The theoretical validation was carried out by mapping the STO route and its elements against the selected organisational theories, that is organic theory and bureaucracy theory since procurement routes are directly related to project organisation setups and interaction between their differentiated parts. Aligning with Eisenhardt, it is argued that by examining the divergent literature for seeking possible contradictions and their explanations, one can pre-empt criticism and increase confidence in the study at hand. The organisation theories, both for and against fragmentation and integration, are juxtaposed with the key project procurement routes including the proposed STO route. The mapping allows for an assessment of the level of formalisation, centralisation, functions, control and specialisation within both the prevailing routes and the STO route.

Empirical validation with the project case survey. The empirical validation of the proposed STO route was carried out in the form of a project case survey with the subsequent interviews in order to find out the perceptions of the respondents directly engaged in relevant project cases and, at minimum, the STO-like routes. The target population of respondents involved experienced clients, consultants and contractors in the building sector in Finland. Finland was chosen due to the author's location and access to both local respondents and project documents. In addition, the characteristics of the Finnish procurement systems were found to be very similar to the practices within the two exemplary countries, the USA and the UK (Oyegoke, 2006). The project case survey was designed to measure the practical relevance and the likelihood of using the STO route in real building project settings. The aim of the survey was to probe some recent cases of the key procurement routes and to reveal the actual project performance, *ex post*. The project case questionnaire was designed with multiple views in order to collect the qualitative and quantitative data as well as the factual information and subjective understanding from among the targeted practitioners. Semi-structured interviews were used in order to probe further and to clarify some of the key issues inherent in the questionnaires as well as to obtain the additional relevant information.

Analogical validation with the four case study examples. The analogical validation was relied upon to complement the overall validation of the STO route through the principles of triangulation. In the absence of pilot projects, the analogical validation was carried out in the form of a review of the existing project case surveys tailored to the STO principles. If any review-generated evidence reveals differences in achieving project success between the STO route and the other procurement routes, the researcher then can only infer an association between the higher success and the particular concept(s). This is so because review-generated evidence cannot rule out other variables confounded with the study characteristics of interest as possible true causes. The analogical validation was carried out in the form of four building project cases. These analogical cases have similar characteristics to the proposed STO route. In the three case examples specialist organisations that are involved in executing the project and produced detailed engineering design from overall project design and performance specifications, the organisations bear their own risks and responsibilities and tender

processes were based on selective competition. The last case example exploited STO approach with 11 STOs and the management systems.

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Phase five: showing the theoretical connections and the research contribution of the solution concept

Within a frame of the constructive research approach the conduct of the study should take place with reliance on established research procedures and operational measures that are also documented in detail. This allows interested scholars and practitioners to check the reliability of every step. In the constructive approach, the initial theoretical connections should be made to the literature in a form of the analysis of the state-of-the-art review in order to define the knowledge gap and to specify the research problem. Thus, the critical problem should be chosen and investigated in-depth. Based on the combined theoretical and empirical bases the new construct should be designed and validated along the principle of triangulation, for instance, through piloting, theoretical validation, empirical validation and analogical validation. The constructive research demands that the construct should add to the body of knowledge, the theoretical contributions should be posited; its novelty and scope of application should be clearly stated.

The STO route complements many innovative approaches and it adds to the body of contracting/procurement management knowledge. The results of the three-part validation indicate the novelty of the STO route as a theoretical contribution and point out to a modest practical applicability of the STO route at minimum. In other words, the adoption of the STO route is likely to result in cost reductions, timely completions and project quality improvements. At the same time, many unknown or design laxities, reworks, variations, claims and project abandonment are avoided ensuring, subsequently, effective PM performance and high owner (client) satisfaction. Overall, it is herein posited that the resultant STO route is a theoretically significant contribution and that it is also applicable among practitioners in the national building sector both inside and outside Finland.

Phase six: examine the scope of applicability of the solution

The constructive approach requires that the study's contribution to the body of cumulative knowledge should be specified and areas for further studies should be highlighted. Further studies may include using empirical studies as a basis to develop or extend theory inductively. This is because empiricism is one of the techniques in constructive approach design which rely on evidence to induce generations and theory building. Wacker (1998) refers this approach to empirical case study where insightful relationships within a limited set of cases are used. According to Eisebhardt and Graebner (2007), sound empirical research for building theory begins with strong grounding in related literature, identifies a research gap, proposes research questions that address the gap and justifying why the research question is better addressed by theory building. Although constructive research is not about theory building nor is it theory driven but an approach in finding solutions to a practical problem. Constructive approach utilises theory-testing approach as one of the validation process.

Another requirement of constructive research is that the development of the construct should follow different stages in the validation process. Before it can be used as a pilot study a slightly modified construct can be used in a project or can be tested

in a project trade (mechanical and electrical), work section (sub-structural work) and finally in a project. The constructive research requires that some anticipated constraints related to the adoption of the construct should be stated. In the case of STO, notwithstanding the fact that CM is widely used in Finland there are several constraints that can hinder the adoption and use of the proposed construct. In principle, any new construct will be first met with mental resistance among decision makers. Typically, Whyte *et al.* (2002) emphasise this adversarial aspect within the culture of the construction industry along its resistance to change.

Relationships between constructive design and other research methods

The constructive research approach tends to question the direct relationship between knowledge (as well as symbols or models) and reality (Jan, 2006). It deals with methodological elaborations of the solutions through construction, which is followed by the methodical theories relating to validating the solutions. The methodological elaboration itself is based on theoretical frameworks, which form epistemological foundations for describing the extrinsic and intrinsic traits of the solution. In the constructive approach it is necessary to show legitimacy, rigour and the integrity of the process.

In contrast action research is a normative option of action-oriented studies (Susman and Evered, 1978). Kasanen *et al.* (1993) argue that the common features of action research and the constructive research approach emerge in the empirical phase of the studies in which the case method is usually applied. They postulate further that both modes of research presuppose a thorough understanding of organisational processes and the researcher adopts a role of a “change agent”. This will enable the researcher to actualize the intended changes in practice and support the participants in their learning process. Action research is not explicitly aimed at designing a new construct although the possibility cannot be ruled out. Therefore, action research is also one of the tools in achieving the construction approach.

The constructive method advocates the use of mixed methods in order to complement each other and serves a significant explanatory power, which poses significant implications to PM research. These methods include nomothetical, decision oriented and action oriented. In comparison, Kasanen *et al.* (1993) closely linked the positivist research tradition to the nomothetical approach which is causal and where attempts are made to state the findings in the form of general laws. The decision-oriented approach is usually grounded on assumptions similar to the nomothetical one but differ fundamentally because it follows a normative approach. In contrast, the decision-oriented approach share very similar features with the constructive research approach in developmental (phases) process. The major difference is that the decision-oriented approach typically uses the method of deduction while the constructive approach is characterized by heuristic innovations and demonstrates the practical usability of the solutions.

Conversely, the action-oriented approach provides an alternative to the nomothetical approach as it brings the human being into the focus of analysis. The explanatory model of the action-oriented approach is often teleological and the historical background of the phenomena studied is examined carefully. Action research places greater emphasis on a thorough understanding of the studied subjects, which sometimes may result in change processes. The conceptual approach is distinguished by its a priori basic nature: it produces new knowledge primarily through the “method of reasoning” (Kasanen *et al.*, 1993).

Constructive research is a very rigorous process that can combine in each of its phases both the theoretical and empirical paradigms. For instance, the development and construction of a solution or design of a construct in the constructive method is usually based on a conceptual approach because of the theoretical and descriptive nature of defining a problem area and obtaining a general, comprehensive understanding of the topic. Although this is not exclusive as the empirical paradigm which can also contribute to defining problem areas and understanding the topic. Morick (1980) refers to empiricism as a set of philosophical beliefs formed around the idea that experience rather than reason is the source of robust knowledge. The validation phases can also combine a theoretical validation based on a descriptive (acceptable theories) and/or a normative (decision-oriented) theoretical approach. It can also be combined with empiricism both in descriptive and normative forms. The nature of problem will determine the research method to be employed in each of the phases.

Some constraints/criticisms of the constructive research approach in PM research field

The effect of the marketplace on PM-construction industry

As in other industries in the construction industry productivity is driven by the market forces (buyer and supplier's power) which in turn result in market cycles. The intrinsic result of market cycles is the fluctuation in supply and demand which often describes market relations between prospective sellers and buyers. It also determines price and quantity sold in the market, the nature of interaction between buyers and seller and serves as a point of departure for other economic models and theories. The antagonist of the constructive approach would argue that the behaviours of market forces (oil prices, slump in housing market, credit crunch) are unpredictable and constructive research as well as econometric and system dynamics cannot adequately address it. This is more of a monetarist view of the market (market as a good mechanism for settling market related problems through the interaction of market forces) where free market economy is advocated. This assertion is not true as the econometric is for forecasting, the system dynamics is predicting an eventful outcome through interactive scenario building and the constructive approach is a problem-solving approach. In the PM field the constructive method usually begins with identification of a problem before a constructive managerial approach is suggested. Niiniluoto (1985) posits that the actual usefulness of managerial construction is never proven before a practical test is passed. Niiniluoto argues that the primary criterion to assess the results of applied studies is their practical usefulness, which raises the issues of the relevance, simplicity and ease of operation of those results.

Government constructive intervention

The government is pioneering key economic and social solutions in the PM disciplines. In the construction industry in the UK for instance, the government has intervened by promoting different initiatives, framework agreements to aggregate demand. This is because construction plays a vital role in the overall economy resulting in "constructive" stimulating packages to boost or aggregate construction demand and supply. On the procurement side for instance, the government has responded to market behaviour by pioneering collaborative arrangements, partnering, framework agreements and sustainable procurement to drive policy on sustainability. In the UK for instance,

The Office of Government Commerce (OGC, 2010) helps government in delivering and managing programmes and projects in supporting the delivery of government policy goals. The provision of a number of best practice tools and products is a good example of the government constructive intervention, for instance, programmes and projects resource toolkit (OGC, 2010).

Positivism and empiricism as a dominance methodologies in PM field

A great amount of debate has been carried out on the role of theory in PM disciplines (Soderlund, 2004b; Smyth and Morris, 2007) and the appropriate research methodologies (Walker, 1997). Some schools of thought argue that the characteristic of a mature PM discipline is the presence of a theoretical base and align more with the positivist research approach. Smyth and Morris (2007) postulate that positivism has been dominant historically in research on projects and also underpins the PMBOK Guide. This school of thought aligns philosophically with scientific ideals and questions the suitability of the other approaches including the constructive approach. According to Winter *et al.* (2006), the most dominant strand of PM thinking is the rational, universal, deterministic model – what has been termed the “hard” systems model, emphasising the planning and control dimensions of PM.

Research methodologies used in social and natural sciences have been evolving with the development of PM. The general consensus is that both the positivism and interpretivist (empiricism) approaches are applicable in the PM field (Smyth and Morris, 2007). Many PM researchers have been leaning towards these approaches by using different research tools such as hypotheses testing, empirical analysis, statistical testing and analogical interpretation to draw inference and generalisation. While all these tools have contributed immensely to the field, enough effort has not been put into problem solving through construction. The constructive approach relied on all these research tools to validate the workability of the constructive solutions.

Gaps between research and practice in PM field

PM is an applied and practical field but the academic research is drifting away from the present needs of industry. Winter *et al.* (2006) suggest directions for new concepts and approaches to support practitioners in the area of PM practices in terms of complexity of projects and PM as well as new concepts, frameworks and approaches. Second, practitioners have relied on their reflective approach towards the complexity of projects and their pragmatic approach towards the use of theory in practice (Winter *et al.*, 2006). The constructive research approach tends to bridge this gap by dealing with practical problems that has research potentials and work with the organisation to propound a workable solution. It becomes imperative the role of the employees of the organisation in which the solution is to be implemented. The implementation of practical functioning solutions becomes entangled in a web of complex organisational processes and procedures. Kasanen *et al.* (1993) postulate that a constructive approach that is considered technically adequate is not necessarily guaranteed to work in practice. This is due in part to the problem of assessing the practical adequacy of any new construct prior to its implementation. These problems can be tackled by linking an early problem definition stage to both practical and theoretical problems as well as the involvement of the organisation in designing and implementing the solutions. Solutions should not be imported to organisations after the overall development.

Criticalness, testing and validation of the constructive research in PM field

The antagonists of constructive research, question the scientific prowess of the approach. Constructive research passes the objectiveness and criticalness of applied research. It uses widely accepted research tools for its design, verification and adaptation. The process can be repeated and checked step-by-step or through each stage of the research framework to obtain the same results as the original studies. Because physical construction projects are capital-intensive pilot studies are not often possible at the early stage of the testing stage. Remedial action can be undertaken in the form of stage validation of elements and trades by project before overall application to the project as demonstrated in the development of the STO approach by Oyegoke and Juhani (2009).

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Relationships between the constructive research outcomes and consulting practice in construction

In most cases the constructive research methodology is used by companies to solve practical problems and to own proprietary rights for a reasonable period of time (at least five years) before they can be published. Since the constructive research methodology aims at solving problems its outcome can also be used as an input to consulting practice and usually has commercial value. A good constructive research outcome usually leads to consulting relationship with the sponsor or interested companies. This also limits its popularity among the researchers.

Conclusions

This paper has started the debate on the applicability of the constructive research to PM disciplines. The constructive research approach has the ability to deal with issues that are sequence of facts and those that rely on social phenomenon and thus, satisfy applied research criteria. The paper has shown that the constructive research approach is distinctively different from other research approaches and potentially extremely useful in the PM field because of its prowess in managerial construction.

It has been established by Smyth and Morris (2007) that the critical management theorists have switched from seeking general to particular explanations. This follows a theoretical shift from theories employing reflexive and dialectic causality that sought general explanations towards postmodern thought based upon interpretative methodologies that seek particular explanations. Interpretative methodologies cover a range of issues and methods which are excellent for understanding perceptions that are part of the particular, yet poor at addressing the general issues. Epistemological issues address context, seek both general and particular explanations, are not typically found in the positivist or empiricist traditions. Critical realism philosophically places research endeavour in context of theory and practice, hence encouraging critical evaluation and reflection on research endeavours (Smyth and Morris, 2007). However, constructive approach places emphasises on theory and practice for solving particular and general problems, rely on construct, critical evaluation, demonstration of solution(s), theoretical connection and general reflection through examination of the scope of application.

For any study to be classified under a constructive research approach it should have gone through the six phases of problem identification, proving of in-depth understanding of the topic, construction of solution, justification of the construct,

highlighting both the theoretical and practical contribution and examining the scope of applicability. The generally acceptable research tools and techniques can be used for justification and validation processes. A researcher can develop her/his own method if it can be adequately proven. The constructive research approach is flexible and uses the method of triangulation in order to validate the proposed solutions. It is advisable that the people and the organisation that will eventually use the solution(s) should be involved both in its design and strategy for practical application. The constructive research approach therefore embedded the principle of co-production. This will eliminate resistance to change to new ways of working.

The constructive research approach suits the future directions of PM in temporary organisations in the area of expectations, action and learning in project settings as advocated by Packendorff (1995). It can be used to achieve future directions in PM as suggested by Winter *et al.* (2006) in the areas of understanding and addressing problems associated with project complexity, social process, value creation, project conceptualisation and practitioner development. It also suits the basic rationale that underlies PM research which is based on solving complex organisational problems (Soderlund, 2004a), the need to integrate PM with the general developments in management and organisation (Soderlund, 2004b), growing acceptance of soft paradigms (Pollack, 2007) and the need to focus on the business benefit of PM (Morris, 2002). One of the key problems associated with constructive approach in the construction field has now been addressed. In the Innovation and Growth Team (2010) report on low carbon construction in the UK, the Chief Construction Adviser identified “piloting” as a major obstacle and suggests that OGC (2010) should work with a public sector department or delivery agency responsible for a rolling building programme to seek to agree a procurement and contractual arrangement within which propositions can be tested.

A series of methods can be used to validate as well as improve construction from phase four “demonstrating that the new construct (solution) works”. One way to improve construction is through inductive validation process by using particular project examples through piloting to reach a general conclusion. The other way is through triangulation which provides a multifaceted view at different levels of analysis. According to Foss and Ellefsen (2002), triangulation is often legitimated through two different purposes: confirmation or/and completeness. In constructive approach triangulation can serve as a means of validating and improving a construct.

The constructive approach adds to the existing body of knowledge, shows proof of logic, embodies a mastery of thorough research methodology and contains evidence to support the applicability of suggested solutions in practice. The constructive research approach deals with the art and practice of managing project and advances the perspective of PM research by enabling a design construct based on the needs of various ranges of stakeholders and providing a means of evaluating and testing the construct in terms of their relevance and usefulness to stated objectives.

Finally, the practical implication is that it encourages co-production of knowledge between the research community and the industry to the level beyond the usual case studies or questionnaire surveys. This is because the constructive approach focuses on problem solving, design and actual demonstration of solution(s) that will involve the participation of the industrial partners in order to prove that the solution works.

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Corresponding author

Adekunle Oyegoke can be contacted at: a.s.oyegoke@salford.ac.uk

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