



**ACTIVITY THEORY PERSPECTIVE FOR PROJECT MANAGEMENT
RESEARCH IN THE BUILT ENVIRONMENT**

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Abstract

This paper presents a conceptual perspective that will assist project management professionals in the development of its theoretical underpinning framework. There is a need for a unified theory of project management with links embedded in all aspects of the profession, be it in the humanities or sciences. Management science tradition and the social science tradition are considered to be incompatible on important issues, although project management skills are founded from these two disciplines. This conceptual unified perspective is based on activity theory (AT). The implications of using activity theory within project management (PM) for the built environment, its conceptual formulation and benefits for use in PM is presented in this paper.

Keywords: *Activity theory, Built environment, Engineering and Construction, Projects, Project management*

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Introduction

It is generally accepted that the lack of an adequate theory of project management is one reason that progress in the field of PM is relatively modest. People come to the field from different built environment disciplines – architecture, engineering, quantity surveying, building survey, structural engineers and others – as such there are serious problems in coordinating and combining their different efforts and perspectives. Apart from the distinct areas of classical management, and management science very little has been provided in way of research and development. Traditional conceptual approaches cannot provide an appropriate basis for addressing the integrated nature of the human elements as well as the technological elements within the PM profession. Rather a unified approach is attempted through the dedicated body of knowledge or institutions of project managements, guidelines and materials that certify the profession (PMI, 2000; Morris, 2003; 1998). The down side is that there are many different PM bodies providing their own views of the profession. When PM is compared to the classical professions (i.e. medicine, law and engineering), which can be quite different, one finds that there are no underlying theoretical basis in which you can identify the standards, practices and well demarcated structure. As with classical professions development, project management needs an underpinning theory that will have structure, identifying the standards, practices and the body of knowledge.

The aim of this paper therefore is to evaluate current works on the developing of a PM theoretical bases, identifying its shortfalls and highlighting possible solutions. The paper also investigates activity theory and its implications as a framework to be used in developing sound theoretical bases for project management. It examines the main advantages of activity theory and highlights recent attempts to apply activity theories in other scientific areas. The paper



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

outlines the importance of activity for future research and theoretical underpinning of project management.

The Current State of Project Management (PM)

The historical model of project management is central around control and organisation; increasingly it is being seen as relating also to strategic, technical and commercial issues. Too often project management is considered to be a planning, execution, implementation only discipline: it needs to be seen in a much broader understanding embracing issues of the whole life cycle of the project being undertaken. While there are clearly common practices (i.e. project development cycle: concept, definition, development, execution and delivery), the environment in which they are deployed are significantly different. This leads to a difference in the way project management topics are handled (Morris, 1998:2003).

A project delivers a specified objective within a defined budget and a defined timescale and quality. Project management therefore is all about tightly defined solutions to problems, many of which are well understood before the task is undertaken. PM is a conscious activity that is goal oriented. Project management relies upon hierarchical decomposition of the overall project into smaller sub-elements so as to achieve manageable tasks.

A project relies upon hierarchical decomposition of the required tasks via some form of Work Breakdown Structure (WBS) such that the final work packages are sufficiently bounded, defined and achievable. The total project is reconstructed from the WBS under the assumption that the sum of the WBS elements equals the project output.

Other attributes of project management worth mentioning are as follows (Turner 1995; Cicmil, 2006):

- Emergent properties – in project management the whole may equal the sum of the parts although overhead effects can imply that the whole is less than the sum of its parts.
- Lifecycles – life cycle phases are often interspersed with decision or review points at which logical break in the project occur.
- Processes – the processes of project management is predominantly a sequential nature.
- Research and development – the continued development of project management has moved into the practising profession of the industry.
- Holistic view – although they have to keep the whole project in mind, but in reality the project manager is only interested in the remainder of the project as far as defining new action is concerned.
- Focus on the delivery of the project
- Drivers - delivery of the project to time cost and quality, while improving profit and productivity.

Hence project management is about getting things done, and as such it is goal oriented.

Although, one might argue that the field of project management (both the practical and theoretical parts of it) has developed rapidly in recent years, some authors focus has been too narrow. A number of authors have argued that, despite the academic interest in courses and programs, the research aspect of project management is not very well developed. Morris (2006) argues, for example, that the academic awakening of interest in project-based undertakings is far



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

too slow. Furthermore, in a review of the literature and theories of project management, Packendorff (1995) claimed that project management is largely considered as a general theory that is not sufficiently empirical. Moreover, he stressed, in the dominant line of research, projects are seen as tools and project management is seen as a set of models and techniques for the planning and control of complex undertakings. Thus, a number of writers have, in recent years stressed the importance of a diversity of theoretical perspectives and in-depth studies in order to construct “middle-range” theories on different types of projects. In a recent literature review, Pinto [8] claimed that the major developments of the research on project management have been into project risk management and critical chain project management. Pinto does not fully acknowledge the problem that the research referred to suffers from almost an entire lack of empirical studies. The developments related to the research on temporary organizations are not fully acknowledged.

The nature of project as a temporary organisation considers the following (Turner, 2006):

- The project as a production function
- As an agency for change
- As an agency for resource utilisation
- As an agency for uncertainty management

Many of the classical definitions of project emphasise the role of a project as a production function, just as the earliest definitions of the firm in classical economics (Cicmil, 2006).

Viewing the project as a temporary organisation introduces many of the elements of concerns, including (Turner, 2006):

- The conflict of interest between the various stakeholders
- The role of the manager, the broker and steward
- The need to put in place information and communications systems to monitor delivery of the project, to monitor achievement of the owner’s objectives, and to avoid self-interest and opportunism by the project’s participants, especially the agent.

As such, Soderlund (2003) concluded that there exist two main theoretical traditions in project management research. The first tradition with its intellectual roots in the engineering science and applied mathematics, are primarily interested in the planning techniques, and methods of project management that can be theorised successfully by a mathematical approach (Turner, 2003). The other tradition with its intellectual roots in the social sciences, such as sociology, organization theory and psychology, are especially interested in the organizational and behavioural aspects of project organisations (Cicmil, 2006).

Another important matter for empirical social research is that of perspective versus phenomenon. For instance, it could be claimed that projects are nothing else than a way of looking at industrial and organizational activity. Whether projects really exist is of less importance in this respect, which is similar to the argument stated that the researcher’s perception of a single project does not necessarily have to correspond with the ones of the actors involved on the project. Researching into projects is thus more a matter of looking and trying to capture the unique, complex and time-limited processes of interaction, technical innovation, organization and management (Packendorff, 1995).

On the other hand, it might be possible to identify research, which states the importance of providing knowledge and theories about the organization and management of projects. Following this line of reasoning it might be stated that the research into the “management by



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

projects”, i.e. studies that look at firms but pay special attention to the project dimension, advocates that projects provide a perspective for analyzing corporate activity.

In a project context, the universal elements are normally uniqueness, task complexity and time-limitedness. Whether the project management is viewed in different ways, or multiple ways, one thing is certain, we need to find ways of unifying these approaches within a particular theory, which are widely acceptable. The theory should contain elements of the personal, social and environmental nature of project management coupled with its scientific aspects. One such unifying approach is offered by the psychological *activity* theory.

Background to Activity Theory (AT)

Before embarking on *activity* theory (AT), it is expedient to position the theoretical understanding considered within this paper. A theory, when shared, provides a common language or framework, through which the co-operation of people in collective undertakings, like projects, firms, etc., is facilitated and enabled. Theory can be seen as a condensed piece of knowledge; it empowers novices to do the things that formerly only experts could do. It is thus instrumental. When explicit, it is possible to constantly test the theory in view of validity and new innovations. A theory provides an explanation of observed behaviour, and contributes thus to understanding. A theory provides prediction of future behaviour. On the basis of the theory, tools for analysing, designing and controlling can be built. Innovative practices can be transferred to other settings by first abstracting a theory and then applying it in target conditions (Koskela, 1999).

Thus, AT appears to be the oldest and most developed of the psychological theories founded in the former Soviet Union. According to cognitive psychology, the human mind is a very specific information-processing unit. Like cognitive psychology, and unlike some other approaches in psychology, AT tends to be a ‘real’, that is, a ‘natural science like,’ theory. Like Piaget's (1950) approach, and unlike traditional cognitive psychology, AT analyzes human beings in their natural environment. Moreover, AT takes into account cultural factors and developmental aspects of human mental life (Bødker 1991; Leont'ev 1978, 1981; Wertsch 1981). AT has been used more widely in the West for HCI (Human-Computer Interaction) research and IS (Information Systems) research (Heersheim, 1995).

AT defines *activity* as a ‘goal directed system in which cognition, behaviour and motivation are integrated and organised by goals and the mechanisms of self-regulation’. Thus, a particular strength of AT is the simultaneous formulation of external behaviour in terms of inner mental concepts and dynamics. This unity of consciousness and behaviour, embedded in a socio-historical context is a major principle of AT (Rubinshtein 1957, Vygotsky 1960). The relationship between conscious and unconscious processes has important implications in the study of human labour. When studying work activity for the purpose of intervention, the ways in which unconscious levels of regulations can be elevated to conscious once are particularly relevant.

Activity may be divided into three components: *orientation*, *executive* and *evaluative* (Bedny and Meister 1997). From the orientation components, people develop a subjective model of reality from which they actively extract distinct representations. As a result, a dynamic picture of the world is formed, providing a meaningful interpretation of reality. Executive



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

components of activity involve the transformation of obtained data according to the required goal. This process involves not only external behavioural components, but also internal mental actions. Evaluative components of activity involve assessment of results and – where appropriate – modification of mental and behavioural actions. The self-regulative system is comprised of tightly interconnected and separate mechanisms.

There are two approaches in the study of activities; one through individual psychological perspectives, another in terms of cultural-historical perspectives. The first considers activity as an attribute of individuals, under which the individual is an agent of the activity. The second, points toward a formulation of an activity, not only as an individual trait, but as normative standards for activity that transcend separate individuals (Bedny, 2000). In this latter perspective, the individual emerges not so much as an agent, but a subject adjusting and adapting to the normative standards and requirements of activity. Activity captures individuals and engenders individuality as much as individuals create activity. Social and physical environment prescribes the space of possible actions for individuals. To establish effective social interactions, an individual must develop standardised actions. Expectations are formed and predictions made about how different people will act in different situations. In AT, goal-orientation mobilises cognitive, behavioural and motivational components into integrated system composed of discrete cognitive-affective units that includes goal-oriented feed-forward and feedback components. AT utilises diverse, dynamic functional units of analysis, the most fundamental of which is the concept of *Action*, which affected the development of action theory in Western Europe (Bedny, 2000).

The study of human labour dominated the development of AT. AT is formulated in terms of a logically ordered system of goal directed mental and behavioural actions rather than reactions. Under the rubrics of AT, plans, motives, methods of performance and goal directed behaviour as a whole can be formulated consciously or unconsciously, but the goal of an *activity* is always conscious (Bedny, 2000). Labour and the use of tools (i.e. artefacts) modify not only *nature*, the object of the labour, but *man*, the agent of the change.

Tools possess a mediation function; Vygotsky called tools that mediate mental activity *signs*. When an individual performs a mental activity, he uses signs as tools in the same way that he uses tools for performing external activity. Language is a major system of signs that mediate the mental activity of man. Because speech is considered the most important sign system, social interactions and communications assume critical importance in human consciousness and cognitive functions. The acquisition of signs as cultural tools empowers the regulation of one's own behaviour.

The General Structure of Activity Theory (AT)

AT is distinguished by the careful delineation of the structure of activity describing both the basic components of activity and their interrelationships. Activity may be represented as an integrated system of cognitive, motivational and behavioural components organised as a system of mental and behavioural actions directed to attain conscious goals.

A goal is formulated as the physical location of an object or a formal description of the final situation that is to be achieved during the functioning of technical or biological systems. AT provides five parameters for describing activity (Bedny, 2000):

1. the method of performance – concrete way of achieving the goal



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

2. a resulting index of work completed compared with goal
3. an informational basis of activity – the sum of all attributes like signals, etc. that empower the organisation of activity
4. a standard style of performance – method of work activity prescribed by instructions and
5. an individual style of performance – method of work activity dependent upon individual features of personality and preferences.

The methods for the study of activity can be represented as follows:

1. *Formulation* experiment –derived from the work of Vygotsky (1960) based on genetic explanation
2. *Systemic-structural* analysis – sub-classified into the following:
 - Parametrical method – concentrated on the study of different parameters of activity that are treated as relatively independent.
 - Morphological analysis in which the major units are actions and operations, based on which one may describe the structure of activity, in terms of logical and temporal-spatial organisation of actions.
 - Functional analysis – in which major unit of analysis is the function block.
 - Macro-structural and micro-structural analysis – that determines the level of analysis. Macro-analysis includes larger units of analysis. Micro-structural analysis suggests more detailed ones. These levels of analysis can be used in morphological as well as functional analysis.

All methods of analysis of activity are intimately related and mutually interactive, so that, according to the system-structured method of analysis, all methods are a unity (Bedny, 2000). AT over the next few decades became part of the larger research community. The focus has moved from the psychological to also take into account the social context as well. In this regard AT has gained popularity as an approach that takes into account the cultural and organisational context and also directly focuses on day to day practical work that involves the innovative use of technology (e.g. IS/HCI research).

According to AT, to understand a phenomenon means to know how it developed into existing form. The principle of development gives an opportunity to conduct thorough, scientific analysis of complex phenomenon while avoiding mechanistic oversimplifications. Thus the choice of unit of analysis of such phenomenon is vital. Project management is a discipline that has evolved and developed over time into its existing form. Project management has permeated into several recognised disciplines and industries across different environmental and social domain. What is lacking is the thorough scientific study and understanding of PM interactive complex phenomenon in different industrial sectors, domains and disciplines.

Levels of Analysis in Activity Theory (AT)

Activities can be studied at different levels of analysis. An activity found at one level of analysis often affects behaviour on the level below. A fundamental components of AT, is the task. Analysis of task performed by the worker allows the efficiency of their work to be



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

estimated. The goal organises task element as whole, around which task may be represented as a logically organised system actions.

In the AT, actions are considered the major, discrete units of analysis that conform to the criteria. Actions are fundamental elements through which one can recreate holistic activity. Each action has separate conscious goals that must be reached to attain the overall goal of the task. The intimation of the goal formulation constitutes the starting point of any action. The conclusion of the action occurs when the result of the action is evaluated in relation to the established goal. In some cases, goals are very specific in others they may be general and contingent. Any action includes several components, called operations, the performance of which contains its own purpose. Zinchenko et al. (1971) introduced the notion of a function block as a component of cognitive action.

The general schema of components and unit analysis may be represented as follows:

Activity → Task → Action → Operation → Function Block (1)

Activity and tasks are considered as objects of study because they are composed of diverse units with complicated internal structures that represent particular kinds of activities that are directed to achieve terminal goals. Actions, operations and function blocks emerge as units of analysis. Action being the most used unit of analysis.

The Implications of AT for Project Management Research

According to AT, project management (PM) is a tool that mediates the interaction of human beings within their environment. PM is also a tool to effect change when working within a framework of a temporary organisation. One distinction to be made is that within PM, *activity* is not the same as that defined in AT. In PM, activity and task are used interchangeably. Although task in AT is more closely related in definition to task in PM. If the next higher level of abstraction of task in PM is an '*activity*', then we can use the AT approach in understanding PM. This gap is the fundamental difference that will bridge socio-cultural conceptualisation that has been missing in other theoretical approaches in PM research. Task in PM are arranged in hierarchical/sequential structure, starting at the work breakdown structure, through the work packages, which in effect mirrors the structure of Activity theory. This represents a shift from model-based approach, or mathematical theorising of researching projects and project management, towards a more holistic-based understanding of the project management research.

In contrast to other types of project management research which draws on models and objective, instrumental rationality of actors, a pragmatic research of project generates knowledge and builds on AT which have the following qualities.

- The understanding of the actors' moral and ethical motives and their sense making processes and how their actions unfold over time and in connection with other, multiple events;
- The experience of emotions and feelings that drive action in complex project environments,



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

- Closer insight into intentions, political agendas and personal drives of individual actors; and
- The identification of tensions, power asymmetric and patterns of communicative relating among individuals and groups and how they are being negotiated in the context.
- Remodelling of artefacts or tools to new understanding and appreciation for the eventual use of *actors* in their environment. as such answering life cycle issues.
- Development of the PM discipline through research in a more holistic academic understanding.

In sum, AT provides a wider theoretical basis for studies of PM interaction in different project management domains than other tried and tested methods. It can take account of social interactions and cultural factors, the developmental aspects, and higher-level goals and values. Also the unit of analysis when researching PM can be done at different level (i.e. project level, sub-project level, task, etc.). At the same time, this conceptual framework does not reject the experimental results and techniques accumulated within the more traditional methods of project management, when viewed as artefacts that can be remodelled to fit new and uncertain demands, as well as the ever changing environmental conditions.

AT in the Construction Industry of the Built Environment

Large firms make up about 9% of the construction industry firms, and contribute 80% to the UK's GDP from the construction industry. Whilst the smaller and medium size enterprises (SMEs) make up the bulk of the industry's firms contribute 20% of the remaining.

Most of the larger firms have emerged from smaller firms that have grown or merged in one way or another through *innovative* processes. If one should consider the size and structure of firms within the construction industry, the larger firms will be more involved in using recognised PM practice, for example practitioners, from Project Management Institute (PMI) using the PMBoK.

The PMBoK structure is written with PM practice of larger firms in mind it was not intended for SMEs. SMEs are not really the main subject matter, where the bulk of the construction industry firms are situated. However, most of the large and smaller firms work together on a majority of projects within the industry, main contractors and subcontractors on the same projects, hence, there should be a theoretical bridging framework within the construction industry where both parties can understand project management from the same framework; AT offers this approach.

Another area of difference is in the management of people between the large firms and the SMEs. Usually the role of HRM is more recognised in large construction firms than the SMEs. From their history most of these large construction firms have emerged with discrete human resource department, unlike the SMEs that still practice the classical or traditional management approach as put forward by Fayol and other pioneers. However, most of the tools and techniques applied in PM as used by large firms and SMEs, which are applied in PM are similar in nature.

Considering the fact that AT takes into account the human subjective elements, it may be that, whether HRM or classical management approach, the AT framework will be useful for future analysis of PM practice within the construction industry. Wherever you are operating on



Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

the project life cycle spectrum, be it a large firm or a small firm, AT can be used to conceptually analysed issues of PM practice in the construction industry, particularly as firms work together most of the time.

Conclusions

In the above discussion, some theoretical areas for further exploration of project management can be identified. The unity of analysis is one area that will be essential to carrying out research into project management in the future. The project itself can be viewed as a unit of analysis in investigating the different areas of projecting across different sectors and industries. Also the way the work breakdown structure is done and the different actions within a project is another relevant construct for future investigation of project. Projects within built environment can be viewed within sectors like building services, architecture. Actions when considered in the wider context of project management can be those relating to sustainability issues like, carbon footprint, energy reduction and other essentials of environmental concerns. Activity theory provides the framework for relevant study areas; some generic, one-off projects, or a multitude of projects as well as very specific studies of particular actions that are related to human interactions. Activity theory can be used within research both empirically as well as experimentally in addressing current issues of sustainable project management when fully understood. Also because activity theory embraces the systems approach (Bedny, 2000), it is possible that activity theory can be fully integrated within the soft system methodology as areas of future development (Checkland, 2000). Within the built environment AT can be used to integrate all aspects of project management.

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Project Management Development – Practice and Perspectives

Fifth International Scientific Conference on Project Management in the Baltic Countries

April 14-15, 2016, Riga, University of Latvia

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