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Enhancing the Decision-Making Process of Project Managers in the Built Environment: An Integrated Approach

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1.0 Abstract

A study of the project manager's (PM) function must be to examine: what their role is, their skills, and training needed. The project manager needs wide perspective regarding the classic management functions of control, coordination, communication, and the settling of performance standards. If the PM is a professional, their performance must be of the highest standard, and must be accountable for a high level of productivity. This is the project manager's Achilles heel. Another problem is the absence of feedback during the early stages through to completion of the project. During the project's life the relative importance of their responsibilities may change several times, including the constant changing of the dynamic environment. The PM will aim for a balanced emphasis; they will try to be flexible so they can adapt to new circumstances as they occur. The PM needs tried and tested methods to aid his decision making. This paper posits an integrated development and use of methods such as; scenario planning, effectuation, and reflective thinking to enhance decision making. The paper concludes with potential benefits that this method brings to the PM when fully understood and tested in the application domain.

2.0 Introduction

The creation of the built environment is based upon the skills of both technologist and entrepreneur. The former may be architect, engineer or other specialist contributing his particular skills to a complex interrelated industry. In turn the entrepreneur, usually as contractor, provides the organisational ability to turn design into reality. A considerable body of knowledge and approach to problems solving under management science with such names as work study, operational research, investment appraisal, decision theory and others are common occurrences on projects within the built environment (Simon, 1999; Turner, 2003).

A project itself is an organisational unit dedicated to the attainment of a goal – generally the successful completion of a developmental product on time, within budget, and in conformance

with predetermined performance specifications and quality. Projects are typically organised by task (vertical structure) instead of by function (horizontal organisation). The obvious organisational goal is to seek the advantages of both – the vertical structure in which the control and performance associated with autonomous management are maintained for a given project, and the horizontal in which better continuity, flexibility, and use of scarce talents may be achieved in a technical group (Turner, 2003).

Projects are becoming ever more expensive, complex and interactive (e.g. sustainability, safety and health issues), and the rational approach offered by the methods of management science can potentially provide benefits to all those who are prepared to make the effort to tackle their problems in a methodical way. However, not all problem areas can be solved by the rational approach, especially decisions that deal with uncertainty and complexity of a different type. The problems are mainly non-linear and mirror some of the way entrepreneurs make decisions (Saravathy, 2003). However, what is lacking is the methodical way of addressing the human elements of decision making that are embedded within these problems.

The aim of the research is to enhance the project manager's decision making in a broader social environment, by understanding the different roles they play in their dynamic working environment. Therefore the objectives of the research study are:

- To develop a conceptual *soft* toolkit for enhancing project managers' decisions
- To develop the *ascientific* methods of practitioners of project management within their social context
- To make recommendations from the research findings that will enable organisations and their practitioners to develop holistic decision making techniques to aid them in their survival and prosperity.
- The objectives of this paper are to:
    - present the theoretical approach in the development of an integrated framework of enhancing project manager's decision making.
    - set out the theoretical framework model - in the form of a *toolkit*, which is in the process of being validated on live application domains of project management, during the course of the research project.

The rest of the paper is divided into the following sections, literature review, research methodology, results from the research and discussion and conclusions from the study.

3.0 Literature Review

The literature on project manager and their decision making is reviewed in this section. Also included are the advantages, disadvantages and limitations of current methods of project management. The literature on other soft methods are then introduced that may enhance project managers' decisions making and problem solving. This section of the paper concludes with a need for developing a conceptual framework that would enhance current project managers' methods using targeted soft approach.

3.1 The Project Manager

A project is an organisational unit dedicated to the attainment of a goal – generally the successful completion of a developmental product on time, within budget, and in conformance with predetermined performance specifications. Projects are typically organised by task (vertical structure) instead of by function (horizontal organisation). The obvious organisational goal is to seek the advantages of both – the vertical structure in which the control and performance associated with autonomous management are maintained for a given project, and the horizontal in which better continuity, flexibility, and use of scarce talents may be achieved in a technical group (Gaddis, 1959; Turner, 1991; Cicmil, 2006).

A study of the project manager function must examine these topics: what he does, what they must be, and what training he needs. In view, of this, the project manager needs a different attitude regarding the classic management functions of control, coordination, communication, and the settling of performance standards. If this kind of employee is to be treated as a professional they must have established for themselves performance standards of the highest order, and must be accountable for productivity at the professional level. Another unique aspect of the project manager's job is that their task is finite in duration. This may be a year or less in some projects and may run to five years and upward for long range, high budget projects.

Another feature of the project manager's job is the absence of feedback information during the early stages and often other stages of their project. Meanwhile during this period of '*blind flying'*, they may be forced to make long-term decisions which commit substantial funds. Essential to the project management concept is a clear delineation of authority and responsibility. The managers know that their basic responsibilities are to deliver their end product:

1. in accordance with performance standards
2. within the limitations of their budget

3. within the time schedule that their company or customer has specified
4. the requisite quality of the product

In general the project manager will delegate by tasks, so that subordinate managers and workers in their group will have the same four responsibilities for subprojects. During the life of an average project the relative importance of each of his responsibilities may change several times. It can be fatal to overemphasise the schedule when cost has become the governing requirements, or vice versa. The skilful project manager will aim for a balanced emphasis; they will try to stay flexible so he can shift and adapt to new circumstances as they occur. Like the line manager the project manager is a man of action, thought, and a front man – a leader. As a man of action, his most important function will be establishment and preservation of a sense of momentum throughout all layers of his project. In addition to keeping the work moving, the project manager should put a good deal of thought into planning. Advance planning is vital in a project (Gaddis, 1959, Turner, 2003, Cicmil, 2006).

A competent project manager has to be part technologist and part manager. Some of the qualifications that a successful project manager must possess proceed logically from the proceeding discussion:

1. Their career must have been modelled in the built environment
2. They must have a working knowledge of many fields, the fundamental kind of knowledge which he can augment when necessary to delve into the intricacies of a specific technology.
3. They must have a good understanding of general management problems – especially marketing, control, contract work, purchasing, law, and human resources. The concept of profitability should be familiar to him
4. They must have a strong, continuous, active interest in teaching, training, continuous professional development of his supervisors.

In reviewing these qualifications, one can observe the emphasis on the integrative function in the operations of the project manager. There is an ever-present requirement for the joining of many parts into a systematic whole. Without the integrative function, often nothing would be done with the concepts originating in the analytical functions. The top-notch manager must be capable of both integrative and analytical abilities; such a role requires resourcefulness and a lot of decision making.

3.2 Assessing project management in the built environment

The audience for project management programs within the built environment consist of mature practitioners with varying experience of working in a project environment within organisations. Their experience provides some knowledge of project management language and of the associated tools, techniques and processes. However, the background experience of these individuals is often grounded in some technical expertise, for example engineering discipline. This tends to colour the application of project management action. Projects are treated as technical activities, remaining in the domain of the technology and using its associated language. As such, the focus tends to be on technological importance and, as a result, management actions have reduced priority (Barron, 2005; Cicmil, 2006).

Many of the project management textbooks reduce the subject into various components (for example, scheduling, risk management, resource management) and then discuss in detail how each component can be organised and achieved (Barron, 2005). There is less emphasis on how each of these components relates to each other component seamlessly.

We all know that projects are delivered through people – i.e. sponsors, customers, suppliers and the project team. Therefore skills associated with working with people need to be carefully learnt. It is important to recognise that such skills go beyond the ideas of researchers such as Meredith Belbin, Abraham Maslow and Eric Berne. Observers of natural environments within organisations are now drawing upon ideas from the 'new science' or complexity theory. There is a developing literature that draws from complexity theory and brings it into the realms of management and organisational interests. This body of knowledge suggests that an organisation exhibits emergent properties that follow the same principles as complex systems, although majority of current project management methods is drawn from the rational method and less on human behaviour (Morris, 2006).

3.3 The Rational Approach: Scientific versus Ascientific

A number of writers have proposed the need to change our perception of science. Some have suggested that science may be appropriately described in terms of problem or puzzle solving (Kuhn 1970). Science, in this conception, is simply a problem solving activity which uses certain methodologies since the emphasis shifts away from aspects such as correlations, statistical significance and the like. One is looking for an appropriate way to solve a particular problem.

Popper (1963) has a similar conception. He states '*the activity of understanding is essentially, the same and more to do with practical solutions to problem'*.

Popper (1963), for example, decries pseudo-science as valueless. For Popper, pseudo-science is knowledge he claims cannot be refined. He gives three examples: Marx's historical analysis, Freud's psycho-analysis, and Adler's individual psychology. Popper notes these theories cannot be considered science since any and all data can fit into theories – they could never be refuted. Einstein's theory of relativity was a pseudo-science at one time, but it has now become accepted as proper science. It is interesting to note that the examples of what Popper calls pseudo-science are all in the human realm. For something to be science, it has to follow certain conventions. It makes no difference whether the subject of study is human or non-human. If the convention cannot be met, then what is produced is at least pseudo-science. It is therefore interesting to speculate whether the whole of social science itself might be considered as pseudo-science under such a view (Hirschheim, 1995).

The hard science presents itself in the form of the logical structures and a reductionist approach. The soft science methods are apparent in the complexity of the problems being tackled, and the softer nature of the elements of the model, such as behaviour, policies, perceptions, and a plurality of views. It is interesting to note the similarities and differences with the standard 'Rational Model' adopted by problem solvers from various fields, including hard-systems approach (Ackoff, 1978). The main limitations of hard science and its developments are its relative neglect of the limits of human (and computer) problem-solving capabilities in the face of real-world complexity. Recognition of these limitations has produced an increasing volume of empirical research aimed at discovering how humans cope with complexity and reconcile it with their bounded computational powers (Simon, 1999).

These alternative modes of inquiry are considered ascientific by the research scientific community. Yet it is precisely these alternative methods which allow us to acquire a better understanding of the human realm, and thus should be considered scientific. The difficulty is changing the community's conception of science, which is legendary. Project management is both a pseudo-science as well as science as it cuts across both the technology and human endeavours as the project manager strives to accomplish their desired goals, mainly creating a new artefact. As such ascientifc methods that are not properly entrenched within this discipline, such as scenario planning (SP), reflective thinking (RT) and effectuation approach (EA) need to be examined.

3.4 Scenario Planning

The problem with the rational approach is that it fails to adequately deal with any event that is unforeseen (Schoemaker, 1995; Wright, 2000), whereas the evolutionary approach suggests that forward planning on strategy is moot and therefore is disliked by managers of the firm. Scenario planning is identified as process approach to strategy development that allows a firm to recognise that certain aspects of *operating in a market* yet to be develop remains unpredictable, until aspects are predetermined. Scenario planning arranges these possibilities in a more simplified form than what might be encountered in a rational approach, making it easier to comprehend while continuing to challenge any prevailing mind-set.

Although the process of developing scenarios is described in the literature in a number of different ways (Schoemaker, 1996; Wright, 2000; Walsh, 2005)), in general, the development of scenarios is described as a simple process summed up in the following steps:

1. identification of future actionable issues or drivers of change
2. creation of framework for conceptualising data pertaining to issues or drivers;
3. development and testing of scenarios
4. reduction of initial scenario to smaller number of ultimate scenarios (two to four)
5. construction of the scenarios; and
6. examination of scenarios and identification of issues arising from them.

The form in which scenarios are written up can vary depending on the participant's experience, the level of complexity of the scenario, and the participants' ability to develop strategy related to that scenario. The application of scenario planning to a firm's strategic development process is appropriate when one considers that, with environmental change; these firms are dealing with uncertainties regarding the eventual outcome of the market. Schoemaker (1995) concurs that scenario planning is an attempt to consider the range of possibilities that motivates decision makers to consider changes that would have been ignored before.

Scenario planning (SP) can be useful tool for strategic development, particularly when dealing with impending environmental change in the future. The purposes of future studies are to discover or invent, examine or evaluate, and propose and promote possible, probable and preferable futures. They are summarised as (Schoemaker, 1995):

- Raising issues of common concern that may be overlooked in the conventional short-term view.

- Highlighting dangers, alternatives and choices that need to be considered before they become urgent.
- Publicising the emerging picture of the medium-term future in order to involve the *team* in the decision-making process.
- Helping project manager to evolve in response to the changing environmental conditions around them.

Some decision makers become so captivated by the process of peering into the future and producing scenarios that they forget that these pictures of the future are not an end in themselves, but merely a means of opening *practitioners'* minds to new possibilities and fresh options. Although scenarios has been used in long term future outcomes for firms, SP can also be used for understanding short and intermediate terms outcomes within project management with its dynamic environment. These are actual *futures* of short and intermediate terms. SP contains all the ingredients that will enable the outcome of projects to be more successful if fully understood and implemented. It will not only be a strategic tool within the project but an operational *magnet* to understand the changing dynamic environment in a micro level that requires the human touch. For example, on construction site, the environment is dynamic and changing so fast, scenarios are plausible alternatives in understanding such changes as safety and organisation site layout.

3.5 Reflections by the Project Manager

Critical reflection can assist leadership (i.e. project managers) to play a vital role in enhancing the project management process. Engaging in critical reflection can create discomfort and dissonance (Schon, 1983; Brookfield, 1991). However, where reflection is absent, there is the constant risk of making poor decisions and bad judgements (Brookfield, 1991). Experience is more than the events and involves the perceptions of the events.

Underpinning theories may only make sense through practice, but practice makes sense only through reflection as enhanced by theory (Raelin, 1997). Pratte and Rury (1991) argue that the true understanding of a discipline cannot be imposed from theory alone, but rather needs to grow out of experiential knowledge and ongoing practice. Thus, this approach of learning has been depicted by Nonaka (1991) as transforming what is implicit into something that is explicit, especially through spirals of ongoing interaction between individuals, work teams, and organisations.

The aim of *formal* reflective learning that integrates previous experiences with new learning should be to assist future leaders to adopt more sophisticated self-monitoring behaviours. Critical reflection is viewed as a social process and is most successful as a collaborative effort. Understanding followers' viewpoints is essential for building trust which is critical for developing creative tension needed to encourage follower learning. Another lens draws on the experiences of colleagues to provide new insights on various situations.

When a person engages in *formal* reflection an experience from the outside world is brought into the mind, turns it over, makes connections to other experiences, and filters it through personal biases. If this process results in learning, the individual then develops inferences to approach the external world, in a way that is different from the approach that would have been used, had reflection occurred. This enhances the processing of existing information, thereby better preparing the person to handle the demands of the rapidly changing environment (Schon, 1983; Daudelin, 1998).

3.6 Effectuation usage for project managers

As project managers our commitment to the role can be approached in one of three ways: we either focus on the external or the internal or both. When we focus on the external we allow circumstances to determine the outcome. Because circumstances constantly change, our decisions are affected. However, if we focus on the internal we make choices. Each choice is a crossroad; one that will either confirm or compromise your commitment to the task. Choices are the only thing you can truly control. You cannot control your circumstances, nor can your strictly speaking, control others. But by focusing on your choices and making them with integrity, you control your commitment, while monitoring the external environment.

These problem areas concern decisions within project management in the built environment mainly deals with uncertainty and complexity of a different type, which the world is still grappling with. Summarising from current literature on decision making, the anatomy of a decision involves:

- A given goal to be achieved or a decision to be made (usually well structured and specific)
- A set of alternative means or causes (that can be generated through decision process)
- Constraints on possible means (usually imposed by the environment), and
- Criteria for selecting between the means (usually maximisation of expected return in terms of the predetermined goal).

Clearly, the above structure assumes a decision process involving causation model and the rational approach. Causal models are based on a predicative logic: *To the extent we can predict the future, we can control it.*

Effectuation suggests a rather different logic for the choice process: *To the extent we can control the future; we do not need to predict it.*

A large part of the future is a product of human decision making. The logic of control overcomes the problems of prediction by keeping investments to the utmost minimum, continually negotiating with key stakeholders, and learning to use contingencies to create new ends or adapt better to achieve old ones. Effectual logic consists of an internally consistent system of principles that drives a dynamic and interactive process for the creation of new ventures and new markets. The logic was inducted from a cognitive science based study of expert entrepreneurs and has since been compared with novices, corporate managers, organic growth leaders, venture capitalists (Sarasvathy, 2003) across different disciplines.

Effectuation then has a skill which practitioners are not using at a much deeper level. In retrospect the skills of project managers stem from their working experience, the fact that knowledge is from what they are competent in. Most PMs come from the technical background in which they are unconsciously using effectuation principles at a lower level, however, what is required are skills that are *formally* developed, learned and honed that would make them more effective.

4.0 Research Methodology

There are several research methods available; however careful analysis shows that there are essentially only few perspectives (e.g. positivism, constructivism, interpretivism, etc.) with many methodologies being only a slight variation of the predominant perspectives. From an interpretivist perspective, understanding social phenomena always involves interpretation. As Giddens (1993) puts it, social science is 'irretrievably hermeneutic'. It is not just the researcher, however, who is engaged in interpretation, the human actors (i.e. *project managers in the built environment*) involved in the social phenomenon under study are also interpreting their situation. Thus, Geertz (1973) puts it; the data for interpretive research are '*really our own constructions of other people's constructions of what they and their compatriots are up to*'.

Even if researchers are able to gain direct access to the actors, however, their ability to obtain an understanding of actors' interpretations may be limited in a number of ways. The researcher cannot assume that he or she understands the actors' description of their behaviour and their interpretations in a particular social setting. Relying on actors' verbal description alone can therefore lead to misinterpretation of what is said. Similarly, social rules and norms identical to those in other settings may have different meanings in another particular setting.

Also actors may provide a distorted account of their behaviour because their ideas as to what ought to happen in the situation may differ from what actually goes on. This is not to say that there is a single 'true' view of what should happen in a situation or what actually happens, rather that actors may interpret their own behaviour in terms of dominant perceptions.

Finally, actors may be unable to give an account of their actions because they form part of social routines of which they are only tacitly aware. Giddens (1993), for example, distinguishes between practical knowledge from experience and discursive knowledge, actors' ability to explain their behaviour, and argues that actors know more than they can say.

One way these limitations could be overcome is by extended interaction with the actors or their domain over time. In addition, repeated experience may provide insight on local meanings, dominant perceptions or tacit knowledge. However, in this study, to gain an understanding of PM available data sources were used.

4.1 Data

The assumptions of interpretivism may therefore be, to interact directly and intensively with their research 'subjects' over extended periods of time. The main phase of the research process in which such interaction took place is in data collection and a range of different data-gathering methods available to researchers at this stage. These may be seen to vary in the extent to which they offer opportunities for interaction between the researcher and the research phenomenon.

This is illustrated in Figure 1, in which a number of methods are placed on a spectrum between maximum distance between researcher and 'subject' and maximum engagement. In Figure 1 only the first two methods are used in this research, due to the time frame and credible data source availability. A minimal interaction with project managers is carried out to clarify one or two points, but not to categorically say that it is a dominant research method.

The analysis of published data clearly lies at the *distant* end of the spectrum. While such methods require no direct interaction between the researcher and social actors, this does not mean that the data they use do not involve any interpretation, as it includes journal papers, conference proceedings with original research and other trade magazines.

Textual analysis was original focus of hermeneutics, especially as applied to the range of potential media available for analysis. The extent to which such analysis can provide access to the author's interpretation depends upon assumptions about the relationship between the author and their text and the ability of readers to achieve a *sympathetic* engagement with the text (Nandhakumar and Jones , 1997).

To manage such a complex project properly, a toolkit or model must be capable of representing systems with these characteristics, and it must be understandable and usable by the managers of the projects. What have been developing over the years are computational models and dedicated software to explicitly project manage. What has been lacking is the *soft* systems approach that takes account of the human mental models (Nandhakumar and Jones , 1997).

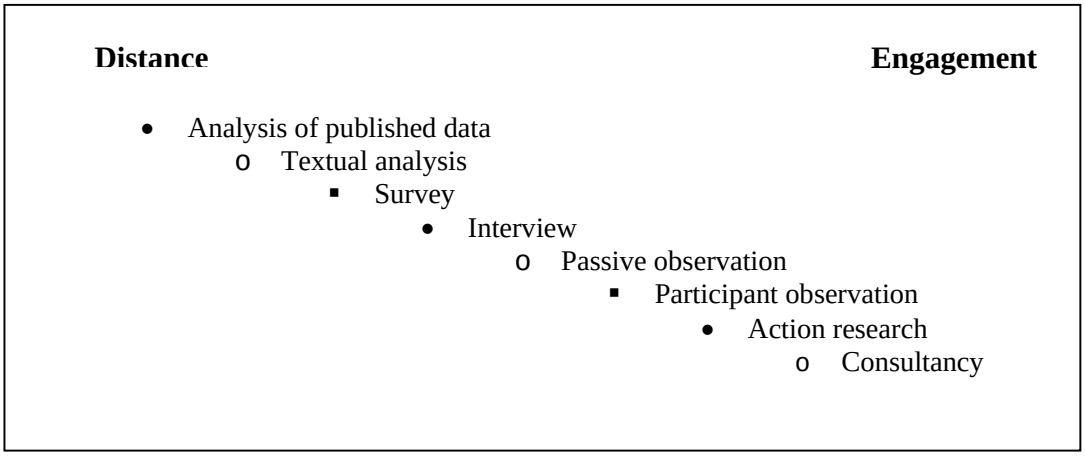

Figure 1: Adapted from Nandhakumar and Jones - 1997

5.0 Results

This section integrates the three human issues discussed in the literature review of scenario planning, effectuation approach and the reflective practitioner with the rational approach for use by the built environment project manager. It employs the use of soft systems methodology developed by Checkland (2000) to bring about the conceptual framework under one umbrella.

5.1 The **S***cenario* **P***lanning,* **E***ffectuation and* **R***eflective (SPER-toolkit) Approach*

The SPER-toolkit is shown in Figure 2. The toolkit brings together the integrative development, use and experiential understanding of the SPER enhancement to project management. The toolkit essential makes use of tried and tested methods in different domains and new and emerging studies that when fully developed would be an ascientific approach enhancing the scientific method. The five phases are presented below:

1. The rational approach – in which planning, organising, controls and all its antecedents have been carried out by the current project management processes under one of the following dedicated bodies: Project Management Institute – Project Management Body of Knowledge (PMI-PMBoK) (Morris, 2006).
2. Scenario planning – in which the possibilities arising as the project is executed from design to implementation for all activities
3. Effectuation – using what we know now to generate both the scenarios as well as aiding in understanding the future scenarios that will be encountered as the project is crystallised
4. The successful project outcome of the project that have taken all the different pathways into consideration – rational method, scenario planning and effectuation approach.
5. Reflections considered as the fifth element nonetheless it is a continuous process over the entire life of the project. It is considered as the fifth element because it will help provide the much needed feedback for updating project managers' knowledge and understanding of processes as well as future projects.

The *whole arrows* and its direction of flow in Figure 2, essentially depict how the two *new* methods feed into the rational approach. While the *segmented arrows* and its direction of flow, shows the feedback of knowledge and understanding that is derived from a *formal* reflective practitioner. This learning experience of a conscious *formal* reflected practitioner (i.e. project manager) is what is lacking in current feedback that we often speak about in must scientific field that are essentially human endeavours, rather than technological endeavours. However, to be complete we need to use the toolkit in an established framework that is fully operational; this is because our mental models are inadequate.

Mental models have some powerful advantages, such as flexibility. It can take a wide range of information into account, and can process information which is presented in a variety of forms. It can be adapted to new situations and modified as new information becomes available. But mental models also suffer from great disadvantages. Mental models are not explicit. They are not easily

examined by others. Their assumptions are hard to pin down in debate or discussion. Interpretations differ. More so we have a bounded rationality.

In practice, the bounded rationality of human judgement means that the best-intentioned mental analysis of a problem as complex as a large construction project cannot produce accurately the myriad interactions which jointly determine the outcome of the program (Neal 1995). Hence an established framework is required, by which we can enhance our limitations.

5.2 The Soft Systems Methodology Framework

Project management is a philosophy, ensuring that the project, the people who work on them, processes and politics, in a social environment all work in harmony. With this background, the methodology envisage begins with the premise that it is necessary to understand the current situation before it is possible to define what is required, or the position that the customer derives on completion of the project. The method recognises that there is a difference between **real**, tangible world and the **concept** world, where ideas are interpreted as mental models. If a project is to be successful then the concepts most match the requirements. The key to a successful project is the accuracy of determining the current and derived situations that makes up the two worlds, the **real** world, where measurements can be made, and the **concept** world, where modelling analysis occur. In a project environment the 'requirements' exists in the real world, while the '*plan, scheduling etc.*' exist in the concept world (Neal, 1995)

The traditional systems engineering approach does not take into consideration the social and cultural context in which to ensure the success of the project. Thus in 1980s, SSM was introduced by Pro. Peter Checkland based on his multiple experiences as a scientist working in the laboratory, a technologist inventing new things, a manager handling complex problems and an academic working with theories and research (Checkland, 2000) from a wide experience of technical and non-technical issues, Checkland believes that conflict in technology and organisation are not technical issues per se, but are also associated with human affairs. SSM contributes as a problem solving method tools emphasising on system thinking idea in a complex system. The concept of SSM employs system thinking approach as an alternative to the reductionist approach of breaking the system into smaller subsystem. SSM enable "seeing the forest not just the trees, where in order to understand any particular tree in a forest we not only need to understand the whole components inside the forest itself but also relation among trees".

The main criticism of conventional planning in PM of the built environment is that concepts, methods and techniques employed tend to reinforce the present. This makes it difficult to design and built alternative visions of the future more suited to their true desires, especially where the humans are the shakers and movers in the project environment. What is needed is the conceptual development of alternative futures along the supply chain of project management. For example, designing artefacts in the BE, whether they are done according to design for X approach, or for sustainability or safety & health, usually it is the fad that is existing at the time that dictates the design paradigm majority of the time. This trend is also mirrored along the supply chain within the built environment, be it materials or working equipment. Hence when any environmental change does occur during the execution of the project, without the right approach to alter course, there are cost or financial implications which are very high. Although risks would have been considered, but the methodology to such risk was not scenario planned. Figure 3 shows the first stage in using the soft system methodology, approach for the enhancement of project managers. The diagram is the top level that will eventually be developed within the SSM methodology.

6.0 Conclusions

The conceptually developed *SPER-toolkit* approach needs to be fully tested in the built and natural environment before we can safely understand its full potential. This requires real live projects to be able to develop all the peripheries to this toolkit. As the understanding develops, the research methodologies will also move from that of analysing textual and published literature to that of action research in which the tools are used to *affect* and *effect* the outcomes of *live* projects and eventually to consultancy work in which the full understanding of failure or successes of project can be measured in a qualitative and quantitative sense, thus complete advice can be given to clients. There is a lot of potential for the development, future refinement and full implementation of the SPER-toolkit as it is simple to understand and its documentations can be developed in-house by any competent project management team. The SPER- toolkit can be used to infill the knowledge gaps of project managers, if fully understood and implemented. The future benefits to organisations as to productivity and financial undertones will improve as the toolkit is used. In a series of future papers and workshops the SPER-toolkit will be elucidated using the SSM framework that makes use of the CATWOE breakdown structure of the problem.

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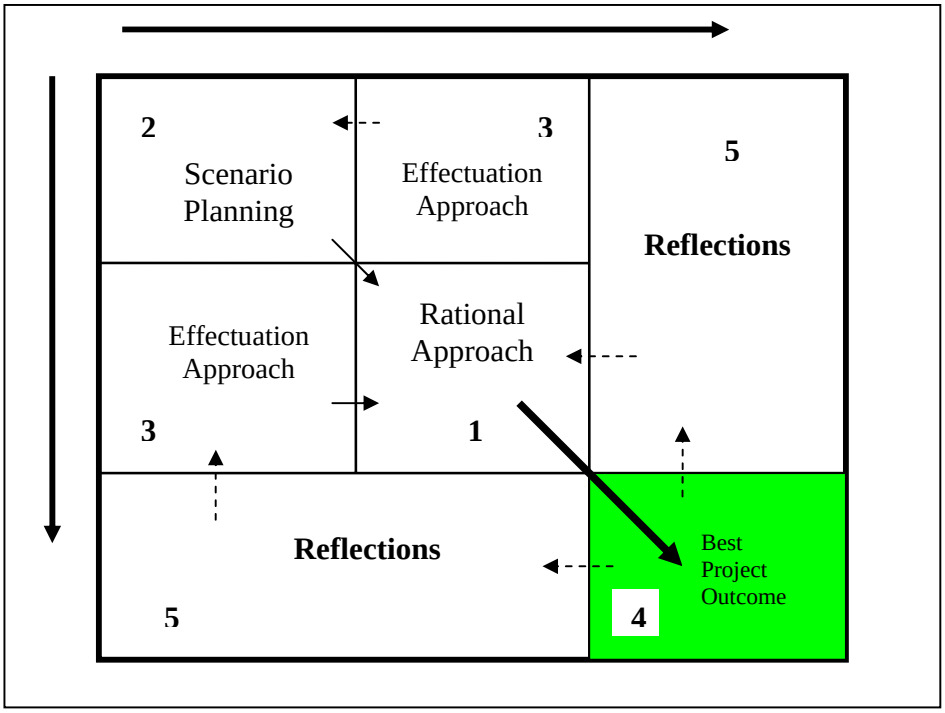

Figure 2: The *SPER-toolkit* approach for enhancing project managers' decision making.

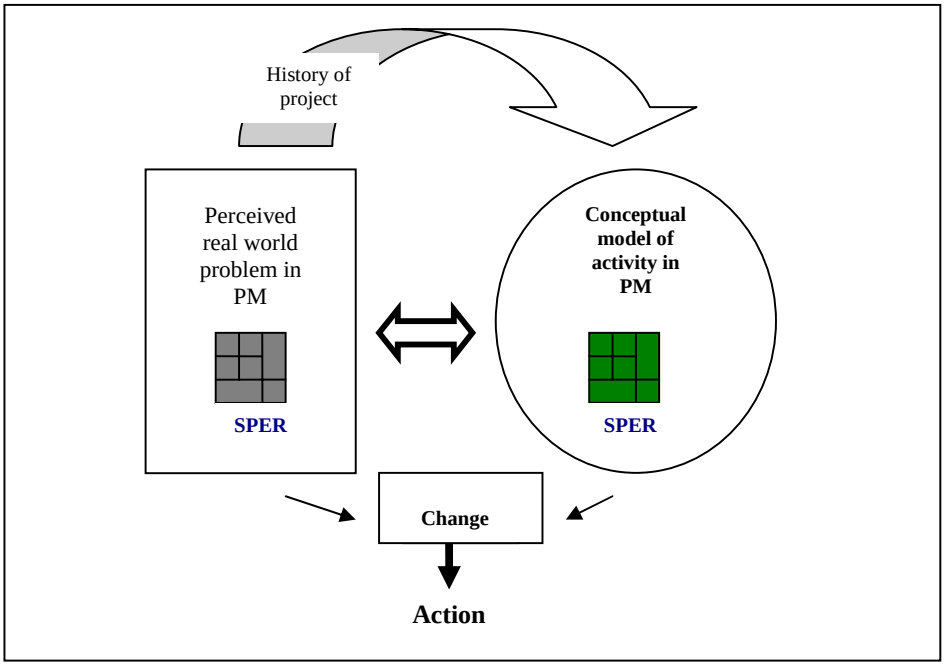

Figure 3: A SSM framework for formulating *SPER*-toolkit