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Evaluation of project outcomes

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The evaluation of the outcome of construction projects has been the subject of unresolved debate for many years. This paper argues that previous views have tried to find a simple solution to a complex problem. The complexities of the issues which underlie the evaluation of project outcomes are derived from project goals, participants' behaviour and the performance of project organizations. Earlier studies did not recognize the manner by which individuals' perceptions of project outcomes were influenced by the range of factors in each person's perception. A model is constructed with two levels of outcome developed from the fundamental behaviour-to-performance-to-outcome (B-P-O) cycle in industrial/organizational psychology. It is postulated that the valence of the first-level outcome (project success) is dependent on the instrumentality relating to the second-level outcome (participant satisfaction). The identification of factors of influence, such as self-efficacy, project complexity, commitment, expectancy, rewards, goals and environmental variables, are shown to be fundamental in understanding an individual's perception of the merit of the outcome of a project.

Keywords: Evaluation, performance, outcome, success, satisfaction

Introduction

Much research concerned with measuring the effectiveness of the project management process depends upon the existence of a method of measuring the degree of success of a project team in achieving the completed project. Any conclusion about how good or bad the project management process was cannot carry much conviction unless it can be judged against some measure of the relative success of the outcome of the project. The concept appears simple and leads to the idea that if the completed project satisfies the client, then it can be said that the project management process performed effectively. However, subsequent research has shown that the concept is much more complex, and leads to questions such as what constitutes satisfaction, who are the claimants on the project whose feelings of satisfaction are important, what is the relationship between success and satisfaction, and how should these issues inform our judgement of the outcome of construction projects? This paper reviews the elements which need to be addressed in evaluating the outcome of projects.

The development of such knowledge to assist in the improvement of the effectiveness of project organizations requires systematic evaluation of the organizations' performance to provide feedback for guiding the participants' behaviour in attaining project goals. However, two fundamental characteristics of project organizations complicate evaluation. They are that a project organization is: (a) a temporary multi-organization (Cherns and Bryant, 1984) and (b) a shifting multi-goal coalition (Newcombe, 1994).

As a result project organizations have complex goals and exhibit complex behaviour for which a theoretical framework is required if we are to be able to evaluate project organization performance and project outcomes. Such a framework is advanced, and the impact of perceptions by different project claimants is discussed to facilitate evaluation.

There is a wide range of people who can claim to have an interest in evaluating the outcome of a project. The client's evaluation has a particular status but the participants in the process of producing the project, e.g. project manager, architect, engineer, etc., also can lay claim as, of course, can the occupants and users. The theoretical framework developed here can be applied to each of them. Individual perceptions of the merit of the outcome can be evaluated and are valuable but the belief that it is possible to combine these perceptions into a single measure will be shown to be a myth.

Towards a framework

The behaviour-performance-outcome (B-P-O) cycle, which is well established in industrial/organizational (I/O) psychology for examining how people formulate goals, evaluate performance and perceive outcomes (Fig. 1), is the framework adopted for evaluating construction project outcomes through an examination of project organization behaviour and performance. It has been described alternatively as the act-product-outcome cycle, as also shown in Fig. 1.

To understand how evaluation of a project outcome occurs, a framework for modelling the discrepancy between a project organization's goal and performance is required. Project outcome often is referred to loosely as project success (or failure). However, it is argued that it has to be based on a theoretical construct of goals leading to types of behaviour which aggregate to performance; the discrepancy between the goal level (the level which is set) and the performance level (the level which is achieved) provides a basis for evaluating outcome. Thus, the cycle of setting project goals, followed by behaviour in the project provision processes to yield a performance and, consequently, outcomes presents a theoretically rational framework. Translated into construction project terms, it is the cycle of defining the project's objectives and converting them into a brief, the actual acts (behaviour patterns) of the members of the project team which by their performance (e.g. designing, constructing) create a product (the project), the outcome of which is evaluated.

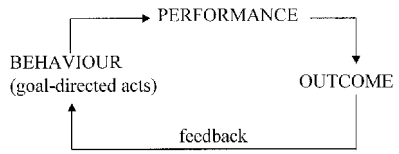

Figure 1 Behaviour-performance-outcome (B-P-O) cycle

Although the appropriate measures should be guided by the goals set for the project, the setting of project goals may be problematic (Cherns and Bryant, 1984) and the formalization and communication of project goals to all participants unlikely to occur. Furthermore, previous studies, e.g. Mackinder and Marvin (1982) and the Tavistock Institute's reports (TI, 1965, 1966), express the problems of eliciting adequate goal information, of translation and of communication between the construction industry participants. In such circumstances, the identity of the evaluator by role and allegiances can be critical in determining what, when and how to measure in evaluating project outcomes.

Behaviour

Behaviour within the cycle relates to the behaviour of the individual and has been defined as an ongoing act or process (Naylor *et al.*, 1980). This act has two defining characteristics or dimensions: 'amplitude' and 'direction'. When an individual decides to do something, that individual first must decide what act s/he is going to perform or attempt to perform (the direction dimension) and then must further decide how much of her/his resources are going to be committed to the performance of that act (the amplitude dimension). Direction is the specific kind of activity or process being carried out: e.g. a designer may decide s/he needs to research alternative cladding systems for a project, and in doing so s/he has specified the direction of her/his behaviour. If while researching cladding, the designer is simultaneously engaged in some other activity (e.g. listening to music) then her/his behaviour is multidirectional in that the designer's total resources are being distributed across more than one act. Amplitude is the total commitment to an act as defined by the amount of individual resources (time and effort) allocated by the individual to the task of performing that act. In performing any act, one can control the length (time) and intensity (effort) of behaviour in carrying out the act. This aspect is particularly important in the design stage of a construction project, as designers often can operate relatively independently with some freedom to decide on the time and effort they expend on a design.

It has been argued that organizational behaviour is the aggregate behaviour of individuals in organizations rather than a concept of an organization having a behaviour pattern (see Naylor *et al.* (1980) for the argument and definitions of organizational behaviour which emphasize individuals as in Gibson *et al.* (1982), Szilagyi and Wallace (1983) and Miner (1988)). The study of organizational behaviour is rooted in the behavioural sciences, particularly psychology and sociology, and has been more oriented towards empirical

than theoretical issues. This became the basis for criticism (Locke, 1977, 1980; Komaki 1986; Lee *et al.*, 1989) and the surge in cognitively based theory and research in psychology demonstrates that cognitive constructs are necessary in explaining human actions (Bandura, 1986).

Two important aspects in analysing organizational behaviour are: (i) macro (organization) and micro (individual) levels, and (ii) cognitive (rational) and affective (emotional) behaviour. The behaviour of the project organization (at the macro level) is the aggregate of the project participants' behaviour (at the micro level); cognitive behaviour refers to the thought processes of individuals and emphasizes rationality; and affective behaviour refers to the feelings of individuals and emphasizes emotions (Naylor *et al.*, 1980).

The importance of individuals as the contributing elements in the performance of organizations is stressed by Vroom (1964), Porter and Lawler (1968), Campbell *et al.* (1970), Heckhaussen (1977), and Naylor *et al.* (1980). However, people do not relate to the organizations as isolated individuals but as part of a group. The key influencing environment for the group is the organization of which it is a part, and the groups are viewed as social entities. An individual's behaviour is governed by her/his goals, self-perceived performance capability (self-efficacy) and motivation, and fuelled further by the organization's expectations (e.g. expecting a certain performance level from an individual), and this expectation may link to a reward and be restrained by the organization's situational constraints (e.g. insufficient internal resources). The situational constraints and the organization's expectations, coupled with self-efficacy will determine the individual's self-assigned goals.

The relevance of these ideas to construction project management is apparent due to the well developed sense of professional independence arising from the well educated independently thinking participants in projects, e.g. architects, engineers, surveyors, and the manner in which they relate to the project organization in groups of like-minded professional colleagues with whom they work.

Performance

The next component in the B-P-O cycle is performance. The accomplishment of task goals is successful performance (Herbert, 1981). Performance is determined by ability and behaviour, i.e. performance = f (ability × motivation), where ability = f(aptitude × [training + experience]) (Vroom, 1964). Performance can be influenced by other extrinsic factors, both environmental and technological. However, these environmental and technological factors act through the B-P-O cycle as moderators, e.g. adverse environmental factors will act as situational constraints affecting the individual's B-P path, while advanced developing technologies may influence performance if the individuals make an effort to acquire them. Hence, the influence of technology manifests itself through the variable of individual's ability (as just defined). Performance is defined also as an aggregate of behaviour over time, tasks or people (Mitchell, 1983). As such, performance is always linked with behaviour and is always assessed by its outcome: hence the B-P-O cycle. In construction, performance is an individual's (e.g. architect's) contribution to the execution of the tasks required to complete the project, e.g. designing, preparing contract documents, constructing, etc.

Performance evaluation is the term for describing performance strengths and weaknesses within and between individuals (Landy, 1989), and this can be explained best in conjunction with the concept of level of aspiration. The concept of level of aspiration can help explain questions like: at what level of effort and challenge is one's own behaviour directed; what affects the perceived expectancies of a linkage between efforts and reward? Aspiration level is a subjective goal which impacts upon performance and serves as a reference point for feelings of success or failure, so that 'performance which exceeds the level of aspiration is success and performance which falls short of the level of aspiration is failure' (Herbert, 1981).

Level of aspiration refers to the level of performance one is trying to attain on a task (Locke and Latham, 1990). Hoppe (cited in Locke and Latham, 1990, p.110) defined it as 'the subject . . . always undertakes the task with certain demands . . . which can change in the course of the activity. The totality of these constantly shifting, now indefinite, now precise, expectations, goal settings or demands in connection with one's own future performance, we shall term the level of aspiration of the subject'. In addition to serving as a standard of appraisal, the level of aspiration also was said to act as an incentive for future performance, to be the expression of a wish and, possibly, a method of defending against failure.

An individual sets self-assigned goals based on her/his prior experience of the task. The individual not only sets the goal level to be achieved but also sets the level of aspiration. Once the acts are performed fully, an individual will judge the results upon her/his level of aspiration in order to conclude a perceived performance level. The individual will then evaluate his/her performance by comparing this perceived performance level with the goal level set originally, i.e. to find out if there is any discrepancy between the goal and the performance. If the performance level meets the goal

level, then the level of goal attainment is 100%, the outcome is a success and it should provide feelings of satisfaction. Feedback also plays a major role in this cycle since it provides information (further stimulus) for setting future levels of aspiration, and the level of aspiration will affect subsequent behaviour and performance.

The process of deriving a given level of aspiration depends on a number of factors: the past performance on the same or similar events, the setting of a level of aspiration for the next performance, the new performance itself and the psychological reaction to the new performance (Herbert, 1981). With past success, the level of aspiration (and the consequent subjectively derived probability of success) will be raised and so bring forth a higher level of motivation and willingness to apply initiative and expend more effort. If a task is either too easy or too difficult, falling outside the range of those abilities, then no level of aspiration is established. Therefore the aspirations of the individual members of the project team will be based on each individual's experience of their performance on previous projects. Experiences are likely, in many cases, to be different due to the temporary nature of project organization, which results in a lack of shared previous experiences by members of a project team.

The potential attractiveness of the outcome and the individuals' expectation of success determine their behaviour (B) and the amount of effort that they are willing to exert to achieve the goals. People evaluate their own performance (P) against the expected outcome (O), this evaluation acts as feedback for subsequent goal setting and behaviour.

Project procurement

The B-P-O cycle in project procurement is triggered by project goals. Goal directed action (purposive behaviour) is both focused (directed) and organized, yet not all actions are goal directed. Goal directed action is characterized by the utilization of feedback information so as to keep actions directed towards the goal(s).

Goals are likely to be organized into a system with no fixed structure, i.e. there is a hierarchical organization of goals and subgoals, superordinate goals and subordinate goals (Pervin, 1989). A goal system is capable of change according to context as well as capable of change over time. Goals can be irrelevant to one another, compatible with one another or in conflict with one another. For project goals, the features of dynamism, maximizing and satisfying approaches and conflict provide further complexities.

For instance, the dynamism of project goals provides that goals may change over time, through client changes and modifications by designers, amendments to legislation, etc.; the satisfying approaches determine that when goals are incompatible optimal macro-performance is likely to be achieved through satisfying, while for compatible goals maximizing is possible; conflict may occur between goals. To assume project goals to be unambiguous must be false unless such goals are defined clearly and expressed to all participants'; otherwise project goals are implied through participants perceptions and experiences and are likely to be skewed towards individuals' interests.

The B-P-O model assumes that the basic conscious actions of the individual are the actions of choice (i.e. judgement and decision making). The act (behaviour) creates projects as a result of carrying out the act (performance) within an input-transformation-output model (Fig. 2). Projects (the results of the acts) are then perceived and evaluated either by the individual directly or by some other entity such as another person or an organization. Behaviour in such a context is a result of the stimulus-organism-response (S-O-R) sequence, a fundamental concept in the study of behaviour. For the purpose of this paper, organism can be replaced by the individuals who make up the organization. The S-O-R sequence is brought about as a result of the forces exerted by environmental factors on the members of an organization. The organization's members have to react by setting, adjusting or re-defining their goals and actions.

The S-O-R paradigm assumes that an individual is inactive until acted upon by stimuli, i.e. the stimuli cause the acts. However, Atkinson (1982) argued that individuals are active before being exposed to stimuli, i.e. individuals are actively motivated to do many different things before exposure to a particular stimulus situation. Atkinson and Birch (1970) conceive the impact of the immediate environment (or stimulus situation) on behaviour to be the various instigating and inhibitory forces it produces, and these influence the arousal of the individual's tendencies to engage or not to engage in certain activities.

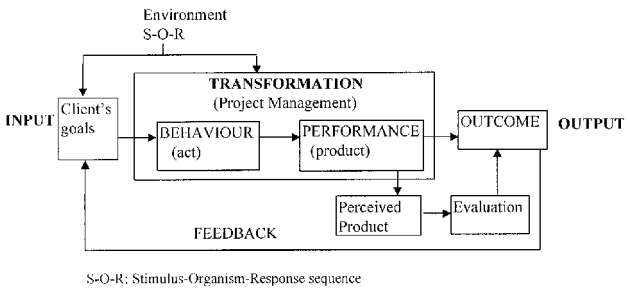

Figure 2 Project procurement process

The S-O-R paradigm in the construction procurement model (Fig. 2) shows that during the transformation process environmental influences are transmitted to the potential client through his/her importation of information, energy and materials from the environment, and may stimulate a response (Walker, 1996). The action of these influences will determine the initial decision whether to proceed. The transformation process will entail the consideration of each alternative within the environmental context and a decision will be made on the basis of the influence of the external factors. The transformation process will receive information, energy and material from the environment and will transform them in its task of identifying the appropriate decisions needed to design and construct the project, ranging from e.g. choosing among alternatives such as buying, leasing or constructing a new building, selecting the structural form, choosing the floor finish, selecting the contractor, etc., all of which will be determined by the environmental influences acting in the process. The effect of the environmental forces is upon the individuals in the organization, the architects, engineers, project managers and, of course, clients, and hence affects their behaviour and performance directly in producing the project outcome.

The reaction of the members of the project team individually (within the transformation process) constitutes their behaviour which generates the performance which produces the outcome which is the completed project. Therefore, each individual will have his/her own perception of the project outcome as a product of their expectation of success, the amount of effort they are willing to exert and their expectation of the outcome, all of this will be the product of the environmental forces acting on the individual both personally and through their effect on the transformation process. The key element is how this translates into methods for project outcomes evaluation.

Project success

Project success is a topic which is frequently discussed and yet rarely agreed upon. The concept of project success has remained ambiguously defined. It is a concept which can mean so much to so many different people because of varying perceptions, and leads to disagreements about whether a project is successful or not. At present, the literature dealing with and defining project success can be divided into three categories which emphasize the following aspects.

Project goals. Commonly cited goals are those concerning time, budget and functionality/quality/technical specification (Gaddis, 1959; Avots, 1969; Olsen, 1971; Tuman, 1983; Morris and Hough, 1987; Trauner, 1993; Williams, 1993; CIOB 1994; Handa and Adas, 1996). Recent research has included other aspects such as safety and environmental sustainability issues. However, these can be interpreted as subsumed under the project goal of quality which, in turn, is interdependent on the other two goals of time and cost.

Satisfaction of the claimant(s). An additional element for a successful project concerns the satisfaction of the claimants, for instance, the client (Barrie, 1980; Bedell, 1983; Baker *et al.*, 1983; Ashley *et al.*, 1987; Lock, 1987; Pinto and Slevin, 1988a,b; Sanvido *et al.*, 1992).

Perception and awareness of different claimant(s). Project claimants with different orientation (e.g. management versus scientific) may have different views of what constitutes a successful project outcome (deCottis and Dyer, 1979; Trauner, 1993).

According to a significant and comprehensive study by Murphy *et al.* (1974), the definition of project success centres upon 'perceptions' and they argue that the definition be termed more appropriately 'perceived success of a project'. Murphy shows that some of the strongest factors determining project success are: (a) co-ordination and relation patterns, (b) avoidance of initial over-optimism and conceptual difficulty, and (c) clarity of success criteria and consensus.

Although the first factor comes within the area of planning and organizing of resources in the formal organization structure, the other two are areas of concern in the study of organizational behaviour where perceptions and expectations concerning human needs and values are the central issues. These two factors can be put into context within the extended B-P-O cycle as in Fig. 3.

Usually, optimism and conceptual difficulty are the initial feelings of the individuals at the commencement of the project; such feelings originate in the feedback loop of the B-P-O cycle which relates the success of previous projects with which the individual have been involved. Feedback acts as information processing and transfer of the experience of past performance to allow new levels of aspiration to be set. Whether the individuals are optimistic about their future performance and whether they perceive the next project as particularly difficult depends on their past experiences.

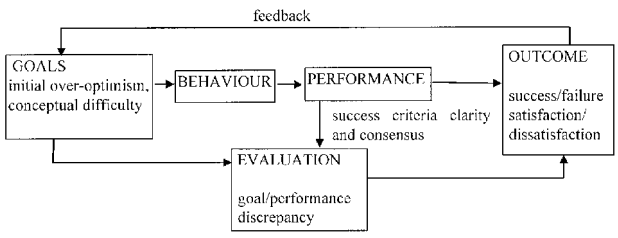

Figure 3 Factors in project success

Clarity of success criteria and consensus are concerned with the evaluation process. Project outcome has to be measured and evaluated against the expected performance. Criteria are needed for comparing the goal level against the performance level thus giving a goal/performance discrepancy to show the degrees to which the goals have been achieved. This evaluation will lead to a conclusion which could be regarded as the success or failure of the project, or feelings of satisfaction or dissatisfaction.

Problems with evaluation arise from the difficulty of modelling performance, as reviewed by Campbell (1983). The approaches to modelling performance vary along three dimensions: (i) the specificity and complexity of the variables in the model, (ii) the focus of the model (on performance outcome or performance process), and (iii) whether it is a model of ratee performance or rater judgement.

Thus, the performances to be modelled can be qualitatively different and may not be related to one another easily. Evaluation involves value judgement. Such judgement itself is the reflection of the perceived outcome and this perception is moderated by the evaluators' past experiences, needs and values. Thus, the perceptual tasks involved in an evaluation process include: (a) deciding what to include and what to ignore (i.e. deciding on the 'goals' to be included for measuring goal/performance discrepancy), and (b) interpreting and making sense out of those items included in the context of one's own experience, needs and values (i.e. devising a scale of measurement for evaluating goal/performance discrepancy).

Often project evaluation has been carried out to provide feedback to guide performance in future projects, e.g. identification of critical success factors (CSFs) to guide project participants' behaviour. However, the methodology in such project evaluation (which centres around an attempt to make explicit those few key areas that dictate project success) ranges from relatively simple procedures which involve interviews between a CSF analyst and a project manager to identify a set of CSFs and their performance measures (Rockart, 1982) to factorial experimental design which encompasses correlational and causal analyses (Ashley *et al.*, 1987). Ashley concludes that studying project success is a viable topic and should be explored further to allow the development of a predictive model to assess the success/failure level of a construction project. However, the CSF method relying on a CSF analyst has weaknesses which must be carefully guarded against: (i) the analysis procedure that leads to CSF identification may be biased by the manager's or researcher's beliefs and values or by the available data; (ii) the information model yielded may be simple and thought provoking but not accurately representative of the actual environment; and (iii) humans often exhibit difficulty in dealing with causality, so any association between CSF and project success as interpreted by a manager may not represent a true causal relationship.

Success–satisfaction relationship

At present, the definitions of project success and the methodology used in identifying success factors often have assumed satisfaction as an attribute to success (Ashley *et al.*, 1987; Pinto and Slevin, 1988a,b). However, a review of the I/O psychology literature demonstrates a theoretical base for the associated definitions of success leading to satisfaction (Vroom, 1964; Naylor *et al.*, 1980; Locke and Latham, 1990). To appreciate the success–satisfaction relationship fully, it is essential to understand how goal-directed behaviour leads to performance and further leads to an outcome which is then perceived and evaluated by the individual.

As project participants exhibit goal seeking behaviour, they tend to behave in ways that result in goal accomplishment which gives rewards, that is they demonstrate motivated behaviour which is directly related to the desirability of the reward, the extent to which the reward satisfies personal motives (or personal goals), the belief that given behaviour will actually be rewarded, and the ability of the individual and his/her self-perceived performance capability to perform such behaviour successfully.

Each of the above elements is unique to any individual and can yield quite different reactions to the same reward, as explained by instrumentality, expectancy and valence in expectancy theory (e.g. Vroom, 1964). Goal setting theory predicts the same consequence but emphasizes goal content (which must be specific and challenging), goal commitment and feedback (Locke and Latham, 1990).

A reward is anything positive that is granted for behaving in some specific way or ways. Therefore, it is a kind of value appraisal by the individual, and involves an automatic, subconscious estimate of the relation between what was perceived, what was conceived and the applicable value standards. The more important the value, the wider the possible range of effect; the actual amount of effect will depend both on value importance and the degree of value fulfilment. Value importance, when applied to goals, constitutes a determinant of goal commitment; i.e. people are more committed to goals that they deem important than to those that they view as unimportant. Effect depends on the relationship between realized performance and expected performance (McClelland *et al.*,

1953; Ilgen and Hamstra, 1972). Lock and Latham (1990) state that succeeding against the odds usually is considered a greater achievement than succeeding when it is expected; therefore, successfully managing a more complex project is likely to be considered a greater achievement. These ideas help to explain the different levels of satisfaction with a project's outcome derived by project team members.

The experiences of success and failure do not depend on the absolute level of performance attained but on performance in relation to one's personal standard (Lewin, 1958). If the standard is exceeded, the individual experiences success and feels pleasure and satisfaction; if the individual does not meet the standard, failure, displeasure and dissatisfaction are experienced; therefore, one project manager's assessment may be different from another project manager's, as may the assessment of the client and any other member of the project team.

Hence, satisfaction is an aptitude (an effect or emotion), the extent of which is related to the rewards one receives (as noted in drive theory and in some of the need theories). Porter's (1961) approach sees satisfaction as the difference between what a person thinks s/he should receive and what s/he feels s/he actually does receive (see also Lawler, 1973).

Since success leads to satisfaction, the most straightforward relationship of goals to satisfaction is that the greater the success experienced relative to the goal set, the greater is the degree of satisfaction experienced. Similarly, dissatisfaction will be experienced when there is goal blockage or failure (Locke, 1976; Peters *et al.*, 1982). These conclusions follow from the principle that goals are used as value standards for appraising performance. This concept of a two-level (success–satisfaction) project outcome arising from the work of Vroom (1964) is shown in Fig. 4.

The first level outcome is goal attainment (i.e. the goal/performance discrepancy level). The valence of the first level outcome is dependent on its instrumentality to provide a second level outcome (a reward), i.e. if completing the job yields promotion (and if promotion is valued by the individual), then the valence of job completion is large because of the promotion (the reward it brings). Therefore project success is attaining the project goals (first level outcome), and participant satisfaction is the reward brought by goal attainment (second level outcome). Achieving the project goals (e.g. in terms of time, cost, quality) of a simple project is perceived differently by an individual compared with the achievement of a complex project, because of the different valences attached to the first level outcome.

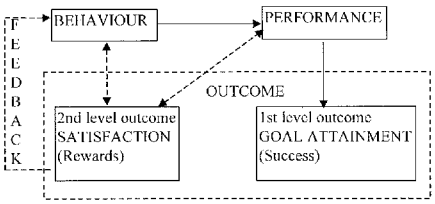

Figure 4 1st-2nd level outcome cycle

The relationship between the elements of the model in Fig. 4 are as follows. (a) The behaviour–performance relationship indicates that working at a particular task is intended to result in some acceptable level of accomplishment. Performance standards are set either formally or informally (by the project manager, supervisor or peers etc.) to allow an assessment of how well the individual is performing. (b) The performance–goal attainment link suggests that the project outcome is evaluated, i.e. the shortfall in performance which has led to the goal/performance discrepancy(the first level outcome). (c) The goal attainment–satisfaction link shows that the rewards granted for task performance yield personal satisfaction (second level outcome) through increased feelings of self-worth, achievement and accomplishment, recognition and competence. These further reinforce the project participant's motivation to improve performance. (d) The behaviour–satisfaction link suggests that the nature of the task itself, quite apart from its related results (goal attainment), can directly affect the person's feelings of satisfaction. If the work is interesting and challenging, personal feelings of accomplishment may result (Hackman and Oldham, 1980; Locke *et al.*, 1983). If the work is monotonous, negative feelings such as hostility are present. (e) The satisfaction–performance link is weaker and various researchers argue whether it should be satisfaction leading to performance or performance causing satisfaction (Henne and Locke, 1985; Lock and Latham, 1990). Luthans (1989) suggests that, although most people assume a positive relationship, the preponderance of research evidence indicates that there is no strong linkage between satisfaction and performance. This weaker link of satisfaction–performance in Fig. 4 is seen as relating satisfaction to performance via commitment, i.e. job satisfaction may increase the individual's commitment to the project and, therefore, will improve performance.

Project outcome evaluation

The need to evaluate the outcome of construction projects has been felt for many years and a number of attempts have been made to measure it. For instance, the project implementation profile measure (Slevin and

Pinto, 1986) and the measurement of satisfaction (Walker and Wilson, 1983). The issues inherent in evaluating a project's outcome include: (a) the definition of goals (depending on the purpose of evaluation and identity of evaluators, e.g. social versus economic benefits), (b) measurement criteria (rater or ratee criteria, e.g. rater judgement suggests evaluation is to be carried out by someone who is not involved in the project realization process such as the occupants who purchase or lease the completed building; ratee judgement suggests self-evaluation by the project team participants), (c) the identity of the evaluator (which claimant, e.g. the client, the architect), and (d) the measurement time frame (when should the outcome be assessed, e.g. at the end of project realization stage, at the post-occupancy stage?).

A framework suggested by Szilagyi (1988) for modelling evaluation recognizes five aspects. (i) Performance is not a single standard but consists of multiple criteria; therefore, evaluators must judge performance using multiple criteria with suitable weightings. (ii) The level of analysis of performance ranges from the individual employed in the organization to the users of the products and services produced by the organization and society in general. Therefore, different criteria have to be applied in evaluating each group concerned with the project. (iii) The focus of evaluation can concern maintenance (to maintain a specific level of activity), improvement (some changes in the performance are desired), and developmental (related to growth and advancement) goals. This means that performance evaluation must be set against appropriate goals. (iv) The time frame for performance, from short to long term, must be established. This relates to when goals are to be achieved. (v) How performance will be measured, ranging from quantitative (numbers can be assigned as values) to qualitative measures (opinions elicited through perceptual means), must be assessed. All of the above, especially the value judgement concerning what goals an organization should adopt and the process by which a judgement is made, are important considerations in evaluation. Whilst this framework was established for evaluation generally, their relevance to construction projects is clear.

However, value judgements on what outcomes are considered acceptable by decision makers often change over time and, not uncommonly, decision makers disagree, to varying extents, on the use of a given set of performance criteria to evaluate the effectiveness of the organization, units, projects or task. As pointed out by Hausser (1980), the purposes of the assessment must be examined to determine what perspective and frame of reference the model should reflect, what processes this model should describe, what outcomes it should predict and on what level of analysis it should focus. As a consequence, the value judgement concerning what goals should be adopted and the process by which that judgement is made can lead to widely differing methods of performance evaluation (Campbell, 1977). Subconscious awareness of such complexity which was not illuminated by a theoretical basis for understanding such complexity may have contributed substantially to the marked lack of will to evaluate completed construction projects which has been evident for many years.

Most studies on critical success factors (CSFs) in project evaluation have identified 'successful' projects for analyses very often on the basis of the respondents' (e.g. project managers') own level of satisfaction. The respondents' satisfaction can be affected by various extrinsic and intrinsic rewards as well as environmental variables, the nature of the project (both in type and complexity), the nature of a participant's organization (both in type and complexity), prioritization of project goals, self-efficacy, and commitment.

Because of these differences a set of CSFs may not be transferable from one project to another project. Only generic areas can be identified and used as broad guidelines. The CSFs of each project may vary subject to changing environmental variables within which the project is embedded; hence, there is no single best route to success.

The evaluation of the outcome of projects is analogous to organizational assessment, the field from which much relevant literature arises. Organizational assessment requires that the unique and conflicting definitions of performance be made explicit and that the organization analyst determines, at the outset, whose value judgements and criteria will be operationalized and measured. Thus, effectiveness if defined as 'the degree to which (an organization) realises its goals' (Etzioni, 1964) and, therefore, involves a comparison between the goal level and outcome level. However, to arrive at a consensus of goals, criteria and standards among all decision makers (or all those who are entitled to make a judgement on effectiveness by nature of their involvement in the organization) is quite unrealistic. This is akin to obtaining consensus amongst the client, the occupants and the contractor for a set of common criteria for measuring project success, i.e. a quest for the holy grail. Only by establishing common goals (often through compromise in resolving potential and actual goal conflicts) for an organization, whether a permanent organization or a temporary multi-organization, can measurement criteria acceptable to *all* be achieved, otherwise, project evaluation has to be done in context, i.e. based on an individual or a group of individuals with common perceptions.

Conclusions

The search for a theoretically sound basis for the evaluation of the outcome of construction projects has occupied construction management researchers for many years. In addition to its obvious practical benefit of providing the means by which a rational judgement can be made of the outcome of construction projects, it would also be of enormous benefit to researchers into project organizations, because the effectiveness of the project management process could be judged relative to the outcome of the project.

This paper argues that the theoretical base lies in the field of industrial and organizational psychology, which assists understanding by providing the behaviour-performance-outcome cycle and the particularly significant distinction between success and satisfaction and their relationship. These theoretical constructs provide the essential underpinnings that have been missing from earlier studies on the evaluation of project outcomes, which essentially have been technical in nature. Such studies did not recognize the manner by which individuals' perceptions of project outcomes were influenced by a range of factors, and which results in each person's perception being idiosyncratic. The identification of factors of influence such as self-efficacy, project complexity, commitment, expectancy, rewards, goals and environmental variables are shown to be fundamental in understanding an individual's perception of the merit of the outcome of a project.

For those who search for a single measure to represent the merits of a project outcome, the theory expounded here will give no solace as a method does not yet exist to aggregate all the participant's behaviour, performance and perceptions over all tasks and the project duration. Even if common goals could be agreed by all claimants to a project the problem of amalgamating perceptions would remain. Hence we are left with the ability to assess the evaluation of a project's outcome by individual participants to the project, or maybe by groups of individuals with perceptions which could be expected to be reasonably common, e.g. architects, structural engineers, member of the client team, if they were able to agree common goals.

To provide an overall assessment of a project's outcome, a profile of the evaluation of all individuals or groups of like-minded individuals would have to be presented. Such a level of examination facilitates comparisons across alternative procurement approaches to provide a macro-evaluation as well as allowing the micro-constituents to be evaluated individually. A whole range of different goals would underline their assessment. Once again goals are shown to be of primary importance. There is a clear essential to determine which goals are applicable and what the definitions of those goals are in order that appropriate measures may be employed. The variability and individuality of goal identification, definition, measurement and evaluation suggests that project critical success factors (CSFs) are likely to be highly individual and project-specific; a search for generally applicable CSFs may be misplaced.

From within the framework of project evaluation in this paper many further avenues of research emerge. Motivated behaviour, through expectancy and rewards, of construction clients, professionals and contractors should be investigated further, i.e., the intrinsic and extrinsic rewards which contribute to satisfaction need to be identified in the B-P (behaviour-to-performance) path. Further research is also required in the P-O (performance-to-outcome) path: e.g. the project goals needed for measurement of project success (including multiple goals, goal consensus and goal content) and the role and effect of the other components of project performance, like motivation and feedback.

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