

## **A General Framework for Gauging the Performance of Initiatives to Enhance Organizational Value**

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### **Abstract**

The project management literature argues that most projects fail, and yet, paradoxically increasing numbers of proposals for new initiatives attract funds. In order to resolve an apparent “investment-in-failure” paradox, this paper questions the methodology used in the literature to judge project performance and to decide on funding new projects. Using results from a field study, we describe a project performance framework that both expands and extends traditional approaches. We argue that the conventional test of project performance is not only fundamentally flawed, but also irrelevant to decision makers. In response, drawing on “principal-agent”, “regret”, and “contingency” theories, we propose a new methodology to assess projects based on the concept of “worth”. According to this approach performance is judged at three separate levels: project management, project ownership, and project investment. These three tests allow distinct judgments to be made about the respective performances of the project manager, the project owner, and the investment represented by the original funding decision. To the extent that financial crises are associated with project failure, such a framework may prove useful because it would support better investment decision-making.

## **1. Introduction**

Projects play a significant role in the global economy. For example, in 2001 25% of the world's \$41 Trillion (US) gross product was spent on projects (PMI, 2001). Turner (2009) estimates that thirty percent of the global economy is project based. Because of its significant size, the performance of the investment represented by this portfolio has far-reaching implications for the overall health of the international economy and its susceptibility to financial crises. It is this linkage between project investment and its potential implications for the scale and severity of financial crises that provides the motive for this paper.

Disturbingly there is strong evidence in the project management literature that projects fail more often than they succeed. If that view does indeed reflect the true state of affairs, then, because of its potential impacts on the world economy, the performance of the global project portfolio bears deeper examination.

Curiously, despite the consensus in the literature that most projects fail (Schmidt, Sarangee and Montoya, 2009), organizations continue to increase their investment in new ventures (Shenhar and Dvir, 2007). This observation presents an apparent “investment-in-failure” paradox (Ryder-Smith, 1998) that we seek to address with the following research question: Why do organizations keep funding initiatives to enhance business performance in the face of repeated failure?

Given the extensive and reliable evidence for both a high rate of project failure and growing investment by organizations in projects, we suggest that a likely explanation for the “investment-in-failure” paradox is that the tests on which the reported failure rates are based are flawed and that, as a consequence, the “true” underlying rates of failure may be lower than currently believed.

This paper analyzes the existing tests used in the literature to evaluate project performance, and argues that they are of little value in making any sort of judgment about

project success or failure to the funding organization because they are *process-oriented*. An immediate implication of this conclusion is that reported failure rates are irrelevant to funding decisions, which should be *investment-oriented*. We propose a conceptual model and assessment framework for projects based on the view that the success of an initiative is ultimately determined by its realized “worth” as gauged by the funding organization. Such an approach not only shows how judgments of success can be made more rigorous, but also how organizations should make their funding decisions if they are to optimize the value of their project portfolio. We then go on to consider the implications of this approach for the manner in which projects are appraised, managed and evaluated. The conceptual project model and performance measurement framework presented in this paper are supported by the results of a field study, also reported here.

## **2. Literature Review**

### **2.1 Project performance measurement**

Projects are the fundamental drivers of enhanced performance for organizations from individual businesses at one end of the spectrum, through to national economies at the other (Lewis et al., 2002). Underlying this important role is the fact that projects frequently involve product or process innovation (Damanpour, 2010). Recent research suggests that most projects fail to achieve their stated goals (Shenhar and Dvir, 2007; Zwikael and Sadeh, 2007). Failure of major projects can not only weaken the reputation and financial status of the funding organization, but also expose other organizations to economic hardship. Examples of apparent project failure include the Sydney Opera house which exceeded its estimated four year construction time by 10 years and its \$7M budget by \$95M (Jones, 2006), and the Hubble Space Telescope, which was sent to orbit with a faulty mirror (Dunar and Waring,

1999). The ICT industry is also known for an unenviable record of cost and schedule overruns (Zwikael and Globerson, 2004).

Most of the studies claiming high project failure rates use criteria related to the efficiency of output delivery whereby projects are considered successful when the primary outputs have been delivered according to certain criteria specified in the project plan. This myopic view has become cemented into conventional project practice as the “iron triangle” (or triple constraint) test of project success whereby performance is judged by the delivery of project outputs fit-for-purpose, on time and within budget (Dvir and Lechler, 2004). This widely-accepted test of project management success is primarily concerned with the efficiency of project output delivery (Lechler and Dvir, 2010) Such an approach sees a project as little more than a form of work that ends with the implementation of a “unique product or service” (PMI, 2004) where performance is confined to judgments about how well that work was executed. Table 1 summarizes some definitions of “project” that focus on outputs, (such as “product” and “deliverables”) or processes (such as “task” and “work”).

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Under the conventional view, a project is a special kind of process, which consumes resources (inputs) and produces an output. For example, organizational resources (inputs) are deployed to the development of (process) a new product (output). When linked in a diagram these same three elements provide us with a process view of a project, as is shown in Figure 1 (Smyrk, 1995). This representation is known as the Input-Process-Output (IPO) model (Chase, Jacobs, and Aquilano, 2006; Krajewski and Ritzman, 2005). The link between outputs and the process is an example of strong causality (Hicks, 1979). This means that the outputs will exist if, and only if, the process is executed.

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If the representation offered in Figure 1 is accepted as a definitive model of a project, then it appears reasonable to adopt performance criteria based on the elements displayed in the figure, (namely inputs, outputs, and the time taken to execute the process). Such a model is entirely appropriate for the metrics used by the business process improvement discipline because of the importance of efficiency in business operations. However when applied to projects the focus becomes problematic because it forces process improvement criteria onto conventional test of success, namely, delivery of outputs within constraints of quality, time, and budget (Scott-Young and Samson, 2008).

## **2.2. Shortcomings of existing performance measurement approaches**

The Input-Process-Output model of projects and the resulting iron triangle performance test have dominated discussion of project success for many years. For some time, concerns have been expressed in the management literature that this output-oriented view of project performance might be flawed (Shenhar and Dvir, 1996; Dvir et al., 1998; Cicmil and Hodgson, 2006). Practitioners are also exploring a broader view of project performance measurement, as is reflected in some of the current project management methodologies, such as PRINCE2 (OGC, 2007) used by governments and business in various countries, such as the UK, Australia, and New Zealand.

Others have argued that the problem of performance measurement is only the symptom, while the real problem lies with project definition and the methodologies used to guide their conduct. For example, Turner and Muller (2003, p. 1) claim that “classical definitions of projects are not wrong, just incomplete”. Others (such as Shenhar and Dvir,

2007; Turner, 2009) have made a wider attack on the discipline claiming that most literature on the management of projects suffers from a scanty theoretical basis and a lack of concepts.

A recent examination of this issue suggests that project success measurement tests are flawed because project definitions and methodologies ignore the generation and realization of benefits (Müller and Turner, 2007). In other words, the literature (and the project management profession) has become preoccupied with project deliverables, while neglecting their intended benefits (Ashurst, Doherty, and Peppard, 2008). As a result, *efficiency of process* (for example completion on time), rather than *effectiveness of investment* (by generating organizational benefits), is seen as the dominating performance metric. This gap between the business drivers of projects (which are presumably benefits-based) and the common methodologies, practices, and performance measurement frameworks that surround them (which are outputs-based) is widely recognized (for example Shenhar and Dvir, 2007). Despite this recognition, it appears that existing theories are incapable of bridging this gap (Zwikaël and Smyrk, 2011). In summary, while the underlying rationale for all projects is that they seek specific target benefits (Dvir and Lechler, 2004), benefits do not appear amongst the criteria used in most performance measurement systems.

Even in studies which consider benefits there is a general assumption that project managers should be held accountable for their realization (OGC, 2007; Malach-Pines, Dvir, and Sadeh, 2009). By way of contrast, Principal-Agent theory (Eisenhardt, 1989; Bozec, Dia and Bozec, 2010; Segrestin and Hatchuel, 2011) suggests that accountabilities for outputs and outcomes should be split amongst different stakeholders. The underlying principle here is that in a project, the role of “purchaser” (project funder) is to be separated from that of “provider” (project manager) (Turner and Muller, 2003).

An additional shortcoming of those papers in the performance measurement literature which consider benefits as a performance criterion is the widespread confusion between

benefits, outcomes and outputs (Nogeste and Walker, 2005). As a result, a number of approaches that claim to be outcome-oriented may simply be variants of an outputs based approach, and, accordingly of doubtful value in the current discussion.

### **3. Theoretical Framework**

Shortcomings in measures of project performance identified in the previous section support the need for development of an alternative approach. In order to establish fundamental principles for such framework, a series of hypotheses was proposed.

To represent the views of various stakeholders, performance measurement systems should be multi-dimensional (Bryde, 2005), and so the following hypotheses seek to identify different viewpoints and their associated performance criteria. A major stakeholder is the funder who commits funds and/or approves allocation of labor to the project. It can be argued that the funder is, in fact, the most important stakeholder of all because he/she alone decides on the release of funds which allows the project to be undertaken (Zwikael and Smyrk, 2011). Accordingly, the following paragraphs try to build on the existing literature to identify potential determinants of funder satisfaction with the investment in a project.

The management literature suggests that the criteria used to determine a project's performance are dominated by those related to the delivery of outputs to agreed quality, on time and within budget (Narayanan, Balasubramanian, & Swaminathan, 2011). Because such criteria would appear to be of considerable interest to the funder, we hypothesize therefore that efficient output delivery enhances funder satisfaction:

*H<sub>1</sub>: Efficient delivery of outputs is positively correlated with funder satisfaction*

Recent literature has suggested that efficient delivery of outputs is an incomplete measure of funder satisfaction with the investment in a project (Zwikael and Sadeh, 2007). A result of this line of argument has been the introduction of a long list of new performance

measures, for example ‘project effectiveness’ (as might be reflected in improved client performance), ‘customer satisfaction’ (with the results of the project), ‘impact on the customer’ (such as fulfillment of customer needs), ‘benefit to the developing organization’ (for example through the creation of new technological capabilities), and ‘business results’ (such as economic success) (Malach-Pines et al., 2009; Lechler and Dvir, 2010). An analysis of these proposed measures suggests that they are all specific instances of outcomes (Zwikael and Smyrk, 2011). Moreover, because outcome generation drives investment in new projects, we hypothesize that outcome realization is a major determinant of funder satisfaction with the investment in a project:

*H<sub>2</sub>: Outcome realization is positively correlated with funder satisfaction*

The above hypotheses recognize both efficient output delivery and outcome realization as measures of project performance. The governance literature suggests that performance is enhanced through the assignment of an accountability for each performance measure (Abednego and Ogunlana, 2006). While there is general acceptance that project managers are accountable for efficient output delivery (Zwikael and Ahn, 2011), the issue of accountability for outcome realization remains unresolved. We argue therefore, that assignment of an additional accountability for outcome realization enhances project performance. Hence, we propose that:

*H<sub>3</sub>: Assigning accountability for outcome realization is positively correlated with funder satisfaction*



#### **4. Methodology**

A survey was used to test the above research hypotheses. Project managers were asked to report on the level of importance of assigning accountability for outcome realization in a recently completed project. For the same projects their supervisors were asked to evaluate performance in three dimensions: efficiency of output delivery, level of outcome realization, and funder satisfaction with project results. In addition, the supervisors were asked to rate the importance of 16 project performance criteria to funders, including realization of target outcomes and efficient delivery of outputs. All items included in both questionnaires were measured on a five point Likert scale. For a full description of the items included in this study, see Zwikael and Smyrk (2011).

A call for participation in the study was sent to members of the Project Management Institute in the Asia Pacific region. Study participants were chosen because of their familiarity and involvement with the project environment and seniority in their organizations. A statistically representative sample of organizations was drawn from the different industries in the local economies. Out of the 102 responses received, 29 responses came from India, 16 from New Zealand, 15 from Australia, and the rest from different Asia Pacific countries. 20.2% of responses came from software organizations, 19.0% from services, 11.9% from engineering, 13.1% from government, and 8.3% from production organizations. Project duration ranged between 2 and 60 months with a mean of 1.3 years. 55.4% of the projects were undertaken for an internal funder within the same organization, while the others were commissioned by an external organization. 89% of responses were male. Based on their importance in the literature, we controlled for project duration (in months), project team size (in FTE), and level of project risk in the regression analysis (Zwikael and Unger-Aviram, 2010).

## 5. Results

To test the first two research hypotheses, we calculated the correlations among reported values of three performance measures: efficient output delivery, target outcome realization, and funder satisfaction. For each pair of measures, Table 2 presents the Pearson correlation coefficient and significance level (in brackets). These results show positive and significant correlations between ‘funder satisfaction’ and both ‘efficient output delivery’ and ‘target outcome realization’. We conclude, therefore, that the first two hypotheses are supported by the study and that funder satisfaction is positively correlated with both the efficient delivery of outputs and outcome realization.

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The last research hypothesis focused on the effect that accountability for outcome realization has on project success. For this purpose, the results of a hierarchical regression are presented in Table 3. Model 1 includes three control variables - project duration, size and risk, while model 2 also allows for the direct effect of accountability for outcome realization. Results suggest that accountability for outcome realization significantly improves project success.

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Results of this study support all three hypotheses and suggest that efficient output delivery and target outcomes realization are determinants of funder satisfaction with the investment in a project and hence both qualify as valid project performance measures. In addition, in order to enhance project performance these results suggest that along with the

accountability of project managers for output delivery, someone should be held accountable for target outcome realization. The remainder of the paper discusses and explores the results of the field study, describes a conceptual model of a project and suggests how this model might be used in the assessment of project performance.

## **6. The Outcome Generation Project Conceptual Model**

Results presented in the previous section suggest that in addition to the accepted focus on output production and delivery, outcome generation and realization should also play a significant role in assessing project performance. The following discussion defines the concept of “benefit”, distinguishes it from the two terms, “outcomes” and “outputs”, and then goes on to explore the causal relationships amongst these concepts.

### **6.1 Project benefits, outcomes and outputs**

Results of the field study support the argument that realizing outcomes can be viewed as an expression of the desire by a funder to create organizational value (Zwikael and Smyrk, 2011). The creation of value is widely regarded as a critical concern of strategic management and organization scholarship (Pitelis, 2009). Value is also a core element in the Resource-Based View (RBV) of organizations (Barney 1986; Collis and Montgomery, 1995). The term “value” is not well defined in the literature, nor is the concept of value creation well understood (Lepak, Smith and Taylor, 2007). Furthermore, there is criticism of a focus in the literature on value capture, rather than value creation (Makadok and Coff, 2002). Yet, despite all this, terms such as ‘use value’ and ‘exchange value’ are in common use (Bowman and Ambrosini, 2000).

Building on the study’s results we define a benefit as a “flow of value” that is triggered by the realization of a target outcome. A target outcome is defined as a desired, measurable end-effect that arises when the outputs from a project are utilized by certain

stakeholders. We define outputs as the artifacts that are produced from the work of the project. Take, for example, a project to improve a construction company's work practices so that its rankings in the national "safety league" move to the top 10 per cent. An appropriate output for this exercise would be *reengineered occupational health and safety procedures*, a target outcome might be expressed as *increased ranking in the safety league*, and a resulting benefit could take the form of *reduced workers compensation insurance premiums*. In special cases the target outcomes may well be expressed directly as benefits (and so the distinction between the two concepts is unnecessary). If benefits ("flows of value") arise from achievement of target outcomes ("desirable end-effects") and projects are funded to realize benefit streams, then the rationale for a project can always be expressed in terms of *generating target outcomes*.

Because outputs take the form of artifacts ("things"), they are properly described as tangible. Outcomes, on the other hand, take the form of end-effects, which although measurable, are, nevertheless intangible. Outcomes in general, and target outcomes in particular, can always be expressed as a change in the value of a variable associated with an end-effect. Because an outcome represents a change for the organization, its labeling should recognize this expected change. As a result, the wording used in the titles of outcomes will frequently begin with a participial adjective (loosely an "-ed" word such as "increased" or "decreased"), for example: "reduced production times", or "increased service levels". This approach is a generalization of earlier attempts to deal with desirable end-effects (Girotra, Terwiesch and Ulrich, 2007; Devinney, Yip and Johnson, 2010), as it accommodates both financial and non-financial outcomes. Table 4 summarizes the major differences between outputs and outcomes.

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## **6.2 A new definition of a project**

The conventional definitions of a project imply that they are undertaken to produce outputs (Table 1). As shown earlier, this narrow definition has led to flawed performance measurement tests. In order to develop a more meaningful measurement framework, we draw on the results of our field study—particularly the conclusion that benefits are critical to the project funder—to propose a new, somewhat wider definition which recognizes that a project is undertaken to generate benefits. This approach is consistent with the emerging view according to which projects are a means to creating change and achieving agreed organizational goals. Interestingly, an outcome-based definition suggested over 50 years ago, was, unfortunately, ignored until recently: “A project is an organization unit dedicated to the attainment of a goal” (Gaddis, 1959, p. 89). Recent management literature highlights terms such as “change” (Turner, 2009), “goal” (Shenhar and Dvir, 2007; Pinto, 2007), “objective” (Kerzner, 2009), and “result” (PMI, 2008) in project definitions - all suggest a distinct “non-outputs” focus.

Consistent with this significant shift in emphasis from outputs to outcomes, our proposed definition for a ‘project’ in this paper is: “A unique process intended to achieve target outcomes”. The next section builds upon the proposed definition to develop a conceptual model which explains how investments in projects turn into outcomes

## **6.3 The proposed project model**

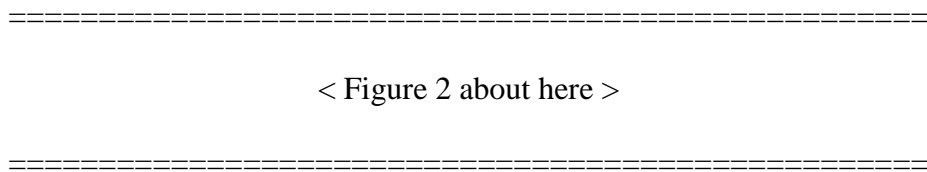
The theoretical foundations of the conceptual project model presented below accept a close relationship between target outcomes (a project’s desired end-effects) and the benefits

that represent flows of value that arise from achievement of those outcomes. The importance of outcomes from business initiatives has been recognized for some time in the organizational modeling literature. For example, the Logic Model (Savaya and Waysman, 2005), which integrates planning, evaluation, and action in organizations, suggests a sequence of steps to achieve a desirable impact. This sequence recognizes inputs, activities, outputs, and outcomes, leading to some form of beneficial effect. The Logic Model attempts to associate outcomes with specific changes in areas such as program participants' behavior, knowledge, skills, status, and level of functioning. However, it does not explain the mechanism by which outputs give rise to outcomes—thus ignoring any outcome generation mechanism.

The results of our field study and the proposed definition of a project suggest that the IPO model presented in Figure 1 be modified. The new structure represents the Inputs-Transform-Outcomes (ITO) model of a project, as shown in Figure 2. The ITO model is so named because it seeks to explain how inputs on the left are transformed into outcomes on the right (Smyrk, 1995). The left hand half of the ITO model is simply the IPO model—to which has been appended a utilization mechanism and a flow of target outcomes. The “left-to-right” chronology implied by the IPO model can now be extended as follows: the project's outputs are eventually delivered to someone who then utilizes them in a way that subsequently generates target outcomes. In the ITO model we propose a mechanism by which outputs give rise to outcomes—namely *utilization*. The entities who utilize a project's outputs in such a way as to generate target outcomes are called the project's *customers*. Because they are funded to effect some intended change, all projects should have corresponding target outcomes (explicit or implicit).

The chronology that underpins the ITO model can be made a little more obvious by showing a horizontal timeline. Under this view, the “work” part of the model (represented by the process ellipse) would have defined start and finish dates—obtained notionally by

dropping perpendiculars from the left and right hand extremities of the ellipse onto the X-axis, as shown in Figure 2.  $T_1$  represents the date on which the work of producing the project's outputs begins, while  $T_2$  indicates the date on which this work is complete. The difference between these two dates is the duration of the work required to produce the project outputs (which corresponds to the traditional view of a project's duration). The ITO model, however, suggests that duration is, in fact, somewhat longer, because a project can only be regarded as finished when a flow of target outcomes has been "secured" (Zwikael and Smyrk, 2011). Such an event must occur sometime after utilization has begun (following delivery of outputs), as indicated by  $T_3$ . Figure 2 shows the most general situation whereby utilization continues (and a corresponding flow of target outcomes is maintained) over an indefinite period into the distant future.



Unlike the *process* in the IPO model that converts resources into outputs, the *utilization* mechanism is subject to weak causality—which means that outputs and outcomes are merely correlated. Expressed another way: outputs, if technically feasible, can be guaranteed (although their delivery may violate time and cost constraints). Target outcomes, on the other hand cannot be guaranteed—for a variety of reasons they may or may not be realized in particular situations.

Target outcomes are "secured" when the actual flow of outcomes is no less than the target and there is evidence that it will continue above this threshold into the future. There is a contrasting scenario in which we would also declare the outcomes of a project as having been secured. This arises when the actual flow of outcomes is below target and there is evidence that it will not reach the target in the future.

Whereas the IPO model implies a single accountability (for delivery of the project's outputs), the ITO model suggests a second (for realization of the project's target outcomes). Consistent with a long-held principle of project management, we assign the first accountability to the project manager, but introduce a new role—that of project owner manager—who holds the second accountability. Theoretical justification for this assignment is discussed in full later in the paper.

The lead time that should be set for the securing of target outcomes (following delivery of a project's outputs) depends on the way in which utilization is expected to occur—and is therefore dependent on the particular outcomes targeted for the project. Clearly the timeframe must be short enough that key players would still be interested in making judgments about success. Take a quit-smoking campaign for high schools in a particular city. The target outcome *reduced smoking rates amongst teenagers* could be expected within months, whereas *increased awareness of the dangers of smoking* might be realized within days. At the other extreme, *reduced incidence of lung cancer* is likely to take decades and so would be unsuitable for targeting because a valuation of the success of the campaign 30 or 40 years later would be of little use (and even less interest) to any of the key players in the original initiative.

#### **6.4 An example of the ITO project model**

The following example demonstrates the use of the ITO model (as presented in Figure 2). A project is executed by a state health department to improve the overall performance of its hospitals. This has been triggered by a combination of (conflicting) budgetary and community pressures. As illustrated in Figure 3, five representative ITO components for the hospital project would be:



**Inputs.** Funds measured in dollars (arising from purchased-in products and services) and labor (representing the involvement of departmental staff assigned to the exercise), measured in person-hours.

**Process.** Reengineer critical hospital-related procedures (such as admit patients, perform surgery and discharge patients).

**Outputs.** A typical initiative of this kind would involve deliverables such as: new business and medical processes, new enabling technologies and new organizational arrangements.

**Utilization.** To achieve the objectives set for the exercise, all the outputs must be utilized by a number of stakeholders (known as the project’s customers)—the most prominent of which would be administrative and medical staff. Patients would also be involved in the utilization of certain outputs as well. Clearly, if the project’s customers do not utilize the outputs to a desired level, then the target outcomes (described next) cannot be generated.

**Target outcomes.** In this case, examples of appropriate target outcomes would include: reduced waiting time for elective surgery (measured for certain benchmark procedures), increased efficiency of hospital administration, reduced recovery times for patients and reduced rates of readmission. (It should be noted that if all these were adopted, some trade-offs may be necessary when setting targets for each).

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The delivery of outputs supports the realization of outcomes, but does not guarantee it. For example, if the new processes are not utilized by hospital staff because they are difficult to follow, the operational process will not improve and outcomes will not be realized. Lists of these two components (outputs and outcomes) when complemented with an overarching, succinct objective, make up the project’s statement of scope. In this illustration,

an objective might appear as “This project seeks to enhance the performance of the state health system.”

## **7. A Multi-Dimensional Framework for Gauging Project Performance**

Supported by results of the field study, in the previous section we have argued that when making funding decisions and measuring project performance, judgments about project success should involve consideration of the benefits realized by the venture. At the same time, important accountabilities for different aspects of the project also need to be judged. Based on results of the field study and the project conceptual model presented above, we propose in this section a three-layered framework of project performance.

Performance assessment of projects is a central issue in management research (Blindenbach-Driessen, van Dalen and van den Ende, 2010). Because the conventional definition of success is predominantly concerned with outputs-based evaluation, a project would be judged as successful if its outputs have been delivered—even if this has had no beneficial impact on the organization. For example, a logistics process with an enabling software system that was delivered to specification, on time and within budget, would, according to the conventional view, be judged as “successful” even if it did not lead to desired changes in selected performance metrics (such as delivery time). It is clear from this discussion that multiple views of success exist. We propose a “triple-test” framework incorporating three such views by recognizing separate levels at which (completely distinct) judgments can be made about project performance:

***Project management success.*** Represented by the project manager’s performance in achieving the project plan.

***Project ownership success.*** Represented by the project owner’s performance in realizing the business case.

***Project investment success.*** Represented by the actual value generated by the project overall.

Further analysis and comparisons of these tests are discussed in Table 5, which provides a generic framework for project success measurement. Because this framework includes three hierarchical levels of performance assessment, it is aligned with the general requirement that performance measures should vary according to their strategic intent (Manion and Cherion, 2009).

The proposed framework is aligned with (and extends) the benefit management literature (for example, Ashurst et al., 2008; Ward and Daniel, 2006; Peppard, Ward and Daniel, 2007) and also with project-strategic fit models (Benko and McFarlan, 2003). For example, Shenhar and Dvir (2007) provided an illustration of a project success criterion in the form of “increased business opportunities for the future”, which is an example of a specific valid target outcome from a project. The framework can also be viewed as part of the ‘success’ research school of project management, focusing on the implementation of organizational strategy (Bredillet, 2008).

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While the proposed measurement framework spans three levels within the funding organization, aligning these views of success with those held by an external contractor is more challenging. Public Private Partnerships, “Alliancing” arrangements, and other co-operative models have been proposed to deal with the underlying divergence of goals between the parties to a contract (Kwak, Chih and Ibbs, 2009). These approaches may be of limited value because they appear to assume that the entities involved face a single ITO model whereas, in reality the model faced by the funding organization and that faced by the contractor are quite distinct. The former holds the outcomes of the client, while the latter holds the outcomes of the contractor. For example, a government transport department’s high

speed train project could be expected to include target outcomes related to such variables as travel times and road congestion. By way of contrast, a contractor's outcomes will relate to fees (which appear as inputs in the client's ITO model). While approaches have been proposed that link the contractor's fees to the achievement of the client's outcomes, in practice this linkage is frequently weakened by the provision of revenue guarantees from the client. While in particular cases it may be possible to reconcile the target outcomes of the contract participants, in general they will be quite distinct—and the implications of this distinction must be acknowledged and managed accordingly.

### **7.1 Regression testing for measurement of project performance**

Regret theory of decision under uncertainty (Bell, 1982; Bleichrodt, Cillo and Diecidue, 2010) posits that people care not only about what they get, but also about what might have been obtained had they chosen differently. We propose therefore, that all three judgments of project success (described in the previous section) employ a regression test. The regression test takes an appropriate baseline document for the project (business case or project plan) and replaces certain parameters appearing in the original document (such as cost and target outcomes) with the actual values as measured at the conclusion of the project. We call the original document the “approved” baseline document and the document based on the actual values of key parameters the “realized” (or “achieved”) baseline document. The regression test takes the form of a specific question posed by whoever is judging success at the level under examination as discussed in the following three sections.

### **7.2 Project management success**

Results of the field study confirmed the importance of efficient project delivery. For project management performance the regression test is based on a question posed by the project owner “Do I regard the achieved project plan as *at least equivalent* to the approved

project plan?” If the answer is “yes”, then the project management (and the project manager) is judged successful; otherwise, it is judged a failure.

When using the regression test for project management, four criteria are of particular concern (all related to delivery of the outputs defined in the project plan): their fitness-for-purpose, the time taken, the costs incurred, and the triggering of any detrimental outcomes by the project manager. A detrimental outcome is defined as one that is undesirable, unacceptable and avoidable. It should be noted that while the first three of these criteria form the foundation of the “iron triangle” (PMI, 2008), without the fourth they cannot be used to judge success or failure.

### **7.3 Project ownership success**

Results of the field study show that effective outcome realization plays a central role in evaluating project performance. In order to gauge the project owner’s performance in realizing the business case, the regression test is based on a question posed by the funder “Do I regard the realized business case as *at least equivalent to* the approved business case?” If the answer is “yes”, then the project ownership (and the project owner) is judged successful; otherwise, it is judged a failure. The answer to this question is dependent on actual values of the following three measures that determine the ‘worth’ of a project:

1. Desirable outcomes (for example, reduced waiting times for elective surgery)
2. Undesirable outcomes (for example, increased staff turnover), and
3. Cost (for example, the outlays for purchases required by the project, the value of staff labor deployed to the project, and all future incremental costs associated with operating the project’s outputs).

The suggested approach is aligned with contingency theory, suggesting that organizational effectiveness is dependent upon the organization’s ability to adjust or adapt to

the environment (Thorgren, Wincent and Anokhin, 2010). Several studies have supported the relevance of contingency theory in the project environment (for example, Keller, 1994; Sauser, Reilly and Shenhar, 2009). In this context, it means that instead of all projects having similar success measures (such as developing new technologies or preparing for the future), they each require specific outcome measures that are peculiar to the organizational context in which the project is taking place.

#### **7.4 Project investment success**

Investment success is of concern to the funder who will be asking: “Do I regret having taken the decision to fund this project?”. This is equivalent to asking “was this investment successful?”. This question is also analyzed with a regression test, but in this case the question posed by the funder is: “Would I have been prepared to fund this project had I been given the realized (rather than the approved) business case?”. By focusing on the view that really matters (the funder’s), the investment success test is a complete generalization of traditional views that try to “balance amongst the needs of different stakeholders” (Turner, 2009: 67).

Figure 4 shows a plane defined by the two variables on which a project’s investment is assessed—worth and riskiness. Riskiness is defined more formally as the risk exposure to the project falling short of its intended worth - determined by the likelihood of reduced worth and the severity of that shortfall. The acceptance of a project with very high potential worth can have disastrous results if its level of risk is not taken into account. The plane is divided into two regions separated by a curve identified as the “project investment frontier”. Those combinations of worth and risk exposure that lie above (and to the left) of this frontier (for example, project “S”) would be considered as investment successes (because this is the region of acceptable business cases), while below (and to the right) - for example, project “F”

- should be regarded as investment failures (because this is the region of unacceptable business cases). We call this figure the Project Investment Evaluation (PIE) model.

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< Figure 4 about here >

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The PIE model offers a novel way of analyzing investments in projects, to complement existing approaches, (which are primarily concerned with the quality of the project management *process*). Organizations can use the model to improve business performance in general and reduce the risk of financial stress in particular. This allows them not only to evaluate the expected performance of (and hence rank) proposed projects that compete for resources, but also confirm that a proposed project falls to the left of the “project investment frontier”.

## 8. Discussion

Poor judgments surrounding a number of (now infamous) initiatives (such as the creation of exotic financial derivatives based on high-risk loans) appear to have been a significant trigger for the recent global financial crisis (Leony and Romeu, 2011). The methodologies used in most empirical studies to judge the performance of such initiatives are preoccupied with the efficiency of project output production and delivery, using variations of the ‘iron triangle’ (time, cost and scope/quality) as a single test for “project success” (Shenhar and Dvir, 2007; Zwikael and Globerson, 2006). This paper proposes instead that distinct judgments about success should be made at each of three levels: project management, project ownership, and the investment represented by the project. We argue that, in its most common form, the accepted approach is fundamentally flawed. Firstly it must be modified by acknowledging detrimental outcomes before it can be applied to judgments about project

management success. Secondly, even after such modification, it is inadequate for making judgments at the other two levels (related to ownership and investment success respectively).

The separation of project success dimensions into three is important because each is measured in its own way by different players, at different stages in the project life and for different purposes. The following examples illustrate the implications of this view for some well-known projects, all suggesting results that conflict with conventional wisdom.

The project manager of the first generation of the Ford Taurus was demoted because the project was completed six months later than scheduled (project management failure). However, despite this apparent project management failure, because the initiative is generally regarded as a commercial success it is reasonable to draw two inferences. The first is that the actual results are consistent with achievement of the original business case (or something close to it) indicating project ownership success. The second is that the funder (the Ford Motor Company) was probably satisfied with its return on investment in the project (investment success) (Shenhar and Dvir, 2007).

In a similar vein, the Sydney Opera House in Australia is an iconic building, and a UNESCO World Heritage Site for which its architect (Jørn Utzon) received the 2003 Pritzker Prize, architecture's highest honor. Much of the phenomenal increase in the number of visitors to Sydney over the past few decades (Colbert, 2003) has been attributed to the existence of this landmark. The impact on tourism (and other related measures) leads to the conclusion that, if judged by its effectiveness, the construction of the building has been (at the very least) an investment success. A judgment about the second level (project ownership success), is more problematic because no business case (as we understand that term today) is available and so the question “Was the original business case realized?” is almost impossible to answer. By way of contrast, when judged in terms of the efficiency of its project management process, the exercise can only be described as a catastrophic failure—given its



time and cost over-runs (Jones, 2006). We might conclude that, despite the project management failure, as an overall venture the Sydney Opera House appears to have been a successful investment for the state government.

The Hubble Space Telescope is an interesting example of investment success (because of the widely held view amongst members of the astronomy community that it has realized outcomes of significant scientific value), combined with project ownership failure (due to its delivery with a faulty mirror) and project management failure (due to budget and timeframe overruns, together with the failure of the original mirror) (Dunar and Waring, 1999).

The above cases confirm that, when judging new initiatives, the efficiency of the project management process plays a limited role in a context that is primarily concerned with the creation of organizational value throughout realized benefits. In other words, performance measures for project ownership and investment (concerned respectively with achievement of the intended business case and the effectiveness of the investment in the project) are relevant to investment decision-making whereas tests based on the efficiency of output delivery are not. We believe that the concept of investment success is novel because it has received little, if any, attention in the literature—at least as far as projects are concerned (e.g., Irani, 2010). While the other two concepts (project ownership and project management success) are now starting to appear in the management literature (albeit in an embryonic form and not necessarily with those names) (e.g. Turner, 2009), there appears to have been little progress towards reconciling the three views outlined here.

The three layers of project performance tests may also explain the “investment-in-failure” paradox described in the introduction to this paper. Investment decisions will be influenced by funders’ perceptions of rates of investment success/failure—rather than rates of management success/failure. Unless the underlying rates of investment failure happen to be

“near” the claimed rates of management failure (an empirical issue not addressed in this paper), then there could well be no “investment-in-failure paradox”.

### **8.1 A new project phase: outcome realization**

Because conventionally, projects are regarded as complete when outputs have been delivered (PMI, 2008; Kerzner, 2009), they are commonly broken into three phases: initiation (when an idea is approved to become a project), planning (when approval is given to begin substantive work), and execution (when project’s outputs are produced, delivered and implemented). Initiation results in a business case on which a funding decision is based, planning results in a project plan on which a decision to start work is based, and execution results in assembly of the project’s outputs.

Results of our field study suggest that outcomes are relevant as criteria for performance evaluation. Consequently, we suggest that, conceptually, a project’s life should be extended (beyond execution) to accommodate outcome realization and measurement. Outcome realization is an additional phase of a project whereby, through a program of appropriate intervention, attempts are made to secure the flow of target outcomes within an acceptable period of time.

### **8.2 The role of the project owner**

While the project manager has always been accepted as accountable for the delivery of project outputs (within certain constraints), the ITO model raises the issue of accountability for target outcomes. Accordingly, we propose a new role, that of “project owner” who (according to agency theory) becomes the funder’s agent (Walters, Kroll and Wright, 2008). Just as the project manager dominates the execution phase of a project, the project owner dominates the outcome realization phase. As the funder’s agent, the project

owner will be held accountable for the realization of the approved business case in general, and for the realization of target outcomes in particular.

While results of our field study confirm the need for accountability for outcome realization, a discussion is yet required as to who should fill this role. For a number of reasons, the project manager is (except in trivially small exercises) disqualified from such an appointment. One of these relates to potential conflicts between the interests of the funder and the project manager in the project. Another relates to the suggestion that project managers usually have a mindset that better suits output delivery, but not the realization of organizational benefits (Kerzner, 2009). A third arises from the fact that a project manager is a transient position—to which the attachment of long-term accountabilities may be most inappropriate (in fact, project managers are frequently appointed from outside the funding organization on a short-term contract).

Projects that include “operational” outputs are of special interest. We define an “operational” output as one which will be deployed into an operational environment for ongoing, day-to-day utilization. Operational outputs continue to generate target outcomes into the distant future. Examples include: new business processes, logistics infrastructure, manufacturing facilities, a new customer support centre and a new vehicle maintenance workshop. Because the bulk of target outcomes generated by such outputs will flow from an operational (rather than a project) environment, a strong case can be made to have the responsible operational manager appointed as project owner. For example, if a project is to re-engineer hospital processes, so that waiting times for elective surgery can be reduced, it would be appropriate to appoint the general manager (or a representative) as the project owner.

This separation of the roles of project manager and project owner can be used as the foundation for a project governance model in which the project owner becomes the project

manager's client and the project manager becomes the project owner's supplier. Such a separation also removes some constraints on the appointment of a project manager—who may well be contracted from outside. Because the project owner acts as the funder's agent, he/she must be appointed from within the funding organization. The project owner tables the business case for approval by the funder and, accordingly is held accountable by the funder for its eventual realization.

### **8.3 Practical implications**

This paper has five major implications for management practice, all of which could go some way towards enhancing the performance of the global project portfolio (and hence reducing the susceptibility of the global economy to investment-induced crises). The first implication involves incorporating a new key role (that of project owner) into models of project governance. The second relates to dividing project accountabilities amongst the funder, project owner and project manager. The third concerns enhancement of performance measurement frameworks by splitting the concept of project success into three distinct layers—applying to the funder, owner, and project manager. The fourth pertains to designing investment portfolios—so that a comparison of all funding opportunities uses the PIE model for worth-riskiness analysis introduced in this paper. Finally there is a requirement to clearly identify and define clear target outcomes for each approved project with an attached accountability for their realization.

## **9. Conclusions**

Organizations are concerned with measurement of performance, especially the extent to which desired benefits are realized from newly funded initiatives. The “triple-test” project performance measurement framework presented in this paper is aligned with a multi-

dimensional framework that “balances various stakeholder perspectives” (Devinney et al., 2010; Bryde, 2005). The common efficiency/outputs-based measurement of project performance plays only an incidental role in project investment decisions. That organizations appear preoccupied with the delivery of project outputs is readily explained as a desire to realize target outcomes sooner rather than later, and hence can be viewed as an expression of the desire to generate value from project investments.

Potentially fruitful areas for future research appear to include: validation of this conceptual model in different organizational contexts, and measurement of actual levels of performance using the three different tests. Other management studies might explore the potential impact on organizational behavior theory arising not only from the assignment of separate accountabilities for various measures of success, but also from the formal recognition of an outcome realization phase in projects. Finally, because a wider definition of project performance leads to a richer range of success criteria (Bryde, 2005), future research may also further expand our knowledge in this direction.

In summary, poor performance of projects is considered to be a major contributor to financial crises. To address these flaws, we have proposed the Project Investment Evaluation (PIE) framework for project performance measurement and the triple-test of project success. The approach to project assessment based on these devices may assist organizations not only in the enhancement of organizational value, but also in reducing their exposure to financial crises.

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<b>Source</b>	<b>Project definition</b>	<b>Output/Process-Oriented Terms Included in the Definition</b>
Project Management Institute (2004)	Temporary endeavor undertaken to create a unique product or service	Product, Service
Meredith and Mantel (2012)	A specific, finite task to be accomplished	Task
Lewis (2000)	A project is a one-time, multitask job that has clearly defined starting and ending dates, a specific scope of work to be performed, a budget, and a specific level of performance to be achieved	Scope of work
International Project Management Association's Competence Baseline (2006)	Time and cost constrained operation to realize a set of defined deliverables up to quality standards and requirements	Deliverables

Table 1. Project definitions focused on outputs and their production

	<b>Mean</b>	<b>S.D.</b>	<b>(1)</b>	<b>(2)</b>
(1) Efficient output delivery	3.93	0.99	1.000	
(2) Target outcome realization	3.68	1.10	.567*** (.000)	1.000
(3) Funder satisfaction	3.76	0.97	.400*** (.000)	.317** (.003)

Table 2. Correlations among project performance variables

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

Variable	Funder satisfaction	
	Model 1	Model 2
Project duration	-0.190	-0.154
Project team size	-0.026	-0.012
Level of risk	0.221	<b>0.268*</b>
Accountability for outcome realization		<b>0.281**</b>
Total F value	2.915 (3,76)*	4.075 (4,75)**
F change		6.879 (1,75)*
R squared	0.103	0.179
R squared change		0.076

Table 3. The impact of outcome accountability on funder satisfaction

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

<b>Characteristic</b>	<b>Output</b>	<b>Outcome</b>
Intention	What is to be delivered?	What effect is being sought?
Form	Artifact	Measurable end effect
Specified by a...	Set of values for all critical fitness-for-purpose features	Set of specific attributes (characteristics)
Labeled with a ...	Noun	Participial adjective
Creation mechanism	Production or delivery	Generation or realization
Certainty	Production can be guaranteed	Generation cannot be guaranteed
Manageability	Production can be controlled	Generation can only be influenced
Measurement	Through fitness-for-purpose features measured in quality tests	Through one or more measures (with defined units and dimensions)
Tangibility	Tangible	Intangible (but measurable)
Appearance	Impossible without execution of process	In certain cases possible - even if process is not executed
Lead time	Available immediately after process is executed	Delayed until some time after execution of the process
Example	A suite of re-engineered hospital processes	Reduced waiting time for elective surgery

Table 4. Outputs versus outcomes



<b>Level of test</b>	<b>Project management success</b>	<b>Project ownership success</b>	<b>Project investment success</b>
Who judges?	Project owner	Project funder	Project funder
Who is being evaluated?	Project manager	Project owner	The investment
What is judged?	Achievement of the project plan	Realization of the business case	The effective “return” on the investment in the project (in the form of desirable outcomes)
Relevant criteria	<ol style="list-style-type: none"> <li>1. Time</li> <li>2. Cost</li> <li>3. Scope/quality</li> <li>4. Detrimental outcomes</li> </ol>	Achievement of the approved business case.	Acceptability of the realized business case.

Table 5. The triple-test performance measurement framework for project success

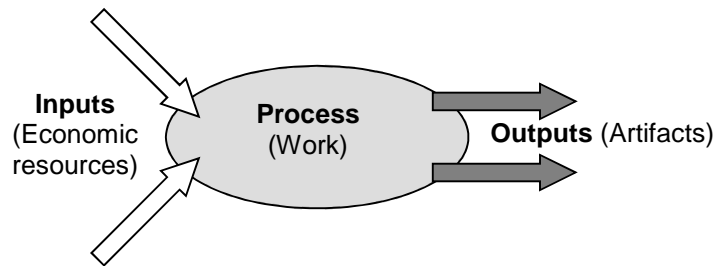


Figure 1. The Input-Process-Output (IPO) model

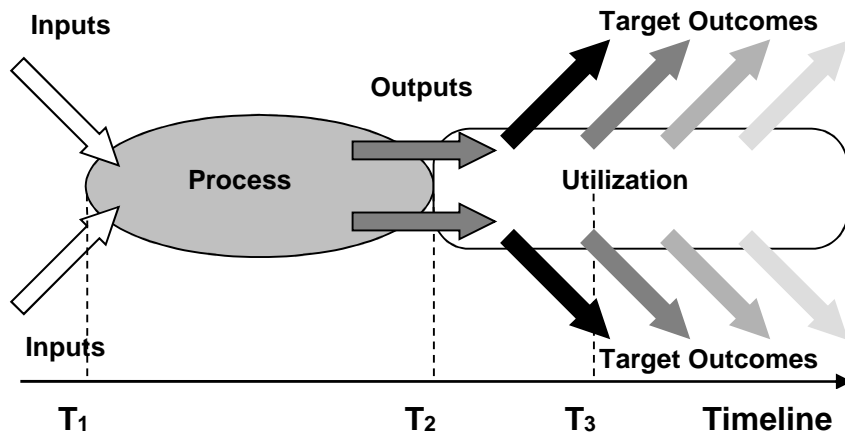


Figure 2. The ITO (Inputs-Transform-Outcomes) project conceptual model (Zwikael and Smyrk, 2011)

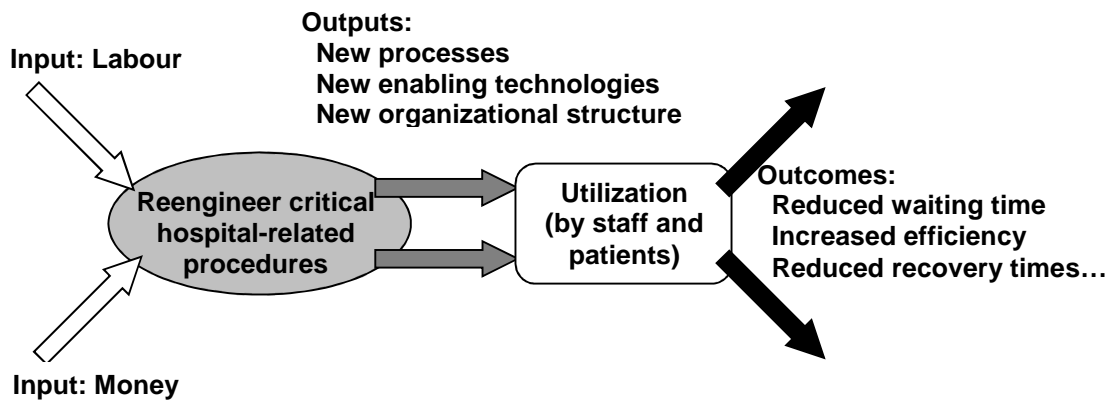


Figure 3. The ITO model of an illustrative hospital project

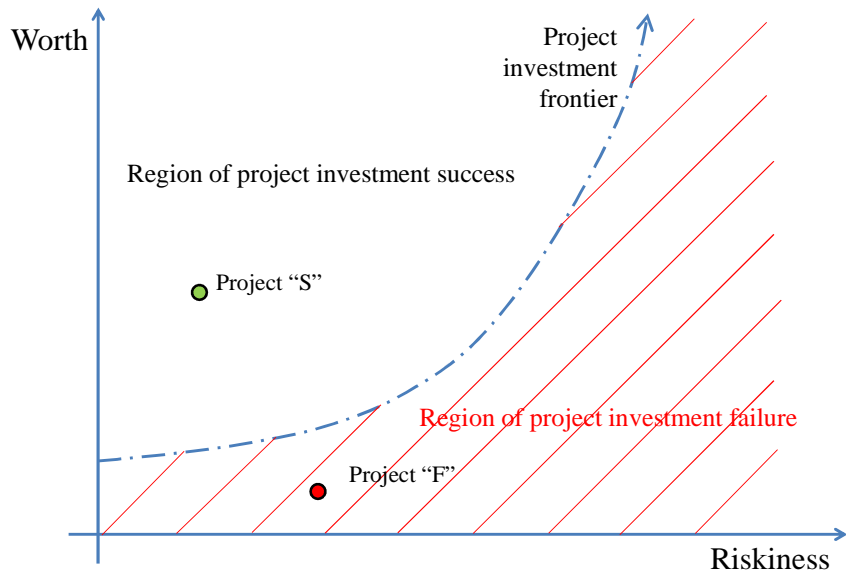


Figure 4. The Project Investment Evaluation (PIE) model for analysis of project investment success (Zwikael and Smyrk, 2011)