Abstract no: 002-0178

"Development of a Performance Measurement Tool with Moving Targets: An Application to Projects"

Second World Conference on POM and 15th Annual POM Conference, Cancun, Mexico, April 30 - May 3, 2004

Dr Nicky Shaw
Leeds University Business School
Western Campus
Leeds
LS2 3YY
nes@lubs.leeds.ac.uk
Tel: 0113 3436848
Fax: 0113 3434465

Mr Adrian Peel
Kellogg Brown and Root Ltd. (KBR)
Hill Park Court
Springfield Drive
Letherhead
Surrey
KT22 7NL
Abstract

The literature on performance measurement systems and frameworks is extensive and documents clearly the myopia of relying predominantly upon financial measures. A wide range of frameworks have been developed over the years to address this, yet many organizations still struggle to identify meaningful metrics with which to populate an individual framework.

The work presented here reports the development of a multi-criteria performance measurement framework, specifically to help measure customer perceptions as well as monitor performance generally, and adopts a five-dimension radial plot. The work is unusual in that as individual metrics are identified it encounters difficulties peculiar to the context of projects. Considerable time was spent identifying the performance criteria, recognising that targets specified at the outset of a project could change considerably; this frequently rendered original performance targets redundant. Any change of project scope was typically re-negotiated and new performance targets agreed with the client as the scope of emergent work became more definable.

1. Introduction

The use of balanced, structured performance measurement systems (PMSs) is well recognised as good practice by academics and practitioners alike and has been published in the literature for a number of years (Kaplan and Norton, 1992), (Medori and Steeple, 2000), (Neely et al., 2000). The significance of individual performance metrics is also clearly documented in the literature for a number of reasons. The measurement activity can help focus attention on a particular issue (Eccles, 1991). It can also influence behaviours; depending upon the metric,
behaviours may be positively targeted towards an area of performance weakness but, more negatively, could encourage more myopic behaviours to the detriment of performance at the system level. The idea that a well respected performance measurement framework removes the danger of adopting ineffective metrics is not born out in practice (Shaw and Peel, 2003).

Most of the performance measurement literature focuses upon the system behind the performance requirements, recommending frameworks such as the Balanced Scorecard and Performance Prism (Kaplan and Norton, 1992), (Neely et al., 2000). This is a sensible way of dealing with the fact that an individual organization’s performance metrics will be very context specific, but that at a more strategic level many firms will have overlapping performance objectives resulting in PMS synergies.

1.1 The Project Environment

Projects are by their very nature unique. At one extreme a project will occur only once and may be immensely complex, such as the Channel Tunnel between the UK and France, whilst at the other extreme projects may afford some repeatability albeit in different locations and perhaps under different conditions (Chase et al., 2004). This uniqueness does not create difficulties for measuring certain elements of performance; different techniques and software programs exist for monitoring projects, such Critical Path Analysis, specifically to track time and cost slippage and resource allocations. Incorporating performance against variable time and cost objectives in to a broader multi-criteria PMS can present difficulties, however.
2. Background

The context for this research was a major alliance between two engineering companies providing project management and consultancy services to a UK utilities provider. This Alliance was involved in managing the upgrade and maintenance of assets across one UK county. The Alliance was interested in developing a PMS that would embrace the delivery of its range of services and also gather feedback from its customer regarding perceptions of their performance. To complicate this and as is common with project operations, emergent work, renegotiated changes and new agreed project targets (typically involving extensions to schedules or increasing costs) were regular occurrences.

At one level, the overall programme of work with the UP was itself considered a ‘project’, that being a unique operational context for both the Alliance parent organizations. Individual ‘asset projects’ numbered approximately one hundred for the overall programme and did inevitably involve some repeatability, although projects varied in size from studies to full project management of ‘new build’ activities. This afforded some standardisation at the business process level; the geotechnical and demographic variation surrounding each asset project however, was significant. Consequently individual project costs, schedules, risks and likelihoods of slippage were quite different.

Whilst some performance measurement did take place, the Alliance did not employ any specific, cohesive framework to guide metric derivation or to collate measurements. Metrics did not reinforce organisational strategy but they did recognise some elements of performance particularly important to the UP. The Alliance was therefore interested in developing a PMS that would help identify customer perceptions of performance across a range of projects,
whilst also recognising the difficulties of performance target specification in the project environment.

3. Methodology

Given the applied nature of the research, an Action Research (AR) approach was adopted involving consultations with the Alliance and also the UP for both the development of, and feedback on the performance measurement framework. The principle of AR is that practitioners as well as researchers are involved in the process of research and that some tangible change, or action, occurs as a result of the work (Reason and Bradbury, 2000), (Coughlan and Coghlan, 2002). First, discussions between senior Alliance managers were facilitated during the early development of the framework. The framework was then trialled on five major projects, both past and close to completion, requiring data to be gathered from the Alliance for current projects, and the Alliance and UP for finished projects. Feedback on both parties’ perceptions of project performance, as well as the framework itself, was obtained.

Considerable time was spent identifying the high-level performance objectives for the Alliance overall and for its projects. A multi-criteria performance framework was selected adopting a polar or radial plot (see Slack et al., 2001) as this was felt most appropriate by the Alliance and also simplest to visualise. This was important to the Alliance given the levels of complexity anticipated and the need for performance information to be interpreted by a wide range of project managers and other staff.
First, the strategic level performance objectives were identified with the help of senior managers at the Alliance. Slack et al.'s (2001) original diagram adopts: ‘quality’, ‘speed’, ‘dependability’, ‘cost’ and ‘flexibility’. It was felt that ‘dependability’, typically taken to mean ‘keeping the promise’, was not especially helpful here as a discrete objective given that targets changed frequently; in its place Health and Safety (H&S) was adopted, given its importance to both the construction industry and the UP in particular. H&S is in reality considered a prerequisite and it was decided to capture it as a performance objective at both the strategic and project levels, although the metric posed some difficulty in definition. The decision was made to interpret ‘speed’ as an objective reflecting whether schedules were adhered to and thus was replaced by the performance objective ‘time’. It was suggested that at the strategic level ‘agility’ would better represent the nature and extent of any flexible working requirements (whilst maintaining ‘flexibility’ at the project level), which managers agreed with. The remaining objectives of quality and cost were unchanged.

The aim was to partially populate the strategic level performance framework with information gathered at the project level. This meant that a high degree of synergy was required between the two levels. It was felt that averaging out the project performance data would suffice initially, although it was recognised that the detail would require refinement. It was also noted that performance in ‘flexible’ and ‘agile’ working did not map particularly well between projects and the strategic performance of the Association. Consequently a subjective measure was adopted for both at this stage, allowing an interpretation of perceived project level flexibility to inform overall perceived agility of the Association. The PMS structure looked as shown in Figure 1:
Research focused predominantly at the project level and the performance framework made use of three questionnaires gathering broadly the same information from the perspectives of:

1. project targets
2. the UP’s perception of performance against those targets, and
3. the Alliance’s perception of performance against the targets.

A number of questions were asked against each objective and averaged (recognising the possibility of weighting objectives in future). An Excel spreadsheet was developed to automatically generate the plots; this had to be kept simple in order for on-site use of the framework to be encouraged.

3.1 Metrics

The identification of metrics to support the radar diagram performance objectives was fulfilled via a number of meetings where the use of uni- and bi-directional axes were discussed for each objective. These are presented below:
Cost: was a surprisingly difficult concept given the high likelihood of changes during the project. The final question was asked bi-modally with ‘1’ indicating a more severe overspend, ‘3’ indicating on-budget and ‘5’ an underspend, illustrated by percentages rather than actual monetary values in order to maintain comparability across projects. The target against which performance was assessed was the latest agreed figure; the ‘original’ target adopted for the polar plot therefore, was always ‘3’, thus removing the need to specify what the latest figure actually was. Note also that ‘5’, although increasing on the axis, represents the achievement of lower cost. This convention was adopted to maintain a consistent view that a physically larger profile on the plot illustrated high performance and vice versa. The cost objective applied only to the Alliance’s fee. However, the Company also managed significant budgets for each project (for subcontractors and so on) which could easily have been included within the cost objective.

Flexibility: was a difficult concept for participants to grasp and remained a subjective measure indicating simply ‘an ability to adapt’ to unforeseen changes on a scale of 1 – 5. Typical considerations when populating the final performance framework included the time to develop a new solution and time to obtain the resources to deal with, any changes.

H&S: a substantial amount of work took place to identify a meaningful series of questions representing H&S, with only moderate success. The Alliance was not exposed to many H&S risks themselves but were clearly associated with accident rates of any subcontractors within each project. This presented an issue regarding contractors’ responsibilities, to which one potential solution was to deal with contractors by measuring against the same H&S metric. Equally, it was important to the Alliance that the UP have the perception of H&S issues being actively managed. The need for comparability across projects and also to capture specific issues / learning points from any H&S incidents,
prompted both a quantitative and qualitative approach for this performance objective. A metric identifying the number of days lost over the project and also the total number of incidents was adopted, using a ‘5’ as ‘none’ for each metric. An issues sheet was also developed to record any contextual H&S problems during a project.

- Quality: comprised five metrics including subjective assessment of how appropriate the original project specification was and whether there had been any deviations from it, through to the quality of the relationship between the Alliance and UP, appropriate levels of communication and so on. The latter two metrics attempted to recognise the significance of the relationship in longitudinal project work and its importance to the Alliance in securing future work by capturing the customer’s current level of comfort with the relationship.

- Time: as with ‘cost’, project schedules often changed and the same convention was adopted where ‘1’ was a significant delay, ‘3’ was on time and ‘5’ an early completion. Again the positive outcome of finishing early was represented as a ‘5’, going outwards on the radial plot.

Finally an open-ended question was also asked of both the UP and Alliance upon project completion, so that any specific learning points could be documented with respect to overall performance.

4. Results

Having identified the three different perspectives for performance monitoring – the original targets plus the UP’s and the Alliance’s perceptions of performance against them – and also the specific metrics against each performance objective, it was necessary to trial the PMS.
Five projects were selected that had recently finished or were near to completion. In each case the cost and schedule ‘original target’ values were identified as those last agreed i.e. after the latest agreed project targets. In each project the Association gave its perspective on its own performance, acknowledging that this was the most likely performance where the project had not quite finished. The UP was only consulted where projects were actually completed.

Questionnaires were administered face-to-face with the Alliance Project Manager (for both identification of original targets and perceptions of performance against them) and with the UP Project Recipient (for the customer’s perception of performance). Explanations were offered as necessary, particularly for the interpretation of ‘flexibility’ and detail around H&S. Once gathered, the data was placed in the Excel spreadsheet, responses averaged where more than one question was asked under a single objective and a radar plot generated. An example plot is shown in Figure 2.

One surprising issue was that the Alliance Project Manager and UP Project Recipient were not always aware of the most recently agreed targets, these having been established at a more senior level by both organizations. This coloured judgements of performance, usually to the detriment of the Association. As might be expected, the Alliance’s self-perception of performance was higher than the UP’s. The Alliance was surprised by the findings but
recognised that in most instances, the performance gaps were reasonably justified. Significantly, the results highlighted that the relationship between the two organizations was being tested in avoidable ways, typically through poor communication and a misinterpretation of why a delay had taken place. Both the Alliance and UP expressed some concern over the complexity of measuring some of the performance objectives, but also that the visual representation worked well.

5. Summary

This work has investigated the use of a multi-dimensional performance measurement framework in the project environment where targets may change before completion. A framework was developed and trialled on a number of projects of a project management and consultancy organization providing services to a UK utility provider. This paper discusses the method adopted to develop the tool as well as some of the issues raised throughout the research process. The work is applicable to any organization working in the project environment.

The complexity surrounding the level, nature and frequency of emergent project work has presented difficulties for the representation of performance targets. The process of developing performance objectives however was useful and the input of stakeholders perceived beneficial by the Alliance overall, as echoed by (PASC, 2003). The use of subjective measures for ‘flexibility’ was not particularly successful, but has at least introduced the possibility of such an approach, which until then had not been entertained.
Using bi-directional axes to deal with core objectives of cost and time (speed) seemed to work well. It was decided that using a percentage figure for cost and time deviation would facilitate better compatibility across projects, as well as averaging out for consideration of performance at the strategic level.

The issue of ambiguity around the outcome of the latest agreed project performance targets, on both the part of the Alliance Project Manager and UP Project Recipient, was a cause for concern. This highlighted that communication between client, supplier and the front line staff needed to be improved in order to help make sense of the performance measurement process and also to improve the customer-supplier relationship. Another perspective however, would be to ask why so many changes to the performance targets had to be agreed. Did it signify particular deficiencies in the project specification, costing processes or scheduling processes, for example? Or did it reflect that initial information of project scope provided by the UP was inadequate? This was raised as something for the Alliance to investigate in the future.
References


