

THE CONSTRUCTION PROJECT BALANCED SCORECARD

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The performance measurement criterion for construction project success has traditionally been founded on cost, time and specification. Present day performance management systems encourage a holistic outlook for the evaluation of project efficiency. Systems have evolved from what was essentially an accounting method of performance measurement into a heterogeneous range of performance statistics each specifically intended to assess various attributes of organisational importance. The literature review reflects on the philosophy of a performance management system and its relevance within current industry practice. The potential application of contemporary performance management models purposely tailored for the measurement of individual construction project 'well-being' is examined. Two well-known performance management frameworks, the EFQM Business Excellence Model and Kaplan and Norton's Balanced Scorecard are assessed for their appropriateness within the field of construction management. The resultant case-study adopts a balanced scorecard format, mapping carefully selected Key Performance Indicators (KPI) from the Constructing Excellence in the Built Environment KPI pack with the four inter-related business perspectives advocated by Kaplan and Norton. Research findings suggest the adaptation of performance management systems for project appraisal have potential benefits for construction managers. Project performance can be evaluated from numerous stakeholder viewpoints, accentuating discrete measures of performance. Collectively, the results highlight project strengths and weaknesses within a pragmatic performance measurement framework. Furthermore KPI assessment across a number of construction projects discloses organisational trends that may otherwise not be so readily evident. The application of a construction project Balanced Scorecard aligned with the established practice of performance goal-setting may also facilitate the introduction of project team-based reward initiatives. The innovative construction project performance template also endorses a number of important management principles, including performance management, organisational learning, best practice, benchmarking, project monitoring and control.

Keywords: balanced scorecard, EFQM, key performance indicators, measurement framework, performance management.

INTRODUCTION

The official UK definition of construction activity "includes general construction and special trade construction for buildings and civil engineering, building installation and building completion. It includes new work, repair, additions and alterations, the erection of prefabricated buildings or structures on the site and also constructions of a temporary nature," (National Statistics, 2003). Industry turnover is in excess of £100

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billion per year, GDP is above 8%, (DTI, 2005) and an estimated 2.2 million people are employed in the UK construction sector, (HSE, 2006). Industry statistics both in terms of turnover and employment positions the construction sector as an economic barometer and indicator of domestic well-being. A fact commonly acknowledged by the UK Government, commenting that “the sector has a profound influence over our quality of life at home and at work,” (DTI, 2002). However, the DTI (2002) have also stated that the performance of the construction sector must improve. The UK construction industry has a long history of reports bemoaning the level of performance, (Leiringer *et al.*, 2005). In the past the construction industry has been accused of being wasteful, inefficient and ineffective, (Beatham *et al.*, 2004).

Research Rationale

Traditional performance management systems typically emphasise corporate levels of predominately financial achievement based on annual results. The short to medium term construction timescales and temporary relationships that characterise a largely project-based industry may be better evaluated by a performance paradigm that encapsulates qualitative as well as quantitative measures of success. The objective of the research programme is to adopt a contemporary performance management philosophy; utilise existing ‘hard’ and ‘soft’ key measurement protocols, to isolate construction project performance and evaluate project success within a pragmatic performance template.

PERFORMANCE MANAGEMENT

Over the past decade corporate interest in performance management has evolved from what was essentially an accounting system of performance measurement in to an eclectic range of performance statistics. Historically, organisational performance criterion has focused first and foremost on the financial aspects of business achievement, (Eccles, 1991; Kaplan and Norton, 1993 and Crowther, 1996). The emergent industrial society of the nineteenth century witnessed the increasing standardisation of financial accounting practice driven by Government Taxation, corporate liability and other stakeholder bodies. Over the coming decades a sophisticated system of accounting protocol evolved in an effort to regulate procedure and coordinate the manner in which financial information was disseminated. This approach to performance measurement was satisfactory whilst corporate trading remained straightforward. By the 1970’s changes in manufacturing and increased global competition started to create different demands on organisations. During the 1980’s commerce began to realise that dimensions of quality and total quality management values could be considered as a strategic intent in their quest for competitive advantage. The subsequent development and implementation of quality measures represented the most positive step taken in recent times to broaden business performance measurement mindset, (Eccles, 1991). This represented a shift in performance doctrine, moving away from a predominately financial accounting model towards a contemporary perspective, matching operational economy and efficiency with corporate effectiveness and ethics.

Contemporary Performance Management Models

A holistic approach to performance management assumes that multiple stakeholders must be satisfied simultaneously, (Open University, 2001). Two of the best known contemporary performance management frameworks are the EFQM Excellence Model and Kaplan and Norton’s Balanced Scorecard. The underlying philosophy of both

models is very similar; “each consists of a non-prescriptive template offering managers a relatively small number of categories of key performance metrics to focus on,” (Wongrassamee *et al.*, 2003).

The EFQM Excellence Model

The first European quality model was created in 1988 and first launched in 1991. Developed by fourteen leading European companies the objective was to promote corporate excellence as a response to the increasing competitive pressures of a global market place. The European Foundation for Quality Management's (EFQM) business excellence model highlights the necessity for a holistic approach to performance enhancement, (Open University, 2001). Its popularity has continued to grow and “by January 2003, EFQM membership had grown to around 800 organisations from most European countries and most sectors of activity,” (EFQM, 2003). The model is based upon eight fundamental concepts of sustainable excellence.

They are: 1/ Results Orientation; 2/ Customer Focus; 3/ Leadership and Constancy of Purpose; 4/ Management by Processes and Facts; 5/ People Development and Involvement; 6/ Continuous Learning, Innovation and Improvement; 7/ Partnership Development and 8/ Corporate Social Responsibility.

EFQM suggest that the “Excellence Model is a practical tool that can be used in a number of different ways:

- As a tool for self-assessment
- As a way to benchmark with other organisations
- As a guide to identify areas for improvement
- As the basis for a common vocabulary and a way of thinking
- As a structure for the organisation's management system” (EFQM, 2006).

The model has nine criteria, broken down in to five enabling activities (leadership, people management, policy and strategy, partnership and resources and finally processes) which drive four areas of results (people results, customer results, society results and key performance results). The model also has feedback in the form of innovation and learning which stimulates leadership and the other four enablers which in turn drive results, producing more feedback and completing the continuous improvement loop. The EFQM Excellence Model is a ‘live’ framework where EFQM continually update the model to reflect changing business needs and management thinking.

The Balanced Scorecard

In recognition of the increasingly complex commercial environment company chief executives wanted innovative ways to articulate corporate well-being. In response to this management challenge Robert S. Kaplan and David P. Norton (1992) devised the ‘Balanced Scorecard’. The assertion of the Balanced Scorecard was to construct a set of four interrelated measures that give senior managers a fast and comprehensive information model that is representative of corporate strategy, business objectives and competitive demands. Financial information on its own is backward looking, commenting on previous performance without predicting future achievements. The balance scorecard supplements the conservative financial viewpoint with three forward thinking business perspectives, namely; customer perspective, internal business perspective and an innovation and learning perspective. The four business

viewpoints create a more 'rounded' approach to performance assessment, acknowledging the importance of the various stakeholders, including the customer and consumer. Kaplan and Norton (1992) stress that the balanced scorecard presents a cross-functional shortlist of key indicators for present and future performance, emphasising that the Balanced Scorecard "provides answers to four basic questions:

- How do customers see us? (customer perspective)
- What must we excel at? (internal perspective)
- Can we continue to improve and create value? (innovation and learning perspective)
- How do we look to shareholders? (financial perspective)."

Even though the four business perspectives are established, the actual content of the balanced scorecard is indeterminate. The balanced scorecard is not a template that can be applied across industry sectors or companies in general. Diverse market conditions, corporate strategies and competitive environments require different scorecards, (Kaplan and Norton, 1993). Companies are required to customise the scorecard to best represent their specific corporate desires in terms of vision, structure, technology and culture. An underlying rationale of the balanced scorecard is to communicate strategic performance, permeating the various layers of administration in a manner that is comprehensible and constructive to those involved in the tactics of operational performance. There is also a strong human relations aspect to the successful implementation of the scorecard. This concurs with recent developments in workplace ecology and in particular the increased adoption of team-based working. The balanced scorecard "approach to performance measurement is consistent with initiatives under way in many companies: cross-functional integration, customer-supplier partnerships, global scale, continuous improvement and team rather than individual accountability," (Kaplan and Norton, 1992).

PERFORMANCE MEASUREMENT

The objective of modern performance measurement techniques is to translate broader management ideals in to specific measurable achievements. Mainstream accounting procedures have been off-set against alternative mechanisms of key performance measurement, collectively known as Key Performance Indicators, (KPI's). It is noteworthy to comment that many companies have a large number of key performance measures of which only a few – and sometimes none – are actually adopted by management to measure performance. "It is not the number and reach of the measures that is most important. It is the relevance," (Roest, 1997). There is also a growing acceptance that for KPI's to be meaningful they need to be incorporated within a performance management system, (Beatham *et al.*, 2004).

The UK Construction Industry and KPI's

In response to the increased criticism by construction clients the UK Government set up a 'Construction Task Force' to investigate and report on the efficiency and quality of UK construction from a customer's perspective. In 1998 Sir John Egan published his findings, entitled 'Rethinking Construction'. A core declaration was the need to set targets for improving industry performance, stating that "to drive dramatic performance improvement the Task Force believes that the construction industry should set itself clear measurable objectives, and then give them focus by adopting quantified targets, milestones and performance indicators," (Egan, 1998). To support the development of performance measurement techniques and sponsor industry-wide

benchmarking programmes the Government set up ‘The Key Performance Indicator (KPI) Project Management Group’. This specialised group, representing a cross-section of industry stakeholders have over the past nine years, under various working-party guises, developed a comprehensive hierarchy of construction Key Performance Indicators (KPI’s). The KPI’s first published in 1999 are a live, year-on-year’ commentary of industry performance. They continue to be developed and refined as more companies adopt the values and participate with the necessary data gathering against which industry-wide benchmarks can be established and reported. KPI calculation, information dissemination and guidance are currently provided by the Government sponsored task-force, Constructing Excellence in the Built Environment. To assist companies in their acceptance of the performance measurement techniques, exemplars for data gathering surveys, data analysis and data calculation are available with further support accessible via regional workshops and KPI road shows. As part of the evolution of industry KPI’s, distinct sectors within the industry, such as ‘Housing’, ‘Consultants’ and ‘Materials’ as well as ‘Social’ (Respect for people) and ‘Environmental’ KPI themes have been developed as part of the overall hierarchy of construction industry performance measurement. The existing suite of construction KPI’s offer companies “a framework to benchmark activities both at a broad level, and at a level much closer to the ‘coal face’,” (Raynsford, 1999).

Project Performance Model

The EFQM model is a corporate management tool designed to help organisations improve performance, (Thorpe and Sumner, 2004). At the heart of the EFQM business excellence model is the notion of self-assessment using questionnaires, self-audits and benchmarking. The implementation of the EFQM framework involves the ‘whole’ company and “does not explicitly emphasise a project focus,” (Bassioni *et al.*, 2005). At present ‘Constructing Excellence’ KPI profiles address only six of the eight fundamental concepts referred to in the EFQM model, (Beatham *et al.*, 2004). As a consequence the framework would require extensive customisation to accommodate a distinctly project performance orientation. Adoption of the model out with the prescribed assessment criteria could undermine the veracity of the resultant outcomes. For this reason there would always be an unacceptable degree of research risk associated with the adoption of the EFQM blueprint. The balanced scorecard in its original format is aptly suited to the measurement of bespoke projects. The holistic ethos could be embraced with carefully chosen KPI’s. The underlying principles of the Balanced Scorecard could be employed with confidence for the performance measurement of a ‘work in progress’ construction project. Due to the ease of research fit between the model, the Constructing Excellence KPI’s and construction project information sources, the Balanced Scorecard was chosen as the most appropriate performance management system. The financial perspective traditionally viewed as a ‘lagging’ measure would capture a snapshot of performance to date. The other three perspectives may be considered as ‘leading’ measures. The function of ‘leading measures’ is to establish current levels of achievement that may significantly influence future performance. For the evaluation of project performance seven individual Key Performance Indicators, four from the ‘Economic - All Construction’ KPI’s and three from ‘Respect for People’ KPI’s were selected for inclusion within the balanced scorecard, (see Table 1).

Table 1: KPI Balanced Scorecard Perspective Appraisal

FINANCIAL	EXTERNAL
Predictability: Construction Cost	Client Satisfaction: Service
Predictability: Construction Time	Client Satisfaction: Product
INTERNAL	INNOVATION & TRAINING
Employee Satisfaction	Training (Days per year)
Hours (worked per day)	

In an effort to incorporate positive features of the EFQM Model, selection appraisal of the KPI's accommodate 'leading' as well as 'lagging' indicators in conjunction with objective and subjective measures of efficiency, (see Table 2).

Table 2: KPI 'EFQM' Selection Appraisal

	'Lagging Indicators'	'Leading Indicators'
<i>Objective Measures</i>	Predictability: Construction Cost Predictability: Construction Time	Training (Days per year) Hours (worked per day)
<i>Subjective Measures</i>	Client Satisfaction: Product	Client Satisfaction: Service Employee Satisfaction

The resultant project performance research model assimilates seven key performance indicators to produce a customised suite of 'Pan-Project' key performance measures.

THE CASE STUDY

The case study and data collection phase of the research programme was carried out between June 2004 and April 2005. The research enlisted the cooperation of three major UK construction contractors, Company B, C and D and comprised of thirteen separate construction projects. A pilot study, Company A, Project 1 (A/1) has been omitted due to the evolving attributes of the methodology and experimental nature of the pilot case study. Key project performance measurement data was collected using questionnaires from various project stakeholders including the Project Manager, Client Representative and individual Project Team Members. The results were transposed in to industry benchmark scores using the appropriate 2004 KPI Wall charts published by Constructing Excellence in the Built Environment.

THE RESULTS

The seven benchmarked key performance indicator percentages for each of the participating construction site projects are presented in Table 3. A mean KPI value for each of the selected KPI's is presented in the right-hand column (KPI Mean). A mean performance score for each of the participating projects is illustrated across the bottom row (Project KPI Mean).

Table 3: Project Balanced Scorecard

Key Performance Indicator	Project B/1	Project B/2	Project B/3	Project B/4	Project B/5	Project C/1	Project C/2	Project C/3	Project D/1	Project D/2	Project D/3	Project D/4	Project D/5	KPI Mean
Predictability Construction - Cost	75	75	27	95	70	75	22	26	16	35	20	75	20	49
Predictability Construction - Time	25	39	26	19	60	60	34	33	28	16	27	60	34	35
Client Satisfaction - Service	55	10	10	27	55	85	100	55	55	55	100	100	100	62
Client Satisfaction - Product	55	55	8	2	20	85	85	8	21	0	100	100	85	48
Employee Satisfaction	61	67	45	46	82	73	60	45	45	85	77	75	62	63
Hours Worked (per week)	22	14	18	20	38	22	26	12	17	17	23	17	24	21
Training Days (per year)	88	75	72	89	94	92	89	95	95	86	91	93	88	88
Project KPI Mean	54	48	29	43	60	70	59	39	40	42	63	74	59	

DATA INTERPRETATION

The interpretation of results is often viewed as a critical stage in research methodology, particularly in relation to performance management studies. Nonetheless a key component of this research objective was the compilation of performance data beyond the traditional limitations of cost, time and specification. The process of data gathering was central to the concept of a construction project balanced scorecard. The outcome has been very successful with case-study projects presenting a set of industry related benchmarks that encompass four different business perspectives capturing various project stakeholder interests. Data interpretation can adopt two divergent viewpoints, project appraisal and KPI assessment.

Project Appraisal

Project appraisal involves the examination of individual project performance in comparison with other project performance scores. Project appraisal within company parameters reveal that project D/4 records the highest mean benchmark score of 74% compared with project D/1 which recorded the lowest company 'D' mean value of 40%. From a visual inspection it is evident that performance values regarding predictability, client satisfaction and employee satisfaction significantly compromises the overall judgment of project D/1. Casual evaluation of the data may be further developed by carrying out statistical investigation to establish patterns of project performance. For example is project D/1 and D/2 performing significantly differently from D/3, D/4 and D/5? Information of this nature on a construction project prior to completion would allow for timely management intervention in an effort address project-specific issues.

KPI Assessment

Data interpretation may also compare various key performance indicators. This approach highlights the strengths and weaknesses associated with overall project

performance. For project D/4 the predominant strength is client satisfaction (external perspective). Training (innovation and training perspective) is also a notable achievement with predictability cost and time (financial perspective) also recording above average indicator results. The only perceptible weakness is the KPI representing working hours per week. The results suggest that working hours for project D/4 is not performing significantly differently from other projects (project appraisal) but if management wished to improve the overall performance of project D/4 then the working hours KPI would offer the greatest potential for improvement. Project B/3 is at the other end of the performance spectrum. Only training days per year records a seemingly satisfactory benchmark score. Preliminary target areas for a project B/3 improvement strategy would focus on enhancing client satisfaction coupled with better predictability. The KPI results may also be a reflection of organisational attributes. From the results, company 'B' would appear to focus on cost and time predictability, whereas both company 'C' and 'D' demonstrate greater client awareness. The seemingly contradictory evidence, reasonable predictability coupled with low levels of client satisfaction (Company 'B') and poorer predictability coupled with high levels of client satisfaction (Company 'C' and 'D') is a timely reminder that a key factor for the meaningful evaluation of performance measurement techniques is careful interpretation.

DISCUSSION

The construction project balanced scorecard challenges the traditional performance measures of cost, time and specification in a number of thought provoking ways. The most obvious attribute of the contemporary approach is the inclusion of objective (quantitative measures) and subjective (qualitative measures) within a 'live' framework that affords an opportunity for change. Traditional performance measurement techniques are lagging measures of what has been accomplished. Measures of this type are outcome orientated. The criticism of a key performance outcome is that the assessment of past achievement is made with little indication for future performance. Whereas indicators suggest there may be a potential benefit still to be realised from the evaluation of current data. Some of the indicators advocated by Constructing Excellence in the Built Environment are by definition key performance outcomes, (KPO's). The discussion is not necessarily about semantics but practitioners do need to be aware of the subtle differences between KPI's and KPO's especially when advocating the introduction of a performance management system. For example defects, profitability, productivity, safety, construction cost and construction time are dependent on end of project data, i.e. KPO's. By utilising the remaining four headline KPI's, namely; predictability – cost, predictability – time, client satisfaction – service, client satisfaction – product, balanced with respect for people indicators such as employee satisfaction, working hours and training days a snapshot measurement and evaluation of project 'well-being' can be successfully undertaken. Subsequent interpretation of the KPI results offer management a valuable project insight. As a consequence information of this nature may provide direction and justification for future decision-making policy. With particular reference to project B/3, identifying poor client satisfaction in week 27 of a 64 week construction contract highlights an obvious opportunity for positive intervention. To continue without addressing the issue may be regarded as short-sighted and representative of outdated behaviours that focus on traditional values of time and money to the detriment of relationship building and soft skills management. A corporate wide application of a 'live' project balanced scorecard not only highlights strengths and weaknesses

associated with each unique construction site but it may also accentuate company-wide performance patterns. Results from the case-study illustrate various construction project qualities. The adoption of an overarching performance management system coupled with carefully selected KPI's give construction practitioners a performance framework against which they can evaluate, compare and benchmark key indicators of future project performance. Other potential applications of a holistic project scorecard exist. In particular reward management and the introduction of team reward systems. Not in itself a new topic but one frequently rejected in favour of an orthodox, individualistic approach to managing people. To this extent the development of a team remuneration incentive scheme congruent with the implementation of a balance project performance scorecard would be a logical and challenging direction for both construction managers and human resource management.

CONCLUSION

To date the implementation of KPI's within the construction sector has been limited, often utilised for marketing purposes as opposed to an integral part of business acumen, (Beatham *et al.*, 2004). The idea of a construction project performance balanced scorecard is therefore an interesting proposition. "The scorecard is not just a measurement system, it is a management system to motivate breakthrough competitive performance," (Kaplan and Norton, 1993). The construction project balanced scorecard successfully captures the ethos of a contemporary performance management model coupled with a pragmatic measurement template that others can use.

REFERENCES

- Bassioni, H.A., Price, A.D.F. and Hassan, T.M. (2005) Building a conceptual framework for measuring business performance in construction: an empirical evaluation. *Construction Management and Economics*, **23**(6), 495-507.
- Beatham, S., Chimay, A. and Thorpe, T. (2004) KPIs: a critical appraisal of their use in construction, *Benchmarking*, **11**(1), 93-117.
- Crowther, D.E.A. (1996) Corporate performance operates in three dimensions, *Managerial Auditing Journal*, **11**(8), 4-13.
- DTI (2005) *Construction Sector Unit Annual Report 2004 / 2005*, HMSO, London.
- DTI (2002) *Rethinking Construction Innovation and Research: A Review of Government R & D Policies and Practices*, HMSO, London.
- Eccles, R.G. (1991) The performance measurement manifesto, *Harvard Business Review*, Jan / Feb., 131-137.
- EFQM (2006) *The EFQM Excellence Model*. Available at URL: <http://www.efqm.org/Default.aspx?tabid=35> (Accessed July 22nd. 2006).
- EFQM (2003) *EFQM: Introducing Excellence*, EFQM.
- Egan, J. (1998) *Rethinking Construction*, HMSO, London.
- HSE, (2006) *Health and Safety in the Construction Industry*. Available URL: <http://www.hse.gov.uk/construction/index.htm> (Accessed, August 2nd. 2006).
- Kaplan, R.S. and Norton, D.P. (1993) Putting the balanced scorecard to work, *Harvard Business Review*, Sept / Oct., 134-147.
- Kaplan, R.S. and Norton, D.P. (1992), The balanced scorecard: Measures that drive performance, *Harvard Business Review*, Jan / Feb., 71-79.

- Leiringer, R., Fernie, S. and Ramboll, N.S. (2005), Adopting Partnering in Sweden: A Critical Perspective, *CIB W65 Conference Proceedings*, 7, 42-53.
- National Statistics (2003) *UK Standard Industrial Classification of Economic Activities 2003*, National Statistics Publications, HMSO, London.
- Open University, (2001) *Management Control and Beyond: A Holistic Approach to Performance Improvement*, The Open University, Milton Keynes.
- Raynsford, N. (2000) *KPI Report for the Minister for Construction*, DETR, London.
- Roest, P. (1997) The golden rules for implementing the balanced business scorecard, *Information Management & Computer Security*, 5(5), 163–165.
- Thorpe, B. and Sumner, P. (2004) *Quality Management in Construction*, Gower Publishing Ltd, Hants, UK.
- Wongrassamee, S., Simmons, J.E.L. and Gardiner, P. D. (2003) *Performance measurement tools: the Balanced Scorecard and the EFQM Excellence Model*, *Measuring Business Excellence*, 7(1), 14–29.