BSC-EFQM BASED APPROACH FOR PERFORMANCE BENCHMARKING IN CONSTRUCTION INDUSTRY

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There is a great need in construction industry for identification of common set of KPIs, in order to systematically control its performance. This paper explains the difference between various management control systems and their use in performance practice. It elaborates a new, integrated, model for performance management in a construction company, based on EFQM – excellence model and Balanced Scorecard (BSC) principles in conjunction with modern control theory. The model uses three types of performance measures: leading (KPI), lagging (KPO) and perceptive (PerM) indicators, across four dimension of BSC and nine sub-dimensions of EFQM model. The indicators are distributed in six dimensions of KPI breakdown structure (KPIBS). Thus, the results of performance measurement, based on KPIBS, are used as input information for benchmarking process of a construction company. The paper shows such example, based on the first level of benchmarking, and elaborates its results. It concludes with final assessment of the model, gives recommendations and sets new objectives for future research.

Keywords: benchmarking, BSC, EFQM, KPI.

INTRODUCTION

Construction industry has a poor image in mostly all parts of the world, (Xiao-Hua and Ling, 2004). The reason can be found in its inability to deliver the expected level of performance (Egan, 1998; C21, 1999). It has been accused for being: the worst, most plundering, inefficient and ineffective (Beatham *et al.*, 2004). In 1999 alone, UK construction sector spent more than 1 billion £ on rework (Nicholson, 1999) and in 2003, more than 1,5 billion £ on performance measurement applications (Eccles, 1991). Issues with fragmentation and structure are more than obvious and are suffocating performance (Egan, 1998). Due to the big acceleration of economy and technology growth, business systems must adopt faster than ever. Only 18% of construction projects meet their time, quality and cost objectives (Vukomanovic and Radujkovic, 2007). Competitive, economic and politic pressures are forcing construction to change its "modus operandi" (Anumba *et al.*, 2000). It is obvious that construction is falling behind other industries (Business times, 2001). All these facts motivated many authors for doing research in the area of performance mgmt. In the last twenty years, the amount of research activity is growing rapidly (Abudayyeh *et al.*, 2004). During 1996 and 1997, one article was published every 5 hours of a working day (Neely, 1998). Today in USA, performance mgmt. takes fourth place among different research streams in the area of construction mgmt. But, ten years ago it was on the tenth and twenty years ago it was not even mentioned (Sharif, 2002). The concept is still young and has emerged fifteen years ago (Sharif, 2002), as a logical answer to FAQ: "How are we doing business?" and "Are we investing in the right

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projects and what benefits do they provide?". There are several reasons for companies to implement performance mgmt., but mostly to control performance in the way that cannot be achieved through accounting and finance (Valiris *et al.*, 2005). All these facts serve as a solid background for the research of performance mgmt. and its applicability in construction industry.

GENESIS OF PERFORMANCE MANAGEMENT

The importance of the identification of organizational performance is evident trough its highly appreciated results. The best performing companies will attract best employees, future investments and probably maximize share value. Key performance indicators (KPI) represent a useful tool for measurement and communication of performance among interested parties, such as: investor, sub-contractor, clients, employees, etc… Traditional performance measures were based on financial indicators, such as: annual revenue, income, profit, etc. (Beatham *et al.*, 2005). Most of them were developed at the beginning of the last century (Sinclair and Zairi, 1995) and stayed unchanged despite paradigm shift in the area of organization and management (Kaplan, 1994). Financial indicators are able to measure and report only already achieved impact and are unable to anticipate future result and thus improve future performance. With this kind of performance measures construction organizations could not asses the performance correctly and so they started to fall behind other concurrent parties (Freeman *et al.*, 1992). Further more, they have been criticized for its connection to easily quantified criteria, while at the same time neglecting other indicators important for competitive success (Steele, 2000). Before 1980, focus was mainly on "the iron triangle" (time, cost and quality/scope) (Vukomanovic, 2006). During the 80-ties, project success has emerged as important part of performance assessment, where success is multi dimensional and all interested parties must achieve agreed level of success (Pinto and Pinto, 1991, Shenhar *et al.*, 1997,…). Actually, performance management emerged from Japan where prof. Deming and Juran were responsible for after-war recovery (Vukomanovic, 2006). Their theories about performance mgmt. and the importance of cultural context and holistic approach, in 1951, were accepted as a catalyst of change which finally led to Japanese supremacy in auto and ITC industry (McCabe, 2001). As a direct answer to Japan excellence and supremacy, Europe and USA, during the 80-ties, introduced new approaches in managing performance. USA introduced Malcom Baldrige National Award and Europe; EFQM Excellence award. Both acknowledging the concept of TQM, became highly appreciated for encouraging continuous improvement. The key point for moving from financial perspective was the work form Kaplan and Norton - the authors of The Balanced Scorecard (BSC) (Kaplan and Norton, 1992). They concluded: "*If senior management gives too much energy on financial indicators organizational long-term objectives will become endangered …* (Kaplan Norton, 1996). A need for balanced set of measures is now widely accepted (Eccles, 1991). Balance should be made within every business aspect, not just the financial one. In the last two decades, many industries, mainly production, implemented new methods and paradigm of thinking, i.e. BSC, in order to improve performance and thus the business's efficiency and effectiveness.

MANAGEMENT CONTROL SYSTEMS

Real time and high quality information is necessary for identification of deviations between planned and achieved performance. Many authors criticized present

performance measurement methods as time and cost consuming (Navona, and Eytan, 2002). Many construction organizations are still not measuring performance and thus are unable to react appropriately. The cause is "ad hoc" management. Recent research on 1500 world project, showed the lack of systematic performance measurement (Navona, and Eytan, 2002). Performance monitoring can be defined as identification of deviations among planned and achieved performance (Vukomanovic, 2006). Trouble with this definition is the inability to find the "right" (key) indicators (KPI), upon which the system will based. According to Simons (1995), mgmt. control can be divided to diagnostic, interactive and strategic control. Diagnostic control is formal system that is used for monitoring against planned state and is suitable for strategy implementation (Vukomanovic, 2006). Thus, corporative performance can be assessed based to comparison of real achievements and pre-set state (Simons, 1995). Main characteristics are: measurement of output from the system, setting of standards for future assessment, correcting deviations from standards. Interactive control is focused on strategic uncertainty, valorization of strategy and information that is used for strategy implementation (Veen-Dirks *et al.*, 2002). Main characteristics are: appreciation of strategy uncertainty, providing feed-back to operational managers, frequent and regular concentration on managers from all levels, output information is used for future strategy development. Strategic control is a formal system which aims on questioning and reformulating strategy (Vukomanovic, 2006). They are most advanced and can "feel" the change in competitive surroundings.
To achieve strategic control, companies must be able to measure data for assessing business presumptions driven by opportunities and threats. Main characteristics are: defining benefits for future performance, balancing profit and investment, setting new stretched objectives and informing management about competitive surroundings.
Table 1 defines the difference between elaborated control systems.

Table 1: The difference between: diagnostic, interactive and strategic control systems.

	Diagnostic control	**Interactive control**	**Strategic control**
Purpose	Generates motivation for result orientation	Stimulates organizational learning	Generates motivation for continuous improvement
Objective	No surprise	Creative search	Forecast
Analytical complex.	Deductive	Simple	Deductive and inductive
System complex.	High	Low	Complex formal systems
Time frame	Past and present	Present and future	Present and future
Objectives	Fixed	Constantly adjusted	Set by competitive surrou.
Feedback	Negative	Positive	Mainly neg., but also posit.
Adjustment on	Process input	Double feedback learning	Continuous adjustment
Communication	No need to talk	Standard procedures	Generates information about client expectations
Employee purpose	Process gate keepers	Supporting	Converts clients' needs in internal activities and implements benchmarking.

Source: Simons (1995)

STRENGTHS AND WEAKNESSES OF PRESENT PERFORMANCE MODELS

This section will elaborate strengths and weaknesses of two most implemented performance management models in construction industry (Vukomanovic, 2006).

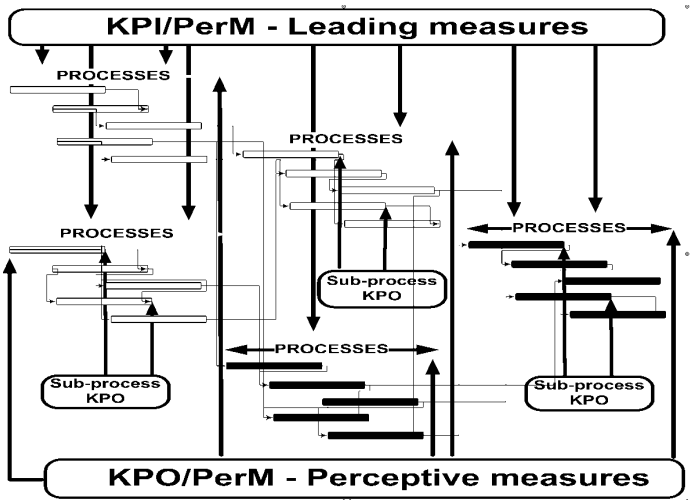

Figure 1: Application of performance measures in processes

First, The Balanced Scorecard (BSC), favours a clear focus on strategy, accepted in organization, and uses it as a starting point for setting project/programme objectives. The system is based on dynamic, causal relationship between four dimension of business: internal processes, organizational learning, clients and financial (Kaplan Norton, 1996), although other dimensions can be added (Hillman, 1994). Criteria of business success, and key performance indicators (KPI), are not clearly defined, thus mgmt. can alter the way they are assessing performance. It is impossible to implement benchmarking in that way since organizations can evaluate performance with different approaches. McCabe (2001) concluded that in order to achieve overall superiority, industry must perform benchmarking. EFQM excellence model is based on static design (Beatham *et al.*, 2005; Vukomanovic, 2006). It contains a set of standards and strategic objectives, which can be, according to EFQM, implemented in every industry. Causal connection with strategic objectives is only implicitly elaborated. But on the other hand, it is much easier to use the model, since performance criteria are pre-defined and standardized. This strength enables organizations to conduct benchmarking. Also, it introduces leading and lagging performance measures, unlike BSC. Both of the models have their strengths and weaknesses, specific to purpose for what they are used. While BSC is suitable for strategy implementation control, EFQM raises doubts. On the other hand, EFQM maintains relationship with the environment (market) and can signalize if business processes and strategy aren't properly aligned. Some authors suggested EFQM adaptation forward strategy focus, but the improvement hasn't been achieved yet: *"EFQM needs Balanced scorecard to: adjust mission, vision and strategy, keep promises alive and kicking and for continuous attention and communication."* (Paul Gemots, Oracle; Vukomanovic, 2006)

THE USE OF PERFORMANCE MEASURES IN PERFORMANCE ASSESSMENT

Different kinds of KPI can be applied within business processes (see Figure 1): leading (KPI), lagging (KPO – key performance outcomes) and perceptive measures (PerM). The same analogy used Beatham (Beatham *et al.*, 2005). KPI are indicative measures and are applied during the execution of processes/sub-process, because of their ability to anticipate future performance and set guidelines for future decision making. They don't show corrective measures, but they encourage management to focus on problematic areas. KPO are measured at the end of the processes and can

signal only past performance. They can also be assigned to sub-processes in order to become leading measures for succeeding sub-process. Perceptive measures are mainly generated trough surveys and they assess the perception of project among interested parties. They can be leading or lagging. It is important to acknowledge that the final performance assessment must be based on these three types of indicators. In former research (Vukomanovic, 2006), we defined KPI breakdown structure (KPIBS) (see Figure 2). KPIBS presents the structure of various KPIs (leading, lagging and perceptive) which are used in for benchmarking purposes within construction industry. Indicators are grouped into 6 dimensions (cost, time, quality, project management, client/user and business). Based on gained results (explained in following section) company can assess its performance and conduct 2nd level of benchmarking.

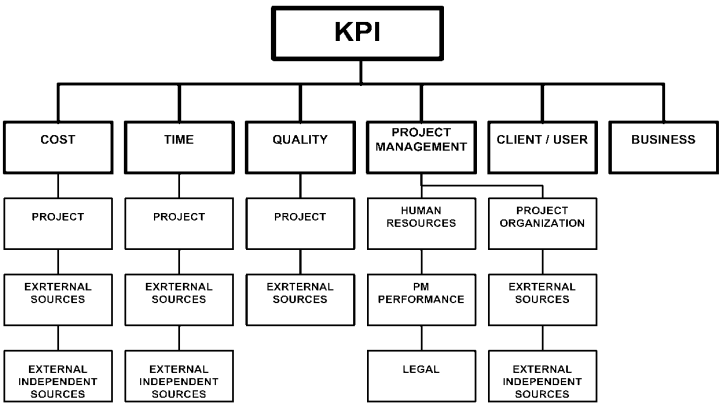

Figure 2: KPI breakdown structure

APPROACH TO PERFORMANCE MANAGEMENT MODEL (PMM) IMPLEMENTATION

The importance of designing a model for performance mgmt. system was explained in the paragraphs above. In order to approach model design, certain prerequisites must have been established; 1. Importance of a holistic performance mgmt. model in construction company, 2. Use of three types of performance measures (KPI, KPO, PerM) in the model, 3. Connection of KPIs with strategy objectives. PMM is comprised of two models (BSC and EFQM excellence model) which are integrated into holistic performance mgmt. system (see Figure 3.). The model is based on all three levels of benchmarking. BSC is used for the first and second and EFQM for the third level. Vision, strategy and critical success factors (CSFs) serve as a basis for KPI development within four dimensions of BSC (financial, customer, internal processes and innovation and learning), using KPIs from KPIBS structure.

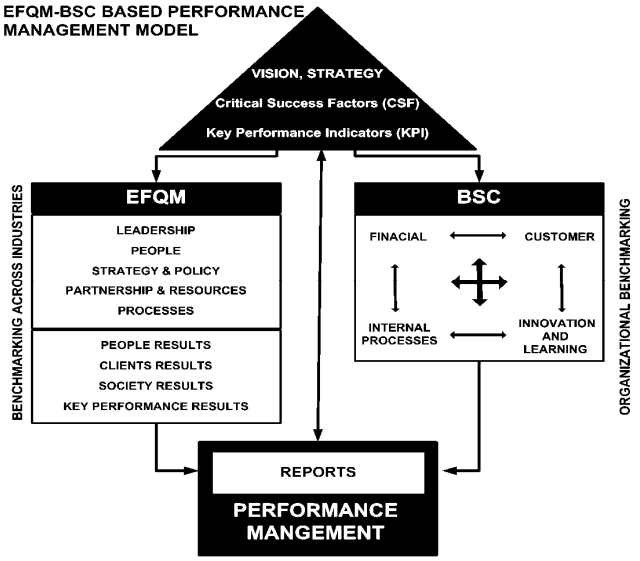

Figure 3: BSC-EFQM based perormance management model

Lower level managers can form their own scorecards, but in regard to higher objectives of overall BSC. Thus the model stimulates benchmarking within organization (1st level). Construction companies can use results from overall scorecard in order to conduct benchmarking on the 2nd level using KPIBS structure across the industry. Upon this point management can only apply diagnostic and interactive control, although some authors concluded that the model has implicit strategic possibilities (Kaplan and Norton, 1999, Kaplan and Norton, 2000, Niven, 2002).

BSC measures right KPIs but it doesn't check if the right KPIs are measured in the right way. The system can define KPIs from strategy and control their implementation, but it can't re-examine strategy and generate a signal to mgmt. if strategy objectives weren't aligned with present market conditions. I.e., BSC is only able to signal if good results from "learning and internal processes" did not lead to expected "client and financial" results. In that way, BSC becomes a generator of lagging measures for strategy control. By assigning another dimension to the model (EFQM excellence model) company becomes able to conduct strategic control and 3rd level of benchmarking among different industries. Vision and strategy are controlled and assessed trough EFQM. By using it, company gains ability to compare itself with other companies, regardless of its sector, and thus can externally assess its performance. If a low level of performance is signalled, company must re-examine strategy, align it with environment (market) and set a new set of CSF and new KPI targets.

So, it was necessary to bring these two models in symbiotic relationship in order to generate strategic and interactive control of performance within business system. Management can use PMM as a performance "libra", where the main aim is to produce balance between inner (BSC) and outer (EFQM) performance.

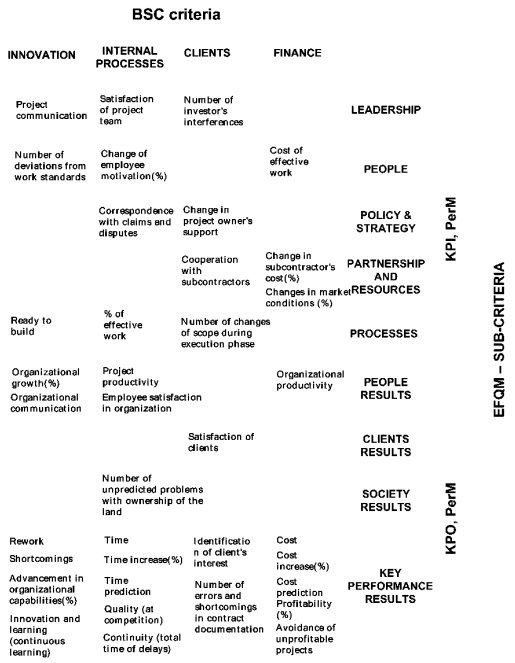

Figure 4: BSC-EFQM based set of KPIs for construction benchmarking

VERIFICATION OF PMM IN CONSTRUCTION INDUSTRY

In order to validate the model, we conducted verification process during M.Sc. thesis research (Vukomanovic, 2006). The results are demonstrated in example used in one Croatian construction company. The model yielded a set of KPIs across four dimensions of BSC and nine sub-dimension of EFQM excellence model and within KPIBS (see Figure 4) and confirmed the integral set of KPIs needed for performance assessment. BSC, which was not suitable for strategic control, was used to set up priorities, focus on the strategy and communicate the objectives trough all levels of organization in order to stimulate lower level scorecards (prerequisite for 1st and 2nd level of benchmarking). Strategic priorities were controlled trough 9 sub-criteria of EFQM as they could be linked with the excellence model in order to implement benchmarking on corporate level (3rd level). In that way, fulfilment of strategic objectives could be achieved trough BSC –interactive and EFQM strategic control. Than, we conducted 1st level of benchmarking (see Figure 5). The methodology is based on 37 KPIs (mentioned earlier) which are distributed in six respective categories (KPIBS). The set is comprised of KPIs (i.e. "project communication", innovation and learning",…), KPOs (i.e. "time", "cost",…) and perceptive measures (i.e. "satisfaction of clients",…) (see Figure 4). Each category has its final score, due to contribution of marks from respective subordinate KPI's. Marks were divided in two categories ([1-5], [5-10]). The first one [1-5], with negative sign shows degradation in comparison to past period and the second one [5-10] shows the improvement. Further methodology will not be elaborated in detail, for the brevity of the paper and the rest can be found in earlier work (Vukomanovic, 2006). From the given example (see Figure 5) it can be noticed that quality has stagnated and time has slightly worsen. We concluded that this was a good way to verify the model in the practice and to set a basis for further validation process. Based on these presumptions, company mgmt. could easily focus on strategy objectives for the next period.

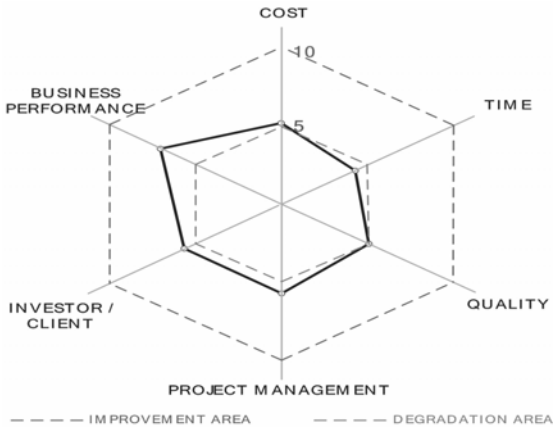

Figure 5: Spider view of performance benchmarking

VALIDATION OF THE MODEL AND STEPS FOR ITS USE IN PRACTICE

The model still needs to be validated in order to implement it in the practice. Presently process is being conducted and it includes these procedures: implementation of the model in two construction companies, acquiring performance results from the first year period, conducting benchmarking (1st, 2nd and 3rd level) between two companies, setting new objectives based on benchmarking results, acquiring performance results from second year period and the assessment of the validation process. Also, we defined steps for PMM implementation which are compliant with the model (see Figure 3). It consists of 12 steps: 1. Definition of input information: vision and strategy, 2. Definition of highly important business objectives (critical success factors – CSF) within the BSC framework, 3. Assignment of minimum one KPI per respective CSF, 4. Assessment of business processes trough BSC and EFQM model, 5. Setting up KPI targets by senior management and hence forth by the lower levels for their own scorecards, 6. Selection of KPIs among lagging, leading and perceptive measures, 7. Every business sector should use their own scorecard, within senior objectives 8. Every KPI should be comprised of: name, purpose, owner, who is measuring it, the measurement method, target, frequency of measurement, frequency of alignment with internal processes and environment, 9. Company level KPIs are used for 1st and 2nd level benchmarking. 10. Industry level KPI are used for 3rd level of benchmarking, 11. Re-evaluation of strategy implementation (BSC) and its formulation (EFQM), 12. Decision making for the future processes, regarding: a) the right choice of indicators and b) the proper use of indicators. Veen-Dirks *et al.* (2002) noted that many companies which were using BSC in a stable market were not convinced in benefits of adding a link with the environment, but companies in unstable market were. Our opinion is that globalization is inevitably forth coming. Since there are few stable markets, upgrading BSC from diagnostic and interactive to strategic control is “condition sine qua non”.

CONCLUSION

This paper has elaborated the importance of performance management in modern construction company. The distinction between different management control systems has been explained and their connection with the two most used performance mgmt. models (Vukomanovic, 2006). We can conclude that BSC serves as a good tool for strategy implementation based on interactive control, but in order to gain strategic

control, organizations must stay in touch with the environment. To achieve such ability, BSC was merged with EFQM in integrated performance mgmt. model (PMM). The model uses BSC criteria and EFQM excellence model sub-criteria regarding three types of KPIs (KPI, KPO and PerM, see Figure 2). The model was verified and it showed applicability in construction industry. KPI breakdown structure (KPIBS) was defined which resulted with spider 6 dimensions diagram for performance assessment. The diagram is used for 1st level benchmarking and is comprised of two zones with their respective marks: improvement [5-10] and degradation [1-5] (see Figure 5). Management can easily use this tool to find specific problem areas and easily set adequate priorities for the next period to come. Presented model still needs improvement and validation trough its use in practice. Strategic control systems must have the imperative in managing performance and their applicability must be further researched and developed. Performance mgmt. systems should be in close hand with company's environment where performance based benchmarking should be the foundation for achieving overall organizational superiority.

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