

ROLE OF VOCATIONAL EDUCATION AND TRAINING IN THE CONSTRUCTION INDUSTRY PERFORMANCE

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In a time of globalization and increasingly competitive environment, measuring performance in construction industry has become critical to business success. Performance measurement aligns organizational resources, activities and processes to the major objectives of the organization. In construction industry value chain considering the project-based nature of the construction industry, the success of the projects effect company performances and the success of the companies effect industrial performance whereby the industrial success effect macro-economic factors. Vocational education and training (VET) can be considered a significant component of project success in the construction industry with its direct effect on the performance of construction projects by increasing productivity on site, reducing rework that is originated by unskilled workers, and reducing project duration and cost. In this context, the aim of this study is to reveal the interaction between the performance of VET institutions and construction industry. In the light of this aim, determined key performance indicators (KPIs) of vocational training and a conceptual performance evaluation system which adopted the financial, trainee satisfaction, internal process, and learning and growth perspectives of the Balanced Scorecard (BSC) method will be presented.

Keywords: Performance management, Performance improvement, Key Performance Indicator (KPI), Vocational training, Construction industry.

Introduction

In recent years, due to the globalized markets, improved technology, increased competition, and as a result, transformed demands, the construction industry is suffering from low performance. The project-based nature of the construction industry led us to consider construction companies and the projects as the main components of the industry. Therefore, with an inductive approach, it can be assumed that the performance of a construction company depends on the cumulative success in its construction projects; the performance of the construction industry depends on the cumulative success of construction companies; and the performance of a country's economy depends on the success of its constituent industries, including the construction industry. Therefore, all these components should perform superior performance in order to increase the performance of the countries. Especially, it should be noted that the

performance of construction projects and hence of construction companies and the construction industry depend a great deal on competent project team (Garbharran et al. 2012), however the construction industry suffers from a shortage of skilled labor. According to Tabassi et al. (2011), human resource development is important to gain competitive advantage in the construction industry. In this context, training and development of labor force takes an important place. In addition, dynamic structure of construction industry necessitates various new methods and project types. Also, changeable labor force profile for every project alleviate demand for trained labor force in the construction industry. In this context, the companies can apply two different methods; “on the job training” and “off the job training”. “On the job training” method workers take pre-prepared courses and they are sent to different workplace to learn their vocation. However, they aren’t as much effective as “off the job training” because training expenditure, contracting and lack of worker incentive can be problems for construction companies. One of the important providers of “off the job training” is Vocational Education and Training (VET) institutions. As Yusof (2009) indicates, VET provides adequately trained labor which in turn may lead to less rework and increased on-site productivity that will directly enhance construction company competitiveness. In addition, equipping the workforce with the skills required for the jobs of today and those of tomorrow is a strategic concern in the national growth and development outlooks of all advanced countries (OECD 2010). The need to upgrade skills applies to the current generation of workers (EC 2010). Therefore, building a skill development strategy requires good-quality education and training systems, and reliable performance measurement to sustain efficiency. In this context, considering that delivering knowledge is no longer restricted to traditional higher education institutions, VET has become an inevitable and necessary asset in the knowledge-based economy era. Consequently, VET institutions are important in achieving company and industry targets. VET institutions create competitive advantage for a construction company by improving project performance in terms of reduced cost, better quality, and shorter duration, as VET institutions train construction workers to learn their vocation (Bilginsoy 2003, Tabassi and Bakar 2009).

One of the important management tasks in the construction industry is performance evaluation to improve the performance of the industry. For example, Latham’s (1994) and Egan’s (1998) reports emphasized the need for performance evaluation in the UK (Bassioni et al. 2004). As stated above, increase in the performance of VETs in construction industry will cause a direct increase in the performance of construction projects and companies respectively. Therefore, setting a clear set of indicators to measure the performance of education and training systems is important (EC 2010). Therefore, in addition to setting up VET, it is necessary to put in place performance measurement systems. Measuring the performance of VET is conducive to better education and training programs. Performance evaluation systems provide a mechanism that enables organizations to improve their business (Robinson et al. 2005). Therefore, one of the important steps in the development of a performance evaluation system is the identification of the Key Performance Indicators (KPIs). KPIs represent a set of measures focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization (Parmenter 2015). In designing a conceptual performance measurement system of VET, the determination of KPIs is very important as these KPIs can improve the outcomes of VET and may encourage VET providers to engage in long-term and goal-oriented development work, hence facilitating the achievement of the goals set for VET by the industry.

The Relationship between the Performance of VET Institutions and Construction Industry

The construction industry depends heavily on manpower (Awe et al., 2010). In contrast to this requirement, there is a problem to find skilled labor force in the construction industry. Rahim et al. (2016) stated that labor shortage plays an important role in achieving sustainability in construction projects. Because, the labor force not only have vital importance on time, quality and cost, but also have an effect on sustainable development characteristics (economic, environmental, and social) depending on time, quality and cost. Awe et al. (2010) also performed survey to identify the root causes of Nigerian

construction industry's labor shortage. According to respondents, insufficient training methods, non-applicability of apprenticeship according to lack of facilities and lack of incentives are the highest scored causes of labor shortage. Thus, comprehensive vocational education and training is remedy of shortage of skilled labor force (Clarke, 2010). Bilau et al. (2015) also summarized the importance of skilled labor force for projects of small and medium construction firms. According to the authors, skilled labor force increase quality, productivity and reduce time and cost overruns. Therefore, the authors stated that there is a direct relationship between VET and construction industry. In Abdul-Aziz et al.'s study (2008), the authors performed a survey to investigate perceptions of VET trainees. The results showed that industry needs VETs' graduates to eliminate worker related problems because the trainees have required ability that meets industry needs. Also interesting finding from the survey, ex-trainees do not spend too much effort to find work when graduating from VETs.

In brief, VET performance depending on nation policies, funding opportunities etc. prevent effective skilled labor force in construction industry according to literature review. So that, construction industry that depends heavily on manpower have problem with project constraints.

KPIs for VET Institutions

Most studies about performance evaluation were conducted by considering only one perspective, namely finance, which causes misleading consequences. Especially for VET, which has not only economic benefits, but also social benefits, a performance evaluation based on only financial criteria does not provide a comprehensive understanding. Therefore, in this study, a framework based on Balanced Scorecard (BSC) was developed to reveal all aspects of performance evaluation of VET by conducting a comprehensive literature survey.

The BSC is a strategic planning and management system that connects the dots between big picture strategy elements such as mission (organization's purpose), vision (what organization aspires for), core values (what organization believes in), strategic focus areas (themes, results and/or goals) and the more operational elements such as objectives (continuous improvement activities), measures (key performance indicators which track strategic performance), targets (organization's desired level of performance), and initiatives (projects that help organization reach its targets). BSCs are used extensively in business and industry, government, and nonprofit organizations worldwide. The concept of BSC was proposed by Kaplan and Norton (1992) to replace traditional performance systems focusing on only one single financial indicator. The financial perspective is still the core performance criterion in BSC, but three more perspectives are considered, namely customer, industrial process, and learning and growth. This model constitutes a balanced performance evaluation and provides comprehensive insights into the effectiveness of organizations. The BSC is commonly used to measure performance. For example, Manville (2007) used BSC to measure the performance of non-profit small and medium sized enterprise, while Shen et al. (2016) used BSC to measure the performance of Enterprise Resource Planning (ERP) operations. The general representation of balanced scorecard (BSC) method is presented in Figure 1.

Frameworks based on BSC were widely used in studies about the performance evaluation of educational institutions. For instance, BSC was used by Wu et al. (2011) to assess the performance of extension education centers in Taiwanese universities, by Zolfani and Ghadikolaei (2013) to evaluate private universities in Iran, and by Al-Hosaini and Sofian (2015) to rate higher education institutions in Malaysia. The framework used in this study is also based on BSC not only because it has proved to be successful in several critical studies, but also because it covers both financial and non-financial aspects.

The framework developed in this study is based on these four perspectives using indicators that reflect the specific issues related to VET in construction. These indicators were determined after a thorough literature review and in the light of the questions posed by Kaplan and Norton (1996) in the scorecard building process: "to succeed financially, how should we look to our shareholders; to succeed with our vision, how should we look to our customers; to satisfy our shareholders and customers, at what internal business processes must we excel, and to succeed with our vision, how shall we sustain our capacity to learn and grow".

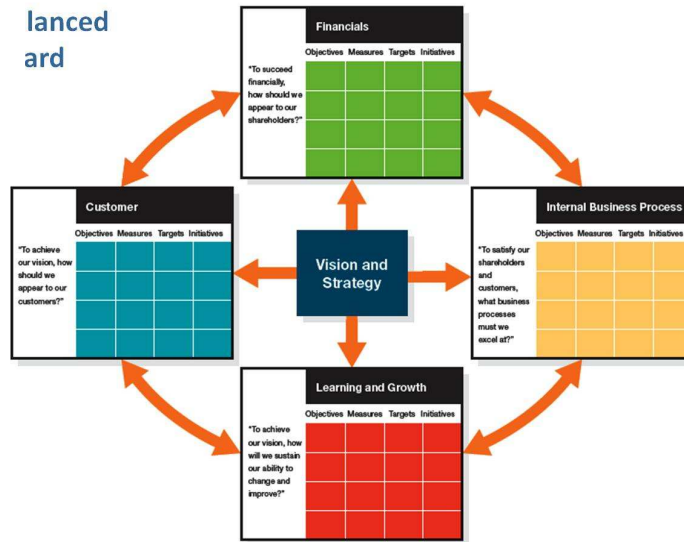


Figure 1. General representation of Balanced Scorecard (BSC)

VETs can be considered as one of the most important component for the success in the construction industry with its direct effect on the performance of construction projects by increasing productivity on site, reducing rework that is originated by unskilled workers, and reducing project duration and cost. In this context, performance increase in VET institutions will directly increase the performance of workers, project and industry respectively. Within this assumption, for the continuity of the construction industry’s sustainable performance, the companies are required to increase their performances by hiring trained workers. VETs are the one of the key providers that provides adequately trained labor that will directly enhance construction company competitiveness. In this sense, the objective of this study is to design a performance evaluation system for VETs. The conceptual performance evaluation system suggests that VETs in construction industry should develop their objectives, measures (KPIs), targets, and initiatives (actions) relative to each of these points of view:

- **Financial Perspective:** This perspective concentrates on VET institution’s financial performance and the use of financial resources.
- **Trainee Perspective:** This perspective concentrates on VET institution’s performance from the point of view the customer that the VET is designed to serve.
- **Internal Process Perspective:** This perspective concentrates on VET institution’s performance considering the quality and efficiency related to teaching and learning activities and products/services or other key business processes related to these activities.
- **Learning and Growth Perspective:** This perspective concentrates on the VET institution’s performance considering the contribution to the improvement in industry’s performance on social and economic development basis.

The indicators developed for each perspective are also presented in Table 1 (Nielsen, 1995; Lee et al., 2000; Ryan, 2002; Fretwell, 2003; Beicht et al., 2004; Plant, 2004; Tonhäuser & Seeber 2005; Hiebert, 2009; Rowland-Jones et al., 2010; FNBE, 2011; Wu et al., 2011; Plant, 2012; CEDEFOP, 2016; European Union, 2016).

Table 1. KPIs for VET institutions

Financial perspective	Internal Process
1. Turnover volume	1. Customized courses
2. Cost control	2. Operational business process
3. Budget control	3. After-sales service
4. Productivity	4. Standard operating procedures
5. Investment strategies	5. School of characteristics
6. Non-founded income	6. Setting up the major programs
7. Net income	7. Increasing administration efficiency
8. Return on investment (ROI)	8. Teaching quality evaluation
9. Advertising cost	9. Experience of teachers and trainers in teaching
	10. Experience of teachers and trainer in practice
	11. Update frequency of course contents and course program
	12. Expenditure on staff development
	13. Development of multidisciplinary courses
	14. Information system capabilities
	15. Encouraging methods
Trainee perspective (Customer)	Learning and Growth
1. Trainee satisfaction	1. Economic growth
2. Continuation of trainee	2. Employees' satisfaction
3. Trainee relationship	3. Firm's performance
4. Expanding of new trainees	4. Employees' retention
5. Market share	5. Employees' productivity
6. Learning environment	6. Earnings
7. Range of products and services	7. Increasing quality of labor
8. Flexibility of service system	8. Crime reduction
9. Image and reputation	9. Social cohesion
10. Trainees' trust	10. Intergenerational benefits
11. Product quality	11. Inclusion of disadvantaged groups
12. Opportunities for further education and training	12. Mobility chance of the employees

Taken into account of the interaction between the performance of VET institutions and construction industry, the conceptual performance evaluation system which adopted the financial, trainee satisfaction, internal process, and learning and growth perspectives of the Balanced Scorecard (BSC) method is presented in Figure 2.

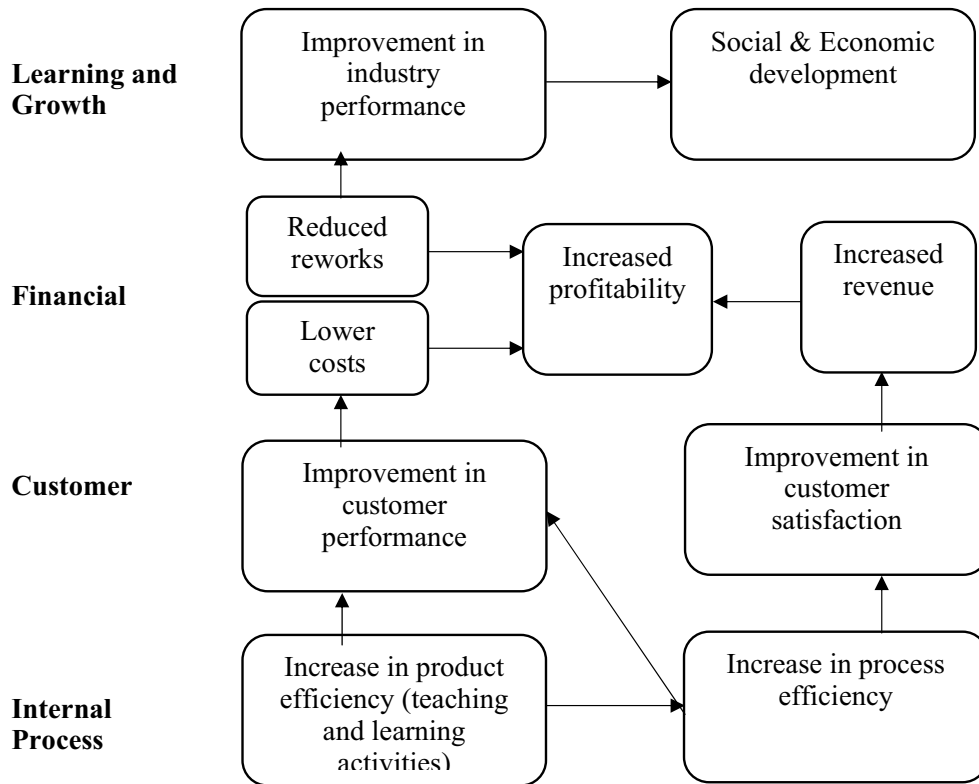


Figure 2. Conceptual performance evaluation system for VET institutions

Conclusion

The construction industry is very labor intensive, and is routinely used by governments to reduce unemployment. A qualified workforce can increase productivity and competitiveness in the construction industry. VET is designed to prepare individuals for a vocation or a specialized occupation, and can positively affect labor productivity, wages, the employment rate, mobility, competitiveness, and increased performance in the construction industry. Thus, the determination of KPIs of VET has great importance. Research on VET has only recently started to emerge. The objective of this study was to reveal the interaction between the performance of VET institutions and construction industry and determine KPIs for VET institutions to design a conceptual performance evaluation system. In the light of this aim, a conceptual performance evaluation system which adopted the financial, trainee satisfaction, internal process, and learning and growth perspectives of the Balanced Scorecard (BSC) method was presented.

There are many factors governing the success of construction projects such as support from senior management, skilled workforce, project team motivation, commitment of all project participants, adequate communications, adequate financial budget, etc. VET is designed to deliver workplace-specific skills and knowledge, and can be considered a significant component of project success in the construction industry since the availability of well-trained workers will increase with effective VET. In this context, the determination of KPIs for VET institutions, and the design of a conceptual performance measurement system are of capital importance. This research identifies the KPIs for VET institutions in the construction industry by using four BSC perspectives. There are only a limited number of studies on

KPIs of higher education, but none of VET in construction. This study fills this gap in the literature by identifying the KPIs for VET institutions in the construction industry. While the performance management literature emphasizes efforts that focus mostly on financial issues including cost, profit and productivity, this study investigates a conceptual performance measurement system that can measure the impact of not only financial issues, but also issues related to trainees, internal processes, and learning and growth. In sum, the significance of this study includes (1) identifying the KPIs of VET, and (2) developing a performance measurement system of VET institutions.

In addition, the findings of the study are expected to contribute to the success of construction projects and construction companies in the long run. Considering that VET is a significant component of project success in the construction industry, effective VET institutions are expected to enhance the performance of construction projects by increasing site productivity, and reducing rework, project duration, and cost. Clearly, the identification of KPIs for VET institutions in the construction industry and the design of a conceptual performance evaluation system that uses four BSC perspectives are likely to improve the effectiveness of VET, and consequently improve the performance of construction projects and companies. Future research can focus on a more detailed analysis of the cause/effect relationship among KPIs.

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