

Understanding of the Key Performance Indicators Measurement Amongst Construction Players in Malaysia

Poh Ngoh Kiew, UTM RAZAK School of Engineering & Advanced Technology, Universiti Teknologi Malaysia Kuala Lumpur, Jalan Semarak, 54100 Kuala Lumpur,
ngohkiew@gmail.com

Syuhaida Ismail, UTM RAZAK School of Engineering & Advanced Technology, Universiti Teknologi Malaysia Kuala Lumpur, Jalan Semarak, 54100 Kuala Lumpur,
syuhaida.kl@ic.utm.my

Aminah Mohd Yusof, Faculty of Civil Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru aminahyusof@utm.my

Abstract

Construction industry nowadays is still synonym with high-profile problems such as cost of project increases, late project delivery, poor quality, abandoned projects and major defective works. Although construction project management has been used extensively in the construction industry, the complexity and dissimilarity of construction projects cannot be regarded as same practices. To meet the objectives of the construction management, strategic management techniques of which include the implementation of key performance indicators (KPIs), KPIs measurement amongst construction players is vital. A questionnaire survey was conducted in Malaysia among 150 construction players: private clients, consultants, contractors, suppliers and purchasers. Factor Analysis (EFA) is used to achieve the aim of this paper in appraising the understanding of the KPIs measurement in terms of definition, characteristics and advantages and disadvantages. Through the understandings of KPIs, it is expected that the findings of this paper could assist the respective construction players to improve their current practice in construction project management for better performance of construction industry in Malaysia.

Keywords: Key Performance Indicators, Measurement, Construction Project Management, Construction Players.

1.0 Introduction

Parmenter (2007) claims that key performance indicators (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. It is also claimed that “very few organizations really monitor their true KPIs, because very few have explored what a KPI actually is” (Parmenter, 2007). A KPI should also tell the management about what action needs to take place and to prevent a recurrence for current and future success of the organization in interim report. There are various models of KPIs have been adopted around the globe with different levels, such as Balanced Scorecard model (BSc) (Kaplan and Norton, 1996), Excellence Foundation model (EFQM, 1999), Process Performance Measurement System (PPMS) (Kueng,2000) and Holistic measurement process frameworks. However, a lot of KPIs have been mislabeled and misused due to lack of understanding. Therefore, the aim of this paper is to appraise the understanding of the KPIs measurement amongst construction players in Malaysia via its objectives of determining of KPIs definition, examining KPIs characteristics and assessing KPIs advantages and disadvantages.

2.0 Understanding of Key Performance Indicators Definition

Table 1.1 shows the results of Exploratory Factor Analysis (EFA) using a Principal Axis Factoring (PAF) extraction method with combining the Oblique rotation method. The results show that the respondents have a very good understanding that KPIs tell them what to do to increase performance dramatically as what gets measured gets done, whereas for Factor 1, the respondents have very poor understanding that KPIs do not tell them how they have done in a critical success factor.

Table 1.1: Summary results of EFA for KPIs instrument*

Instrument	Factors and Items Included	Factor Loading	Communalities
KPI's	Factor 1		
	Do not tell you how you have done in a critical success factor	0.924	0.848
	Do not tell you what to do	0.863	0.77
	Do not tell you what you have done	0.843	0.7
	Eigenvalue = 2.639, % variance explained = 48.22%, Cronbach's alpha = .908		
	Factor 2		
	Tell you what to do to increase performance dramatically as "what gets measured gets done"	0.851	0.713
	Link vision to strategy, objectives, critical success factors and individual actions of the project or organization	0.845	0.732
Eigenvalue = 1.627, % variance explained = 27.08%, Cronbach's alpha = .835			

Note: 1) * The EFA analysis is based on PAF extraction method with Oblique rotation method.

Table 1.2 illustrates the results of the EFA analysis using an extraction method with combining the oblique rotation method. The result indicates that the respondents agreed on the KPIs definition as a set of measure focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization and also an quantifiable measurements with specific targets or goals that make the difference between success and failure of a company.

Table 1.2: Summary results of EFA for "KPIs" definition instrument*

Instrument	Factors and Items Included	Factor Loading	Communalities
KPIs Definition	<u>KPIs Definition</u> A set of measure focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization.	0.784	0.615
	Quantifiable measurements with specific targets or goals that make the difference between success and failure of company.	0.733	0.537
	A set of selected indicators considered key for monitoring the performance of a strategic objective, outcome, or key result area important to the success of an activity and growth of the organization overall.	0.721	0.519
	A set of data sets against which a project or organizational can be benchmark the process and performances for re-engineering or quality improvement initiative.	0.63	0.397
	Qualitative or quantitative measurement of activities of project or organization which reflects how well project or organization is achieving its stated goals and objectives.	0.567	0.321
	Eigenvalue = 2.893, % variance explained = 47.79%, Cronbach's alpha = 0.816		

Note: 1) * The EFA analysis is based on PAF extraction method with Oblique rotation method.

3.0 Understanding of Key Performance Indicators Characteristic

The initial Exploratory Factor Analysis (EFA) analyses are maintained and the diagnostic of the items is carried out in this stage. The summary results of EFA are illustrated in Table 1.3. The Cronbach's Alpha for Characteristics 2 is at the good reliable of the set of grouped items (0.803), which indicates that the respondent agreed the characteristics of KPIs should be expressed in either number or non-number, or both. The respondents also agreed the simplified KPIs data must be accurate, reliable, and honest to ease understanding towards fast action as illustrated in Characteristics 1.

Table 1.3: Summary results of EFA for KPIs characteristics instrument*

Instrument	Factors and Items Included	Factor Loading	Communalities
KPI's Characteristics	<u>Characteristics 1</u>		
	Simplify data reporting in accurate, reliable, and honest to ease understanding towards fast action.	0.894	0.76
	Visually and graphically illustrated.	0.725	0.63
	Closely-monitor the results of action.	0.653	0.41
	Eigenvalue = 2.594, % variance explained = 44.31%, Cronbach's alpha = .803		
	<u>Characteristics 2</u>		
	Expressed in either number or non-number, or both.	0.849	0.742
	Take into account short term and long term considerations which offer an excellent opportunity for business to target the specific areas of desired growth and achieve maximum result.	0.628	0.387
Eigenvalue = 1.136, % variance explained = 14.28%, Cronbach's alpha = .709			

Note: 1) * The EFA analysis is based on PAF extraction method with Oblique rotation method.

2) Five items are removed due to the loading below 0.55.

4.0 Understanding of Key Performance Indicators Advantages and Disadvantages

The EFA analyses are rerun using PAF extraction method combined with oblique rotation by constrained to two factors solution. The results of EFA are presented in Table 1.4 for advantages and Table 1.5 for disadvantages. The Cronbach's Alpha for Advantage 1 and Advantage 2 is at the excellent reliable of the set of grouped items since the value is above 0.90 (0.901 and 0.907 respectively). This reinforces on the benefits of implementing KPIs measurement as it allows management to streamline the entire organization reputation, to see the moment of the project progress on the particular phase from project milestone, which makes operations more flexible than competitors. On the other hand, it is also a reliable and accurate tool in monitoring performance in comparison with other manual surveys and benchmark the organization performance against other industry or organization.

Table 1.4: Summary results of EFA for "KPIs" implementation advantages instrument*

Instrument	Factors and Items Included	Factor Loading	Communalities
KPIs Implementation Advantages	<u>Advantage 1</u>		
	Streamline the entire organization reputation as it links employee rewards and sanction to performance measured against the KPIs	0.841	0.66
	The management will be able to see the moment of the project progress on the particular phase from project milestone which makes operations more flexible than competitors.	0.834	0.623
	Proven as the most reliable and accurate tools in monitoring performance in comparison with other manual surveys.	0.783	0.654
	Benchmark the organization performance against other industry or organization.	0.738	0.541
Capable of being eyes and ears for management and staffs.	0.684	0.495	

Professed by the construction industry players who calculate their organization or project benchmark score from metrics.	0.656	0.483
Competent in highlighting organization and project weakness.	0.642	0.537
Minimize time in benchmarking due to visual metrics.	0.601	0.349
Eigenvalue = 7.399, % variance explained = 49.94%, Cronbach's alpha = .901		
Advantage 2		
Deliver project free from defect.	-0.944	0.778
Deliver project efficiently on time.	-0.82	0.608
Deliver project efficiently safe.	-0.804	0.677
Deliver project on budget.	-0.802	0.666
Drive towards excellent reputed construction companies.	-0.642	0.556
Drive toward profitable construction companies.	-0.592	0.487
Eigenvalue = 1.507, % variance explained = 8.02%, Cronbach's alpha = .907		

Note: 1) * The EFA analysis is based on PAF extraction method with Oblique rotation method.

Table 1.15: Summary results of EFA for “KPIs implementation disadvantages” instrument*

Instrument	Factors and Items Included	Factor Loading	Communalities
KPI's Implementation Disadvantages	Disadvantage 1		
	Waste time in undertaking the surveys.	0.882	0.79
	Waste financial resources in evaluating the end results to the potential KPI's users in organization at project.	0.873	0.747
	Waste time in evaluating the end results to the potential KPI's users in organization at project.	0.864	0.73
	Waste time in creating metrics, brainstorming the bad indicators, undertaking the surveys and evaluating the end results to the potential KPI's users in organization at project.	0.857	0.724
	Waste financial resources in undertaking the surveys.	0.843	0.703
	Any corrections on the drivers cannot be simply done.	0.734	0.603
	Non exposure on the correct principles, theory and practical will lead to failure in increasing the cost of KPI's implementation.	0.7	0.476
	Non exposure on the correct principles, theory and practical will lead to failure in improving organization performance.	0.689	0.467
	Extensive time consuming in KPI's selection and setting for first time executor.	0.675	0.482
	Workable for particular project but not necessary sound for another project due to the construction is a unique industry.	0.589	0.417
	Eigenvalue = 6.727, % variance explained = 39.69%, Cronbach's alpha = .937		
	Disadvantage 2		
	Waste time in brainstorming the bad indicators.	0.787	0.607
	Waste financial resources in brainstorming bad indicators.	0.706	0.49
	Data collection through KPI's questionnaires or surveys is fluctuating depending on time and resources input to KPI's system development.	0.673	0.5
	Focus on organization's interest rather than customer.	0.621	0.377
	Lack of management skills affects the KPI's efficiency.	0.57	0.42
	Require involvement every level of personnel cooperation within the organizations.	0.558	0.332
	Eigenvalue = 3.011, % variance explained = 15.61%, Cronbach's alpha = .811		

Note: 1) * The EFA analysis is based on PAF extraction method with Oblique rotation method

The two factors under this disadvantage of KPI's implementations measurements are named Disadvantage 1 and Disadvantage 2. The internal consistency of the extracted variables is acceptable reliable. The Cronbach's Alpha for Disadvantage 1 is at the excellent reliable of the set of grouped items since the value above 0.90 (0.937), whereas for Disadvantage 2, it indicates that it has a good reliable set of grouped items (0.811). However, the result which indicates that the respondent agreed

on the disadvantages of KPI's implementation are on the issues of wasting time and wasting financial.

5.0 Conclusions

Generally, the aim of this paper in appraising the understanding of the key performance indicators (KPIs) measurement in terms of definition, characteristics and advantages and disadvantages is successfully achieved. In order to achieve this aim, the results for KPIs definition, KPIs characteristics and KPIs advantages and disadvantages are analyzed. Based on the results, the respondents have poor understanding on KPIs definition as a set of measurement for qualitative or quantitative measurement of activities of project or organization which reflects how well project or organization is achieving its stated goals and objectives. However, majority of the respondents have sufficient understanding that it is a set of measure focusing on those aspects of organizational performance that are the most critical for the current and future success of the organization. In addition, the respondents have poor understanding that KPIs take into account short term and long term considerations, which offer an excellent opportunity for business to target the specific areas of desired growth and achieve maximum result. However, the respondents have sufficient understanding that KPIs simplify data reporting in accurate, reliable, and honest to ease understanding towards fast action. As for the KPIs advantages and disadvantages, the respondents have sufficient understanding that KPIs streamline the entire organization reputation and KPIs measurement requires involvement of every level of personnel cooperation within the organizations. Since all the variables in this study meet the Cronbach's alpha greater 0.80, it is proven that KPIs may act as a valuable performance measurement tool for the construction project in near future in order to meet the project goals and objectives.

References

- European Foundation for Quality Management. (1999). *Introducing Excellence*. Brussel, Belgium.
- Henson, JK., Roberts, JK. (2006). *Use of Exploratory Factor Analysis in Published Research: Common Errors and Some Comment on Improved Practice*. Educational and Psychological Measurement, 66 (3).
- Kaplan, R., & Norton, D. (1996). *Translating Strategy Into Action : The Balanced Scorecard*. Harvard Business School, Boston.
- Kueng, P. (2000). *Process Performance Measurement System: A tool to Support Process-Based Organizations*. Total Quality Management, 11(1), 67-85.
- Parmenter, D. (2007). *Key Performance Indicators: Developing, Implementing and Using Winning KPIs*. New Jersey: John Wiley & Sons, Inc.