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COSTRUCTION HOLDINGS SYSTEMATIC MANAGEMENT, USING KEY PERFORMANCE INDICATORS FOR CONSECUTIVE IMPROVEMENT

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ABSTRACT

The purpose of this research is to study the characteristics of construction holdings and introduce management strategies to improve holdings performance through systematic evaluations. The new strategy introduced in this research is a tool for integrating and configuring existing managerial methods with evaluation methods for making managerial solutions. The huge volume of data and difficulty in separation of useful data is one of current difficulties in mega companies. The direction of this research after studying the literature and reviewing the research gap in the field of performance evaluation models, includes presentation of problem design and general concepts, research methodology and research achievements, which is a guide and a model for companies to use. Having suitable evaluation indicators in every management area of companies can be a decision support for managing issues in organizations. The topic of research is to present a model of integrated performance assessment of construction holdings and to continuously improve performance of these organizations. The focus of the discussion is to enhance the organization's capacity in holdings solutions and integrate functional tools of performance evaluation. To achieve the goal of this study, steps have been taken to establish evaluation and integration systems for achieving results that are more effective in order to catch desired results. The final achievement of this research is to provide a validated assessment method for construction holdings to enhance ability for data processing and management of sub-companies.

Keywords: *Holdings Management, Controlling Indicators, Management Model.*

INTRODUCTION

Regarding the subject of research, the aim of research is to study the characteristics of holdings in the field of construction and the provision of management strategies to enhance the organization's performance through systematic evaluations. In this study, by investigating in performance evaluation methods for construction holdings and assigning the correct integration of these models, main step is taken to more accurately assess the construction holdings and result continuous improvement (Chun, Kim & Lee, 2014). The construction company managerial and coordinating issues is a concern in studies on indicators quality and different aspects monitoring (Volkova, Chelyshkova & Lysenko, 2016). Some researches investigate the weaknesses of current state by conducting the interviews in order to determine the required scope (Aldridge, 2013).

The choice of management methods is a delicate subject that needs to be deeply studied. There are various management methods and assessment indicators that each of these methods has its advantages and disadvantages, so the important thing is to choose the most appropriate method for achieving the desired goals. Previous researches has not focused on the systematic

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management of construction holdings. Various researches on organizational management, performance measurement and performance enhancements has been done. by studying them and looking at characteristics of holdings, better managing solutions for holdings will be introduced in this research. In traditional performance evaluation methods, more attention is being paid to financial evaluation indicators and past events. The traditional view, judging and reminding of performance and verifiable control are targeted (Tabatabaei, Mir Hosseini & Sadat,2013). This researches usually focus only on the function of past period and are shaped by the requirements of the past. Modern view of education, growth and capacity development evaluation capacities, improvement of the organization and its performance, consulting services and public participation of stakeholders, motivation and responsibility to improve quality and optimize the activities and operations aimed Based on the identification of weaknesses and strengths and organizational excellence(Kaplan, Norton,2010).

Systemic performance evaluation is developed using modern techniques and methods. The scope of measuring performance can be the macro level of a holding, one unit, a process, or a staff member. Organizations, individuals, or organizational units, although they seem to perform work, are only part of the whole system, and the conditions of other components must be considered. Attention to the comprehensive criteria and the organization's strategies are an integral part of a comprehensive performance management system. Such an approach to performance appraisal will be real, fair, reliable, and dynamic assessment method.

Financially reliant valuation criteria have shortcomings, including short-term and non-strategic ones, based on historical information, one-dimensional evaluations, a mere reliance on accounting information, and neglect of important variables such as quality, innovation, and customer satisfaction.

Research gap

In the table1, a summary of previous research studies and research gap analyses is shown.

Table1: Research gap analyses

developing objective function of the utility function	showing a Case study	Performance measurement	Using controlling indicator	Provide Performance Evaluation Tool	year	researcher
	√		√	√	2009	(Lo & Lu,2019)
√	√		√		2016	(Lee,2016)
	√		√	√	2017	(Banihashemi,2017)
		√	√	√	2016	(Merit,2017)
√	√			√	2014	(Chun,2011)
	√	√		√	2015	(Ekena,2015)
√	√			√	2013	(Abbaszade,2014)
	√	√	√	√	2014	(Firouzabadi,2013)
	√		√	√	2016	Liuguo Shao, et.al
√				√	2014	(Chun et,al.,2015)
√				√	2016	(Kliuchnikova, Pobegaylov,2016)
√			√	√	2016	(Zhen-Zhong Hu et. AL.,2016)

	√			√	2016	(Xin Hu et. al.,2016)

RESEARCH METHODOLOGY

In figure1, a total diagram of research method and steps to make the final model is shown.

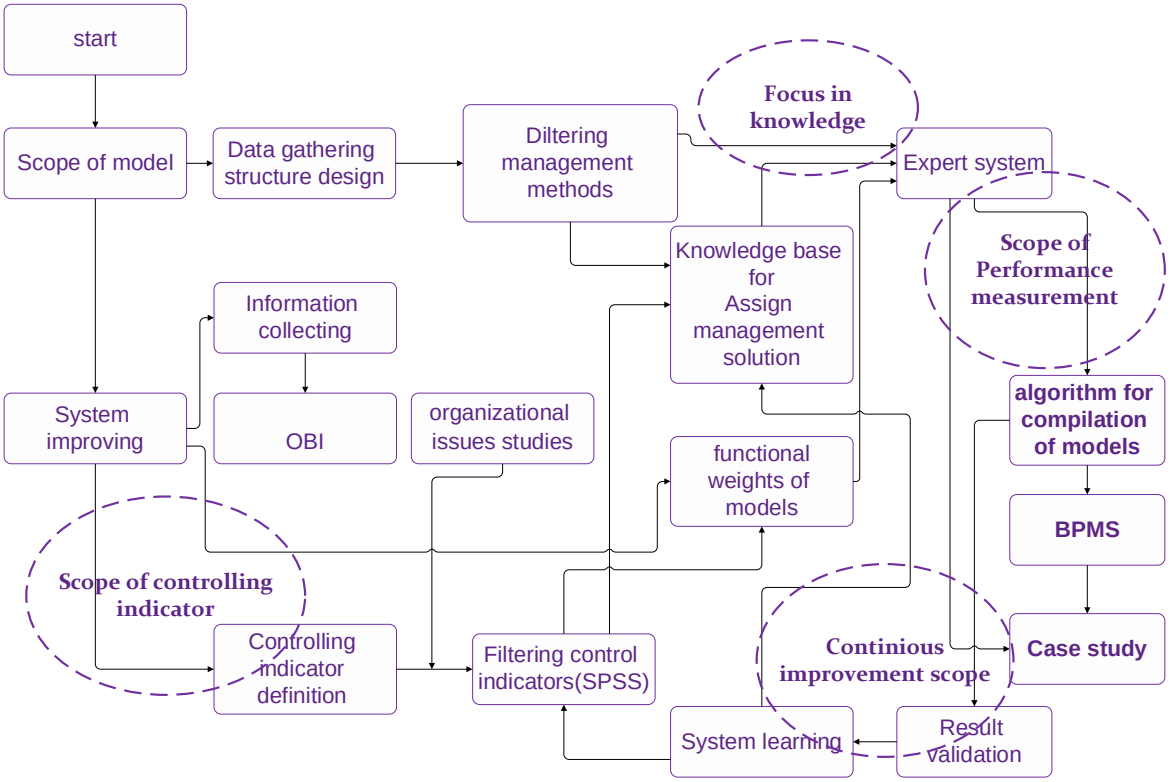

Figure 1: Research methodology

Interview and questionnaire

The pivot point in management of holdings is the creation of a coherent planning system in the management structure of the holding. According to studies, one of the main tasks of the parent company is strategic planning for its subsidiaries, which is in line with the company's general rout and ensure the movement of the organization's sub-groups towards the stated goals. Comprehensive planning and coordination relies on statistics and information related to the set of facilities and constraints, and to be systematic and principled. Indeed, the use of an integrated planning system enables comparisons of the efficiency of different units and acts as an integrated and acceptable leverage for controlling and measuring responsibilities. As companies become more sophisticated, upgrading management practices becomes an important concern. This section indicates the current status of management and control systems in local reputable holdings by raising the questions and conducting the interviews with managers. The aim of this section is to introduce the quantitative indicators to assess the status in each holding performance section. Therefore, each of these indicators are repeatedly measured and then the report of indicators, which briefly indicate the management status, is sent for different levels of organization after comparing it with the mean of that index in other

related organization. At the next stage, the parameters are ranked based on the impact of utilizing the Anp hierarchy method and Likert scale by interviewing with construction industry experts. The last column of table 2 represents the results of questionnaires.

Table 2: List of suggested indicators by experts

1	Financial and economic	1	Sell / Allocated resources
		2	Accounting profit/Amount of contracts
		3	Cash flow of liquidity/ total depth
		4	Annual profit/ total value
2	Human resources	5	Value Added /Cost of Human Resources
		6	Sales /the expense of human resources
3	Capital	7	Project profits/investing made
		8	Annual profit/sold annually
		9	Annual profit/holding capital
4	Innovation	10	Income from new products/sell
		11	The percentage reduction in the time needed to develop a new generation of services in the project
5	Education, growth and development	12	The number of proposals offered to the number of human resources
		13	Annual percentage rate of personnel learning
		14	Rated Holding Knowledge Management System
6	Technical section	15	percentage of specialist personnel
		16	Level of scientific expertise in personnel
7	Scope and scale	17	Nominal value of holding/ market size
		18	Number of holding personnel/ holding value
		19	Number of companies on the contract side/ market norm
		20	Annual sales of holding/ market share

Indicators that are required to examine these areas more closely and more appropriately are worthwhile. According to the indicators presented in the previous section, the indexes of valuation of holdings are produced and finalized. In figure 2 and figure 3 the way the questionnaires are inserted in software and analyses of data is shown briefly.

Figure2: Anp analyses

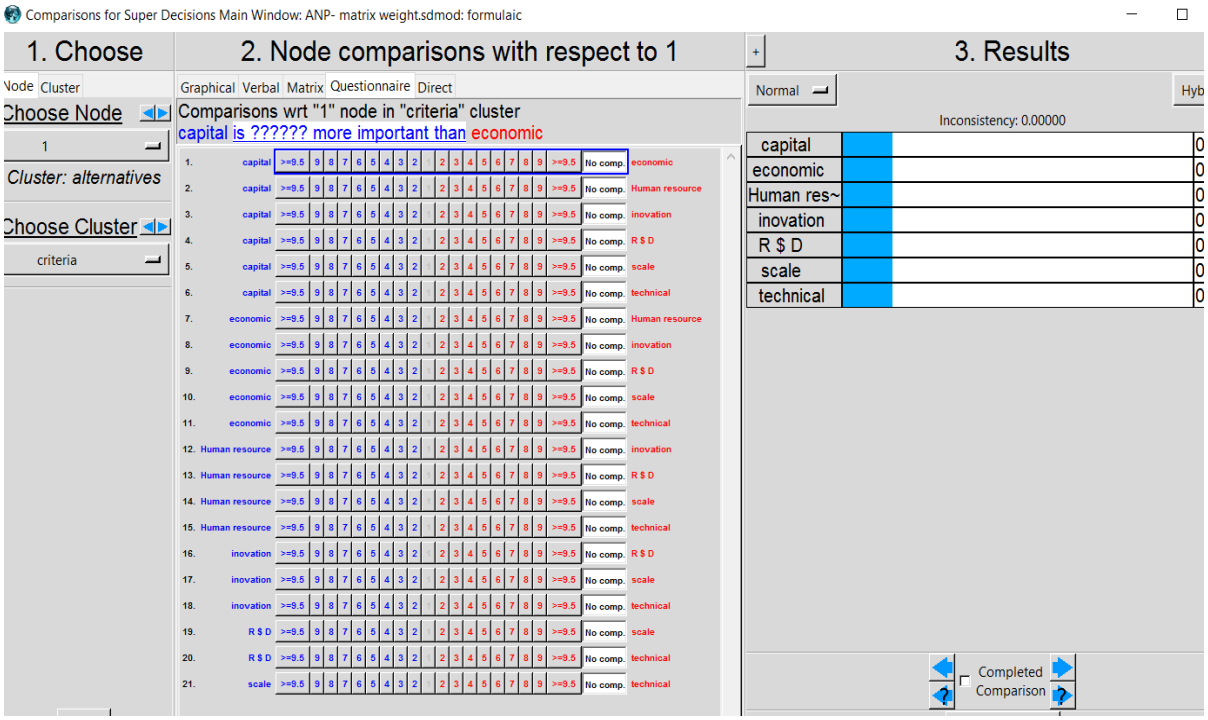

Figure 3: Anp analyses result sample

The new indicators are introduced in order to prepare a list of indicators through the domain experts' and author's comments. Summation of these indicators and indicators of study resources constitute the initial list of indicators. After creating the initial list of indicators, they are ranked. Each of these indicators can be defined with the mean of industry according to the statistical data in the lack of appropriate data and according to the management team's viewpoint on the type of item when none of them exists. Some of the mentioned indicators are explained and quantified as follows (table3).

Table 3: Weighted indicators by experts

Suggested index	Score
Financial indicators	
Ratio of outcomes to allocated resources by organization	3.2
Ratio of number of contractors to superiors	1.5
Average time of collecting the receivables	2.2
Ratio of debt to credit	3.3
Ratio of accounting profit to total sale	3.3
Ratio of current liquidity to total depth	2.2
Annual profit to total value	3.8
Labor efficiency	
Ratio of statement to cost of superior labor	2.2
Staff satisfaction index	1.8
The individual competence for their posts (organization inspector's report)	3.5
The influence of defined work culture of organization	2.3
Ratio of value added to the number of human resources	4.5
Managerial power	

Compliance of project process based on the strategic/ portfolio process	2.5
Motivating and delegating the sections team by managers	3.6
The percentage of success in delivery/ percentage of success in portfolio	2.1
Evaluation of suppliers or subcontractors in terms of ability to adapt to possible changes in design	3.6
Capital productivity	
Ratio of realized profit to expected profit	2.1
Ratio of companies profit to investment in each company	3.2
Ratio of capital involved in the company to income from , compared to holding	3.4
Optimized project implementation	
The real cost of faults in implementation or designing to cumulative function	1.6
Percentage of activities needed to be refined and reworked	2.9
Percentage of poor and rejected services by employer	3.3
Average customer satisfaction index and other regulatory factors	2.9
Ratio of real to planned progress	4.3
Percentage of real physical progress to contract volumes	2.9
Project implementation process	
Analysis and report of risk management plans	1.2
Employer's satisfaction: cost performance index (CPI)	1.6
Employer's satisfaction: schedule performance index (SPI)	3.3
Percentage of work delays in 10 main activities per month/ portfolio index	3.0
Ratio of achieved milestones to program milestone	3.3
The rate of company documentation on the official website of holding	3.7
Success in contract management (report of inspector in organization)	2.3
The use of information systems in headquarters of organization	3.9
Success in achieving the professional team (report of inspector in organization)	3.8
Innovation	
Percentage of revenue from new products and service in project	4.1
Ratio of people aware of goals and strategies in each sector	3.6
Time required to develop a new generation of services in project	4.0
Education, learning and development	
Total key members' turnover in each companies team	4.2
The use of enterprise system center and updating with it	3.1
Ratio of submitted proposals to the number of human resources	3.1
The amount of information available to employees	3.5
The regular and scheduled meetings with employer for common understanding of project	2.8
Project manager's membership in forums and attending in conferences and specialized seminars	3.9

In all research projects, the researcher should consider important issues such as the ability to generalize the results, validity, reliability, as well as the degree of trust and confidence. In general, it can be concluded that a good test should have the desirable features such as the objectivity, ease of performance, practicality, ease of interpretation, validity, reliability in order to lead to accurate results. Among these features, the reliability and validity are more important. Here, alpha Cronbach's method which is more common than other methods is studied in this regard. alpha Cronbach's coefficient method can be utilized for determining the reliability of questionnaire or test with an emphasis on the internal correlation. In this method, the components or parts of questionnaire are utilized for measuring the reliability coefficient of test (Ekena, et. al., 2015). Alpha Cronbach's coefficient ranges from zero to one; the greater the ratio, the greater the reliability of scale. According to the rule, alpha should be at least 70% in order to be considered as the scale with reliability. Therefore, SPSS software is utilized for

measuring alpha Cronbach. The obtained outcome is equal to 79% and it is acceptable (Firouzabadi, Izadkhah, 2013; Shakeri, et al., 2015).

Definition of objective function

Each organization should have a unique objective function according to its own situation. Using this function, the organization can summarize the status of each section by a single number and determine the proximity of companies status to objectives of organization. This function should be achieved by defined indexes, and should be in fact the sum of them. The features of this function are investigated as follows:

- It should have a positively correlation with improvement of each index.
- In the case that each index has the critical status, this index should be severely declined, so that the high mean of other indexes cannot hide a crisis.
- The indexes, which are more important, should have higher weights in the function.
- The priorities of management team to various groups of indexes (financial, productivity, etc.) should be defined as the input to function.
- It should be understood and has the ability to be changed by management team.
- The high amount of an index should have no exponential and fake impact on it.

With this objective function and having indexes available, constant company assessment will be possible and continuous improvement will be gained (Shakeri, et al., 2015).

DISCUSSION

In this paper, a brief introduction to holdings management and control procedures is presented with regard to the current problems as well as seeking to simplify the complex construction holdings management. Transparency of research process is main benefit of this model. In other words, introduced indexes facilitate tasks which are assigned to employees and then management becomes more detailed with the procedures of activities. These cause difficulty areas be clarified for management and the responsible person will be determined in this work process. According to the documentation in activities, this system allows the control of management team on any changes made, so helps change management being possible in the holding. Upgrading individual knowledge through learning, increasing speed of personnel outcome and enhancing the productivity will be gained. Determining the algorithms of work and information flow and clarifying the individual responsibilities for their activities will come as result. Taking advantage of combined data due to their integration is another advantage of the process.

Data availability statement

The datasets generated analyzed during the current study are available on reasonable request.

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