

Performance Management for Syrian Construction Projects

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Abstract It has become known that project management through integrated and balanced indicators will achieve a significant improvement in the performance of such projects. Performance measurement and management is still unused as a performance improvement tool in Syrian construction projects. The aim of this paper is to examine the application of balanced, integrated, and recent performance management system in order to adopt it as a tool to measure and manage Syrian construction projects performance. Balanced score card was selected as framework for proposed performance management system, and performance goals were set for 8 key performance indicators. BSC designer (performance management software) was used to support application the all related issues concerning performance management stages (measure, store, analyze, report, and use) and balanced scorecard elements (objectives, measures, goals, initiatives). Four under construction building projects were chosen as a sample of selected company projects to examine a comprehensive application of performance management model. The proposed construction project balanced scorecard performance framework successfully demonstrated the projects overall performance which was marginal and ranged between (24.42-35.05) %, and progress towards goals which was limited; besides projects strengths and weaknesses. In conclusion, the application of the proposed framework has proved that it forms an integrated and balanced system for measuring and managing performance in term of its ability to address all performance management stages and BSC elements. This research finding is very important for performance management practitioners because the proposed methodology forms an experimented framework which helps them with smooth, balanced, and successful implementation of performance management for construction projects performance improvement.

Keywords Construction performance management, Balanced score card, Key performance indicators

1. Introduction

1.1. Background

In spite of increased international interest in performance improvement in construction, the Syrian construction companies have not shown any progress in this matter. The research, according to [1] and [2], about construction projects performance recorded weak performance particularly with regards to the main performance indicators (cost, time) which showed a big delay in construction projects that sometimes exceeded 100% of planned project duration. According to [3], Delay in Syrian construction projects became a common Phenomenon which had negative effects on project performance and parties. Another research [4] also verified weak performance in a set of key performance indicators as 29 out of 37 projects proved to be inefficient through performance measurement

using Data Envelop analysis. The quality was also little above average as measured by customer satisfaction in construction projects and the customer satisfaction average was 2.73 in a set of 30 executed projects and on 1-5 scale according to [5], the research also stated that most of the studied projects failed to achieve the planned goals. Few attempts were done to investigate the reasons behind poor performance in construction projects [4] and Results showed that weak performance was caused by the weak use of project management techniques and the average of project management maturity for 20 projects was 1.8 on a scale of 1-5 which means that project managers depend on the personal skills and experience and there is no systemized planning and control tools for project management. The upcoming phase of reconstruction in Syria requires delivering large scale production with tight constraints of time, cost, and quality to meet labor market needs. Therefore the local construction companies will work with international companies to deliver high quality projects that meet customer needs. It will be not appropriate to continue working with traditional management methods that generated big deviations and poor quality; the local companies have to enhance its performance to compete with

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international companies and participate in delivering high quality projects. This requires that local companies must achieve better projects performance in accordance with international standards and, therefore, they need to employ a better level of management that contributes to a high level of control which increases their efficiency. The high performance and quality products require new and flexible tools which help in performance Management. Measuring and analyzing performance through performance management system will help construction companies to set priorities and manage performance systematically to achieve better balanced performance.

1.2. Research Problem and Aim

Despite the positive link between building and construction and economic development, the performance of the construction sector in Syria was classified as weak depending on the national policy report for science and innovation [6]. The report indicated that weak performance was mainly affected by the legal environment of the building sector, surplus workers, and lack of finance and work stations. In addition to that, the government decision about merging similar construction companies created many administrative, financial, and organizational problems such as the weak role of construction sector in gross domestic product (GDP), weakness of management in general because of absence to performance management systems and weakness of project management which affected negatively projects duration, technical specification and quality.

The bad management was identified as the main rework reason in [7] and the rework became a convention in Syrian construction projects in spite of the extreme costs and schedule overruns caused by it. The rework index at 22% completion of the research case study was 1.33% which means that the cost overrun was 33% though it is expected to reach 100% at the end of the project. Other factors of rework were identified which included human factors, technical and engineering factors, besides to contract type. Performance measurement was considered a fundamental issue in any planned performance improvement process [8], and [9] defines the flow of information as one of the three main reasons for the building sector weakness. At the national level, effective performance measurement absence was identified as one of the causes of low quality of construction projects [7]. The application of performance measurement and management system in Syrian projects will help project managers to supervise and monitor project performance. It has become known that project management through integrated and balanced measurements will achieve a significant improvement in the performance of such projects like meeting the requirements of the stakeholders successfully, and focusing on the critical areas for improvement [10]. Most of the used indicators of construction companies performance measurement in Syria focus on financial aspects (profit) [4], and in spite of their

usefulness, they are not sufficient because they are late indicators and lack strategic focus, and they fail to provide information on the quality and other operations within the project [10]. Moreover, recent performance systems have grown from traditional accountability measurement systems to organizational management systems that support organization growth through a holistic approach that requires using of a set of performance indicators to measure multiple stakeholders' satisfaction [11].

The aim of this paper is to examine the application of one balanced, integrated, and recent performance management system in order to adopt it as a tool to measure and manage Syrian construction projects performance. Performance management framework which included a set of performance goals and balanced indicators were used to measure performance and progress of a sample of Syrian construction projects. The results which included projects performance and progress towards goals were presented, this allowed articulation of construction projects strength and weaknesses and assessment of current plans and activities effectiveness to achieve stated performance goals in Syria. This study proposes a contemporary balanced, and integrated performance management methodology that examines the application of recent tools which will draw the attention of construction companies to performance management systems role and the importance of systematically managing and improving their projects performance. The proposed methodology guide the Performance management practitioners to better application of performance management system and maximize its benefits in performance improvement.

2. Literature Review

2.1. Performance Measurement

The need to change traditional measurement systems in Syria was recognized only by academics. Construction companies performance measurement still use financial measures in spite of research attempts to introduce the most important performance measures as a set of key performance indicators (KPIs) to be used by Syrian construction companies [4], [12].

Internationally, the traditional (financial) performance management systems were criticized because they are based on lagging indicators that are not sufficient; they give information about the past and they are not helpful to introduce information about causes, areas, and responsibility in case the project succeeded or failed [13] [14] to support decision making and direct future performance.

Accordingly, research in performance measurement was increased clearly after the year 1990 since [15] mentioned that 3600 papers were published on performance measurement between the years 1994 -1995 which was described as a revolution. Performance measurement was

defined as: "the process of quantifying effectiveness and efficiency of actions." [16]. The research proposed many tools which employ leading non-financial indicators such as quality, time, productivity, etc., that can lead the performance and not just know it [17] [18]. Indicators were defined as: "numerical information used to quantify the input, output and performance dimensions of processes, products, programs, projects, services and the overall outcomes of an organization" [19]. Then, the concept of key performance indicators (KPIs) was raised which is "a measure of performance of an activity critical to organizational and project success" [20]. The concept of (KPIs) generated an ever growing number of indicators because each organization will choose the indicators that support the activities which are critical and of best value for the organization. In [21], a set of performance indicators were presented for performance measurement in construction; they are: time, cost, quality, client satisfaction, client changes, business performance and health & safety. Also we can find in [22] another example for KPIs for The Construction Industry Institute of the USA which used 4 KPIs as follows: Performance, Construction Productivity, Engineering Productivity and Practices and they were broken down into subsections to a better use and follow up. The concern then was on the design process of the performance measurement system (PMS) that was considered crucial to success and achieves the expected results of PMS in support of the strategy application [23]. From the other hand, the application of PMS started to grow as the largest construction engineering organizations have adopted PMS [24], and the research emphasized the importance and the power of performance measurement as the main driver of performance improvement [25]. Basically, the performance measurement helped in performance monitoring and setting priorities through defining fields that need attention. In addition it enhances enthusiasm, improves communication, and activates accountability [26].

2.2. Performance Management

Performance measurement systems (PMS) were excellent tools to know about weak and good indicators of performance but they failed to guide performance improvement in terms of overall improvement because the performance improvement in one indicator may be at the expense of another one. This caused the development of Performance management which is "a systematic approach to improve their goals through an ongoing process of establishing strategic performance objectives; measuring performance; collecting; analysing; reviewing; reporting performance data; using that data" [27]. Performance management was developed as a result of PMS practical use which showed the need to maximize the effect of PMS application to support managerial action. [28] stated that there is now a general acceptance that adopting KPI's and reach measures are of value just when they are incorporated

within performance management system. Therefore, a lot of models were used in order to set targets and standards that support control and management of performance. Here, we introduce the two of the worldwide best known performance management frame works: The European Foundation for Quality Management's (EFQM) Excellence model and Kaplan and Norton's Balanced scorecard (BSC), which philosophy were described by [29] as: "each consists of a non-prescriptive template offering managers a relatively small number of categories of key performance metrics to focus on.". EFQM represents a structure for the organization's management system and it emphasizes the holistic performance view by optimizing the use and effectiveness of all of their resources within the overall organization. The model includes five enabling criteria (leadership, people management, policy and strategy, partnership and resources and finally processes) and four areas of results (people results, customer results, society results and key performance results) besides that the model supports system continuous improvement through feedback acquired by innovation and learning [30]. The model was used for different purposes in construction [31] and the construction practitioners considered it easier than other models in term of indicators definition and monitoring [32]. Also the balanced score card addressed the issue of holistic view of performance through completing financial lagging measures with future (leading) measures which are customer perspective, internal business perspective and an innovation and learning perspective .Therefore BSC was considered as a fast and comprehensive information model that can describe corporate strategy, business objectives and competitive demands [30]. As BSC was chosen as a performance management framework in this research, we will display its origin and component in details.

2.3. Balanced Score Card (BSC)

Kaplan and Norton (1992) [33] introduced BSC responding to challenges which faced performance measurement frameworks about its weakness in driving performance. A wide range of companies adopted BSC to measure and improve performance as it was seen by researchers as a strategic management tool in constructing a performance management system [34]. "Figure 1" [35] shows BSC structure and perspective and illustrates the answers it provides in each of its proposed perspective. Therefore, BSC helps companies to create future vale by describing performance in the four proposed perspectives as following [34].

BSC framework allowed companies to customize the relevant set of potential indicators in each perspective according to its vision, strategy, and special work conditions as they are different and changing issues in companies. BSC also consisted of the strategy map which includes performance targets and standards and clarifies how the strategy may be successfully executed, [36] stated that it allows defining the relations between indicators in the four

BSC perspectives in order to connect the various operations in relevant departments to the planned results. According to [37] BSC is considered one of the five most famous tools used globally in business management. The conclusion depended on the Bain & Company (one of the world's leading consulting firms in the field of management) in research entitled "trends and management tools". The classification resulted from 1208 interviews with managers from all over the world as the research came up with a list of 25 most common tools for business management and BSC as mentioned above was the first of five tools most commonly used.

In conclusion, the two of performance management models (EFQM, BSC) were considered applicable, appropriate, and beneficial for construction industry performance measurement and management. This was also emphasized by [30] as he founded in his research that the application of performance management systems has potential benefits through disclosing organizational trends and it indorses a number of important management principles.

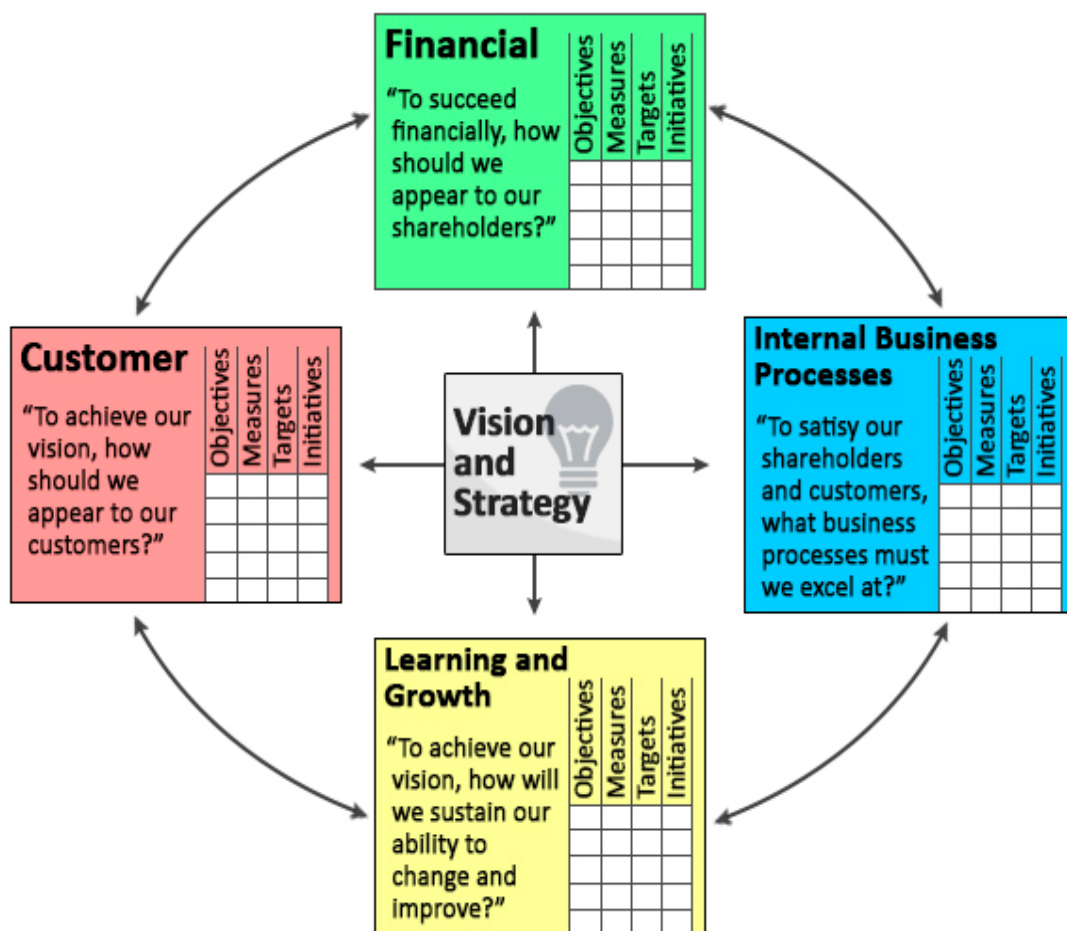
2.4. Previous Studies

Performance measurement and management is diverse in terms of purposes and methods. However we agree with [38] that performance management is a key issue in construction due to its complex factors. The importance of performance measurement and management was emphasized in literature as an essential issue for any improvement efforts, and large construction companies adopted performance management to improve their performance. In this section, we review the literature on performance management. BSC was used in [30] for construction projects in well-being identification and examined its application using seven qualitative and quantitative key performance indicators for 13 projects. The model illustrated the qualities of various projects and the research showed that using performance measurement system will help evaluate and benchmark projects performance and drive decision making process which has potential benefits for construction managers. Also [39] developed a web based construction performance monitoring system to help control construction projects. In the research, eight project performance measures categories including specific indicators were identified and word wide web and database technology was used to automate the data collection and monitoring process. The researchers found that the use of performance system can assist project managers at different levels in monitoring and assessing project performance. Projects performance benchmarking was also used to identify best practices by [40]; he designed a performance measurement framework using nine KPI's and applied it for projects related to construction purposes in three large companies in Vietnam. The research came up with actions done in the studied projects and determined the actions with important effects. Excellence model for construction was used by [41] as a performance measurement and management framework, a questionnaire

survey was used to evaluate and analyse proposed criteria and sub-criteria, the empirical study confirmed the proposed model and the criteria weights were suggested. The researchers mentioned that the main benefit of the model is the criteria and sub-criteria that would help construction contractors in performance measurement and management, but it is limited as a managerial tool as it can help improve performance but not guarantee it. Also BSC was used in [34] in order to measure industry performance as the critical success factors and the recommended strategic thrusts were evaluated using a list of KPI's that was linked with each strategic thrust. The research revealed that the recommendation meets all BSC four perspectives but it lacks costumer relationship and costumer management in both costumer and internal business process perspectives; the recommendations that address the identified gaps were also suggested. Other attempts were found on the application of performance management systems in construction. In [42], performance management method was developed for construction companies, the proposed system defined the five phases for performance management process which are measure, store, analyse, report, and use; Then the proposed system were prepared for practical use by putting the phases together and applying simulation in order to help use analysis result which include comparable data for support decision making. The main strength of the proposed method is its contribution to the definition of performance management process besides its experiment of efficient performance possibility which enhances the application of performance management systems for construction performance management. Measurement of Projects success was another reason for performance measurement application in Hong Kong [43]; projects success was benchmarked using performance measurement system which includes both leading and lagging KPI's and was tested by using reliability interval method. The research revealed the most 10 suitable KPI's in order to evaluate projects in addition to comprehensive assessment. The researcher stated that the provided framework can assist in benchmarking, monitoring, and improvement of construction projects at various stages of project lifecycle to achieve excellence. Performance of works contracts award process also was investigated in [44] using performance measurement framework that includes relevant criteria and indicators. AHP was used to identify the weights for selected criteria and the study concluded the critical performance criteria that the public contract award must include to achieve above of 80% of the expected performance. The research regarding performance indicators selection continued to grow as effective performance measurement was considered critical to project success since [45] identified the 10 most popular KPI's through extensive literature review in attempt to found the most relevant KPI's to the Ghanaian construction industry. Therefore, to achieve this goal an industry survey was conducted and a set of nine KPI's that can be used by Ghanaian contractors were used to measure and benchmark

performance. Thus, in spite of the progress that has been made in performance management implementation in large construction companies, there are still significant challenges regarding its implementation in terms of planning, deployment, and assessment and review stages [38]. Performance management models were considered as basis to develop strategy for sustaining long term business objectives and they proved to be effective and innovative tools in performance improvement. Thus most of research on performance concentrates on performance measurement issues and KPI'S as they are essential for performance measurement systems design. In spite of the importance of implementations issues of performance management models, research still in adequate in addressing all related issues concerning performance management stages (measure, store, analyse, report, and use and balanced

scorecard elements (objectives, measures, goals, initiatives). Therefore, more investigation has to be done in performance management models design in terms of defining goals and monitor the progress towards its achievement which was missing in previous research performance management models. Also, more investigation has to be done in term of PMS application by using advanced tools which facilitate its application in all the stages of performance management and will increase support in decision making and performance improvement. The inadequacy in addressing performance management stages and its practical application encouraged us to examine a comprehensive application of performance management model in an attempt to contribute to value maximizing of recent performance management models application in term of required stages and BSC elements.



- **Financial:** which will eventually lead to higher shareholder value
- **Customers:** deliver specific value to the market
- **Internal processes:** innovate and build the right strategic capabilities and efficiencies
- **Learning and growth:** knowledge, skills and systems that employees will need

Figure 1. Four perspectives of balanced scorecard

3. Research Methodology

As the research aim was to investigate the application of integrated balanced performance management system, BSC was selected as a performance management model and performance management system was designed accordingly. Also BSC designer was proposed as performance management software to facilitate performance management application according to performance management stages and BSC elements. The proposed performance management system was implemented to measure performance and progress in four construction projects and findings were made with regards to performance management model application and performance indicators results for studied projects.

3.1. Performance Management System

Table 1. Proposed Performance Measurement Indicators and Formulas

Performance Indicators	Calculation formula
Financial perspective	
profitability	-return of investment = net income/total expenses
cumulative profit	-profit for 9 months
Costumer perspective	
external customer satisfaction	- questionnaire of 1-5 scale - ratio of non-conformance items in quality checklist
internal customer satisfaction	questionnaire of 1-5 scale
Internal processes	
productivity	work productivity = quantity/time
planning effectiveness	cost Prediction possibility = (actual cost-expected cost)/actual cost
human resource management	questionnaire of 1-5 scale
Learning & growth	
human resource development	Training ratio =No. of trainees/total number of staff

BSC was selected as performance management framework because it is more suitable for projects than EFQM which involves the whole company [30]. Design of performance management system includes goals setting, defines relations (strategy map), and selects indicators and calculation formulas, besides total performance and progress measurement. Performance indicators vary from one country to another depending on market conditions, policies, cultures, strategies and competitive environments that require different standards [46], therefore it was necessary to use a set of indicators that fit the building environment in Syria so we depended on the performance management model developed by [47] to measure and manage the performance of Syrian construction projects using BSC framework. We reviewed the proposed model and some changes were made based on the company's in the research

case study strategy, goals, and work plan. We reserved the proposed strategy map which clarifies the relations between indicators, but the indicators were shortened from 9 to 8, the financial growth was replaced by cumulative profit (from the beginning of the year to the date of performance measurement) and the financial incentives were not considered as performance goals to this period of work as the company has been through a financial crisis since the start of Syrian crisis in 2011. The selected performance indicators calculation formulas are displayed in table 1.

We also used the proposed software in [47] BSC Designer Balanced Scorecard Software Version 6.2 as performance management system through continuous measurement and monitoring that allows to measure performance and follow up changes towards achieving performance goals. This is because Information Management Systems was defined as one of the critical success factors to apply performance Measurement system [48]. Patrizia concluded that in these situations, we should focus on technical and practical aspects and neglect organizational and administrative ones.

To bridge this gap, management system such as PMS should be applied and supported by MIS; it shall accelerate managerial change and dedicate institutional learning. Also MIS will support the quick and visual display of construction information which will help to improve the presentation of construction information [49]. BSC designer help simplify the process of creating and managing Balanced Scorecards or KPI groups www.bscdesigner.com, where the software allows key performance indicators group establishment, define relationships between groups and indicators and determine the relative importance of the indicators. Besides to that, it introduces the formulas of value calculation according to the customer needs and allows exporting performance values from the Excel program for subsequent treatment and reading data from most known databases. The software also includes another effective feature that is the support in the design of the strategy map which is an important way to display visual indicators and the relationships between them and to provide a graphic representation of the indicators and its values. Besides, it fosters cooperation between users through the use of attachments in order to exchange ideas, tasks, and reports which it is an effective way of improving the company's performance using visual presentation of performance data through graphical diagrams, charts and performance dashboards. "Figure 2" shows Data log in BSC designer. Total performance and progress values are essential and important outputs of BSC designer because the total value of performance helps monitor current performance of KPI which guarantees that improvement in one indicator is not at the expense of another. Showing the result of performance in a comparable way allows benchmarking the value of performance between the company's different projects and identifies causes of best practices and bad performance. From the other hand, knowing the progress value shows the progress towards

achieving goals which warns of the need to change current plans and tools in case no improvement was evident for the planned period of time. BSC designer offers a flexible way to calculate total performance and progress values depending on a set of indicators, such as the minimum and maximum values, target value, and baseline as showed in (1) and (2) formulas:

$$\text{Performance} = (\text{value} - \text{min}) / (\text{max} - \text{min}) \quad (1)$$

$$\text{Progress} = (\text{value} - \text{baseline}) / (\text{target} - \text{baseline}) \quad (2)$$

In order to calculate performance and progress values, we identified (min, max, baseline, target values) as shown in table 2. We can see that performance value was calculated in relation to max performance values which were identified relying on construction industry standards and national standards for productivity rates. Therefore, performance value reflects the value of performance comparing it by maximum performance values that the company plans to reach at the strategic level. Progress value was calculated in relation to targeted performance values which were identified relying on company goals in performance improvement as identified by the company's management in this case study.

The importance of the proposed methodology results is by overcoming the serious gap that limited the effectiveness of the performance management system implementation for construction projects which was identified in previous research [49] in terms of the difficulty of analysis, update, and review of data of the performance indicators. This was done through employ BSC designer software as MIS for

performance measurement and management. Therefore, the novelty in proposed performance management framework is its examination for integrated balanced recent performance management system using new tool (BSC designer) for construction projects that allows not only to measure but to monitor and therefore to manage the progress in performance improvement of projects. The proposed methodology indorses the modern management principles identified in literature for performance management such as the total and balanced performance, organization learning and growth, besides to link performance indicators to performance goals and allows projects performance monitoring and control through continuous comparison of performance management and performance goals to avoid any obstacles and misapplication of performance improvement activities. Therefore, the proposed methodology may be described as modern integrated methodology for performance management as it addresses all stages of the process and all BSC elements.

3.2. Data Collection

The research case study was the major construction company in Syria that represents the main contractor for public Syrian building and construction projects. Data collection phase was between September 2014 and September 2015. Four under construction building projects were chosen as a sample of company projects to measure performance (A, B, C, D) and assess progress towards performance goals.

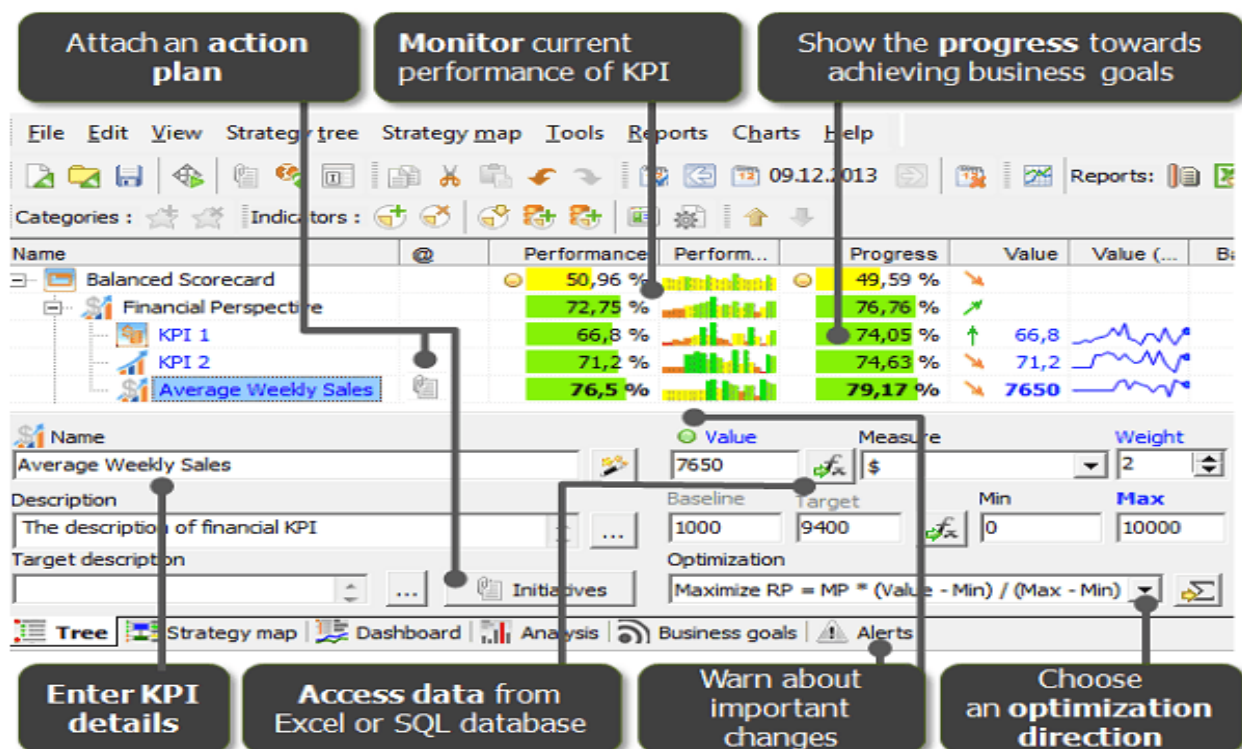


Figure 2. Data log in BSC Designer

Table 2. Max, Min, and Goal Values for Measurement and Progress

Measurement indicators	Performance		Progress	
	Max	Min	Target	Baseline
Profitability %	10	0	5	0
External customer satisfaction (1-5)	5	0	3.5	2
External customer satisfaction (quality checklists) %	100	70	90	80
Internal customer satisfaction (1-5)	5	0	3.5	2
Productivity concrete (m ³)/month	1060	0	900	800
Productivity (tiles) (m ²)/day	10	0	9	7
Productivity (paint) (m ²)/day	33	0	30	25
Productivity (block) (m ³)/month	71.5	0	60	50
Productivity (external wall closing) (m ²)/day	20	0	18	16
Productivity (internal wall closing) (m ²)/day	11.5	0	10	9
Planning effectiveness %	100	0	20	30
Human resource management (1-5)	5	0	3.5	2
Human resource development %	50	0	20	10

Performance scorecards and questionnaires were used to collect data on key project performance indicators through project managers and member's interviews regarding the data of project quality checklists and internal customer satisfaction, and through the client representative interview regarding the data of external customer satisfaction indicator. Regarding the lasting indicators, data were obtained from project records and documents. All the obtained data were recorded on performance scorecards that were aggregated into excel sheets and exported to BSC designer.

4. Results Analysis and Discussion

The performance values for four BSC perspectives and its key performance indicators for each of studied projects are presented in table 3 and 4. The overall performance and progress towards goals achievement is presented in the first row. Colors have been used in BSC designer to illustrate the performance limits clearly as follows:

- Red color less than 20% (unacceptable)
- Orange from 20-40% (Marginal)
- Yellow color from 40-60% (good)
- Green from 60-80% (Excellent)
- Dark green till 100% (Exceptional)

The proposed performance management system successfully presented performance value through the eight proposed indicators for the case study projects in September 2015, and September 2014 with exception for projects A, and B and as it was for seven of the proposed indicators in 2014 as there were some difficulties to obtain performance data and measurements for first time in the company. The Colors and symbols give quick show of data performance and status; we can notice that red, orange, and yellow circles are dominant in all of four studied projects which

reflect weak performance and progress towards achieving costumer performance was excellent but the progress towards its improvement was less than planned goal. Internal goals and provide important opportunity for improvement. Here we discuss the total projects performance and progress values and BSC perspective and KPI performance.

4.1. Projects Performance and Progress

The total performance of case study projects was convergent, it was marginal (orange area) for all studied projects and ranged between 20-40%. The highest performance value was for project B in 2015 with a score of 35.05% compared with 24.42% lowest score for project D also in 2015.

The overall view of performance is in tables 3 and 4 shows that there are two performance perspectives compromised in all projects which are financial perspective and learning and growth perspective. Projects progress towards performance improvement in the two periods where project performance measured in 2014 and 2015 was limited as we can see all values of performance progress towards stated goals recorded negative ones. This reflected on the projects performance values as A and D projects performance receded in 2015 and B and C projects recorded slight higher score which was only 6% for Project B.

4.2. Performance Perspectives and KPI Assessment

The projects strengths and weaknesses were highlighted through comparing performance perspectives and indicators.

For project A, no strengths were noticed in any of performance perspective in 2014 but costumer perspective was observed as a single strength perspective in 2015 with an excellent performance value. Performance dashboards as costumer performance dashboard in "figure 3" help obtain quick clear information for performance and progress

towards stated goals of improvement. We can see that even good performance was for the productivity indicator. the process perspective was also a good attainment and the

Table 3. Performance and Progress for Projects in 2014

Indicators \ Projects		A		B		C		D	
Name		Performance	Progress	Performance	Progress	Performance	Progress	Performance	Progress
Balanced Scorecard		27.90 %	-415.54 %	29.05 %	-56.37 %	30.05 %	-180.24 %	26.42 %	-183.96 %
Financial Perspective		0.00 %	-1645.5...	49.52 %	-62.00 %	0.00 %	-750.90 %	0.00 %	-718.90 %
profit		0.00 %	-1598.4...	99.04 %	191.60 %	0.00 %	-766.80 %	0.00 %	-710.00 %
cumulative profit		0.00 %	-1692.6...	0.00 %	-315.60 %	0.00 %	-735.00 %	0.00 %	-727.80 %
Customer Perspective		56.33 %	38.21 %	37.64 %	-7.12 %	60.94 %	75.04 %	47.09 %	21.25 %
ext customer satisfaction		64.66 %	73.29 %	63.91 %	69.57 %	63.43 %	67.14 %	68.94 %	94.71 %
quality checklist				0.00 %	-107.25 %	58.33 %	75.00 %	47.43 %	42.30 %
int customer satisfaction		48.00 %	3.14 %	43.32 %	4.60 %	61.00 %	79.00 %	36.00 %	-26.00 %
Internal Process Perspective		55.27 %	45.14 %			59.27 %	54.90 %	58.60 %	61.81 %
HR management		55.27 %	45.14 %			59.27 %	54.90 %	58.60 %	61.81 %
Learning & Growth Perspective		0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %
HR development		0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %

Table 4. Performance and Progress for Projects in 2015

Indicators \ Projects		A		B		C		D	
Name		Performance	Progress	Performance	Progress	Performance	Progress	Performance	Progress
Balanced Scorecard		27.82 %	-124.47 %	35.05 %	-59.65 %	32.34 %	-133.89 %	24.42 %	-239.25 %
Financial Perspective		0.00 %	-340.80 %	34.85 %	-2.30 %	0.00 %	-523.00 %	0.00 %	-685.00 %
profit		0.00 %	-315.60 %	69.70 %	139.40 %	0.00 %	-450.00 %	0.00 %	-672.20 %
cumulative profit		0.00 %	-366.00 %	0.00 %	-144.00 %	0.00 %	-596.00 %	0.00 %	-697.80 %
Customer Perspective		60.31 %	64.47 %	60.42 %	67.61 %	62.43 %	74.40 %	59.02 %	65.28 %
ext customer satisfaction		62.06 %	60.29 %	57.11 %	35.57 %	55.97 %	29.86 %	60.83 %	54.14 %
quality checklist		63.20 %	89.60 %	86.00 %	158.00 %	63.33 %	90.00 %	38.03 %	14.10 %
int customer satisfaction		58.00 %	54.00 %	49.28 %	38.44 %	65.20 %	88.88 %	68.60 %	96.44 %
Internal Process Perspective		50.97 %	-121.54 %	44.94 %	-203.92...	66.94 %	13.05 %	38.64 %	-237.27 %
productivity		60.42 %	-96.25 %	60.28 %	-161.00 %	77.93 %	11.67 %	62.94 %	-50.00 %
planing effectiveness		40.75 %	-292.50 %	22.21 %	-477.90 %	71.81 %	18.10 %	0.83 %	-691.70 %
HR management		51.73 %	24.14 %	52.33 %	27.14 %	51.07 %	9.38 %	52.17 %	29.88 %
Learning & Growth Perspective		0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %
HR development		0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %	0.00 %	-100.00 %

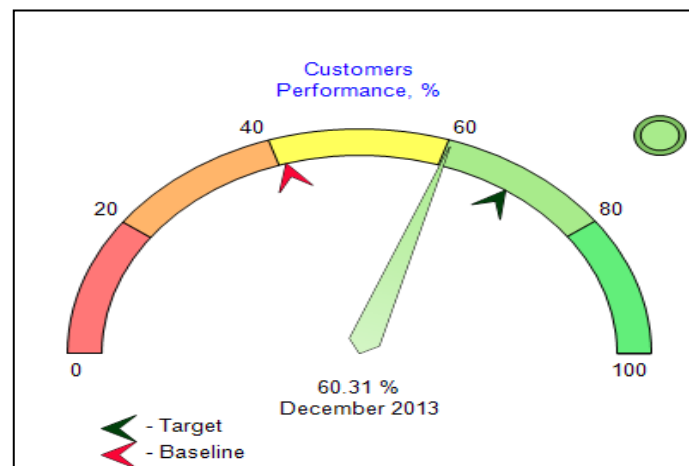


Figure 3. Performance dashboard for customer perspective for project A

On the other hand, a noticeable weakness in project A were observed in both financial and learning and growth perspectives which was a common weakness in all the studied projects; therefore, they offer great opportunity for performance improvement. Also project B had no strength perspectives in 2014, with single strength was noticed in customer perspective in 2015. In project C, we noticed two strength perspectives which are customer perspective and internal process perspective, but no strength in any of performance perspective were noticed in spite of existence of some excellent indicators in customer and internal process perspectives. The above-mentioned results, which are a reflection of the company's strategy, show that the company focuses on customer satisfaction and internal business process. The financial perspective seemed to be critical in each of its two indicators with dominant red and orange colours as it was unacceptable for the projects A, C, and D for two years and with marginal value for project B in 2015 and single good value in 2014. This was accompanied by negative progress towards achieving stated goals for performance improvement. This risky deviation in financial performance which appeared in three of studied projects performance recorded (0)% in profit performance and negative values in profit progress which means financial loose that the company have to bear, was caused by the ongoing Syrian crisis and its accompanied effects like the continuous increase of prices and difficulties in providing materials, in addition to stoped of many company projects that exists in the struggle areas caused to enlarge the financial problem that existed before the crisis as a result of poor performance management and administrative problems that was explained in the displayed research problem of the paper, this risky deviation affected directly and indirectly the overall performance as the indirect effects of financial failure appeared through stop of training programs and compensation systems which negatively affected the learning and growth perspective. The customer perspective was the single excellent performance perspective with green colour in three projects A, B, C with good one in project D and all its three indicators were excellent and good unless quality checklists in project D which was marginal. This also was accompanied by an excellent and good progress towards goals achievement in most indicators of customer perspective with an exception of quality checklists which had a marginal progress towards goal achievement. The difference between the projects was clear in the internal process perspective as it ranged between marginal in project D to good with yellow colour in both of A, and B and reached excellent performance in project C but the progress towards goal achievement in all of the projects was marginal. The learning and growth perspective seemed to be negligent as it recorded unacceptable performance and progress in all projects. This reflects that the company focuses on short term goals without a real effective focusing organizational learning and growth.

4.3. Results Discussion

The proposed construction project balanced scorecard performance framework successfully demonstrated the projects overall performance, progress towards goals, and projects strengths and weaknesses. The framework utilized a balanced set of indicators that focuses not only on results which fail to effectively direct the future performance, but also focuses on processes through key indicators that allow to take prompt decisions which guide and direct present performance towards achieving the project performance goals and results. The early identification of weak performance gives the opportunity for intervention to maximize weak performance indicators values for the remaining duration of project. We see that project D recorded the less performance value for two years of study that was (26.42)%, and (24.42)%. Therefore, the management can follow on causes and apply solutions to mitigate this decline in performance indicators and work on effective ways of improvement at least for the two perspectives of customer satisfaction and internal business processes which recorded good and excellent performance in the other projects working in the same environment. This benchmarking helps in learning and motivating for performance improvement. The overall performance which ranged between (26.42-30.05)% in 2014 and (24.42-35.05)% in 2015 and overall negative progress values which ranged between (-56.37) % and (-415.54)% in 2014 and between (-59.65)% and (-239.25)% that resulted from the case study projects were marginal in spite of the existence of some exceptional, excellent, and good performance perspectives and indicators since in 2014 the profit indicator performance was (99.04)% in project B and customer satisfaction indicator recorded exceptional value with score of (94.71)% and in 2015 quality checklist indicator recorded exceptional indicator with (90)% score and internal customer satisfaction also was exceptional with (96.44)% score. The clear Display of performance indicators allows to conduct quick statistical analysis for performance and progress indicators as in 2014 a set of 17 out of 82 which ratio were (20.73%) of performance indicators recorded exceptional and excellent performance and 18 of performance indicators which ratio were (21.95)% recorded good performance, while 53 (64.63)% of performance indicators were on marginal and unacceptable performance. Convergent ratios were found on 2015 as excellent and exceptional performance indicators were 28 out of 104 measured indicators which ratio is (26.92)%, and good performance indicators were 14 which ratio is (13.46)%, and the biggest ratio was for marginal and unacceptable performance indicators with 62 indicators which ratio were (59.61)%. The existence of reasonable ratios of excellent and good indicators gives good opportunity for internal benchmarking in the company using the proposed methodology in regular basis for monitoring progress and internal benchmarking, which foster organizational learning and performance improvement. The

overall marginal performance and progress for projects performance was caused by the very large decline in both of unacceptable performance perspectives which are financial which performance was (0) % for all of three projects (A, C, D) in 2014 and 2015 and (learning and grow) which also was (0) % for all four studied projects in the two years of study, this values deviated the overall performance result and negatively affected the final value of performance. Therefore, both perspectives should have the priority for revision and change of current performance improvement, goals, plans, and activities depending on root causes analysis for causes that affected the resulted performance indicators values. Regardless of the complexity of the financial situation in the company, the planned performance management as discussed above in literature review will direct the process of gradual improvement and facilitate it through using the proposed framework that allows putting the performance strategy map and goals and periodically following up the progress and performance results. Also, learning and growth perspective is critical and if continued to be in the same way, the company will face serious problems regarding human resources performance at all levels starting from managers, engineers, technicians and workshop workers because the company did not transfer the increasing technology developments and needed skills for its teams; this will cause receding in costumer and productivity indicators which preserved good performance values. The company should also focus on the internal process perspective which was only good (40-60)% because the studied company has a record of professional historical experiences and practitioners which allow it to improve the performance of internal processes from good to excellent levels. As the overall value of progress was negative and the progress was also limited in most of indicators, therefore the company should work on changing all the work plans depending on performance value resulted by using the proposed balanced scorecard framework and using BSC designer which will help the company to record and retrieve performance data in a flexible visible way that allows easy analysis, evaluation and benchmarking of projects and indicators performance to support a follow up and performance management in a balanced way that supports organizational growth. Discussion with company management about performance indicators results helped in setting recommendations as initiatives for performance improvement to help project managers mitigate the decline in performance indicators in the four BSC perspectives by using proposed methodology to interim monitoring and follow - up of performance progress against planed goals. The process of performance measurement can be implemented to measure performance measurement in the proposed indicators on a monthly or quarry basis. The issued performance reports supported by BSC designer with performance graphs should be displayed and discussed with project managers by company management and recommendations about performance management should be set according to the results of progress towards performance goals. The regular short term

monitoring for progress of achieving performance goals allows improvement of performance management process consequently improvement in achieving the performance strategic objectives. Following are the set recommendations:

Financial perspective

- Perform financial planning and control.
- Decrease the additional expenses caused by surplus workers.
- Provide business contracts for new projects as the company has big staff which bears further increasing on its work capacity.

Costumer perspective:

- Use advanced tools for project planning like MS Project to control delays, and building information modeling such as Revit for better planning and implementation of projects.
- Conduct quality control using quality checklists because the used visual check for quality control proved to be in efficient in spite of the resulted good quality score on performance measurement because this was for final product which usually reached with delay and rework which causes time and cost overruns for projects at final project submission.
- Provide materials on a timely basis as it was one of low score points on the customer satisfaction questionnaire.
- Conduct regular analysis for time and cost overruns and work on prevent its occurrence through discovering the root causes and setting preventative and corrective actions.

Internal Business Process:

- Plan and follow on the resource usage upon to type and quantity.
- Reduce rework on executed works.
- Design and employ performance planning and review for workers and Create compensation system for workers in order to improve the productivity.
- Use project management techniques and IT.
- Define tasks of staff and distribute it.
- Improve staff technical and communication skills.
- Risk planning and management since the absence of risk management system enlarged the bad effects of Syrian crisis on the quality and quantity of contracted works which also limited the possibility to get new contracts.

Learning and growth:

- Document lessons learned in order to in hence organizational learning.
- Encourage innovative problems solutions
- Increase training activities.

In conclusion, the application of the proposed framework has proved to be an integrated and balanced system for measuring and managing performance in terms of its ability to demonstrate the value of overall performance, which guarantees that the improvement in one indicator is not at the

expense of another and in terms of its ability to highlight strengths and weaknesses in performance indicators; besides its effectiveness in calculating and showing the progress towards defined goals which has not been examined as a monitoring way in previously proposed models for performance management. Therefore, the proposed methodology may be described as a modern integrated methodology for performance management as it addresses all performance management process stages (measure, store, analyses, report, and use) with all balanced scorecard elements (objectives, measures, goals, initiatives). These research findings are very important for performance management practitioners as they help start using the proposed methodology as a proven performance management methodology. The proposed system enhances performance management theory in two aspects. The first is in terms of the importance of linking performance indicators to improvement goals, and the application of the system through linking the indicators with performance targets accurately which illustrated the extent of progress toward goals and thus gives the chance to intervene early in the event of note a lack of progress. The second aspect of the importance performance measurement and management is that it is a continuous cycle for performance improvement. We also found that the proposed performance framework is suitable, applicable, and easy to use besides its importance to support performance improvement. Therefore, no changes were done for the proposed framework including indicators, targets, and formulas. The findings regarding the total performance and progress values also were very important because they showed extreme weakness in two of performance perspectives and limited progress towards goals which expose the company to important risks and blusters its existence. Therefore, the financial and learning and growth perspectives which were determined as marginal performance perspectives are expected to be a new scope for future research.

5. Conclusions

The proposed BSC performance management framework proved to be an excellent tool for performance measurement and management. Using a balanced set of indicators through BSC designer software helped retrieve overall performance and progress towards stated goals values. It also enabled to identify strengths and weaknesses of studied projects in a clear visible easy analysis and interpretation using colours and performance dashboards and charts. Performance information showed that there is an important opportunity for overall performance improvement and highlighted the priorities that Case Study Company should consider in performance improvement efforts which are finance and learning and growth perspective as they recorded marginal performance values. Performance data comparison across two years showed that the used traditional performance management approach is ineffective in achieving progress

towards defined goals. Therefore, using the proposed framework as agreed also by company management will offer a better way to follow on and control performance; subsequently, better management and improvement for company performance will be achieved. The strength of the proposed methodology comes from its ability to address performance management application in easy comprehensive way and in accordance to performance stages and BSC elements. This was facilitated and managed through the application of BSC designer as performance management software which allowed to design performance measurement system according to BSC model, also the software allowed to define strategy map which included objectives and goals besides to its support to performance measurement through predefined formulas in addition to the feature of monitoring progress towards goals which not been addressed in previously proposed modes, and at last it allowed to set performance improvement initiatives to be implemented by project managers for performance improvement. The proposed methodology forms experimented framework which help project management practitioners for smooth, balanced, and successful implementation in performance management for construction projects performance improvement. Therefore, the research made a contribution to performance management integrated and balanced application in term of covering performance management stages and BSC elements, The limitation of the proposed methodology was in giving equal importance for performance indicator and further research for assign weights for performance indicators is required, Also the research performance results are for case study projects and can't be generalized for another projects.

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