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MEASURING PERFORMANCE OF GACHSARAN OIL AND GAS EXPLOITATION COMPANY USING BALANCED SCORECARD

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ABSTRACT

The importance of performance measurement has been specified for organizations and it plays an important role in many organizations. Today and in information age, organizations need to measure all aspects of their financial and non-financial issues. For this purpose, various frameworks and models have been developed to measure performance, European Quality Award Model and the Baldrige Award, as well as some frameworks including performance pyramid, and the balanced scorecard. The Balanced Scorecard is a tool to translate organization vision and strategy into a comprehensive metrics to assess performance which provides a framework for strategic assessment and management system. The aim of the present study was to evaluate the performance of Gachsaran oil and gas Exploitation Company using balanced scorecard. The research statistical population included all experts of Gachsaran oil and gas Exploitation Company. Considering the results, it should be stated that the customer dimension and the development dimension and have the highest and lowest priority among the four dimensions of the balanced scorecard respectively.

Keywords: *Balanced Scorecard, Analysis Process, Gachsaran Oil and Gas Exploitation Company*

INTRODUCTION

Measuring performance process has come a far way to evolve and progress in recent years, in fact in line with the development and evolution of management thoughts in the management schools, the process, its nature and efficiency have been also developed and the scope of using measuring the performance has been developed to all aspects of human and organizational activities (Adeli, 2005). Today, managers have discovered the value and impact of performance measurement tools in organizations, but they rarely use it as a part of a company's strategy. However, in reality, determining reliable financial value for assets such as employee skills, motivation, flexibility, customers' loyalty and databases system, and also identifying and including them in the balance sheet of the organization is not possible simply but the mentioned assets and capabilities to achieve today and tomorrow success of a competitive environment are crucial (Ali, 2005; Farzin, 2007). Balanced Scorecard is a strategic management system including Mission, vision, strategic goals, measuring performance, and four financial faces, internal business processes, customer and growth and learning and strategic goals fit with all four aspects are related to strategies of company and to each other by a set of causal relationships (Johnson, 2001; Kaplan, 2004). According to the mentioned issues the present article seeks to evaluate performance of Gachsaran oil and gas Exploitation Company using balanced scorecard.

Research Literature

Performance Measurement and its History

Performance measurement or performance measurement has been existed in all ages. A lot of research on the nature and methodology of performance measurement have been used in organizations in recent years. The research results would be worthwhile to use them in understanding the current state of the organizations and to examine the future challenges of performance measurement system through them (Jafari, 2007).

In 1995, Oakland examined basic problems of measuring performance in the context of Total Quality Management. Harrison (1992) examined measuring performance problems in timed manufacturing systems, Luskamb (1993) studied them in manufacturing Resource Planning, Stanton and Hammer (1995) studied the problems in business re-engineering process. Any new developments in performance

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measurement criteria, causes more problems in using traditional criteria can be uncovered. What is clear is that while historical data form the basis of a performance measurement system, however, managers can hardly be indifferent to them. The main reason for the formation of a performance measurement system using historical data is that these data are often obtained during normal business activities (Kaplan, 2000; Kaplan, 1996).

Performance Management and Design Models

In specialized literature, performance management is examined and analyzed at individual or organizational level. In recent years, the assessment of individual performance has been driven to the performance of the organizational sectors (Andersen *et al.*, 2004). So far, different models and patterns of performance measurement have been presented. They can be grouped in three categories:

- 1- Models based on time and cost, emphasizing on financial measurements and manufacturing processes and based on the spent time and cost.
- 2- Organizational excellence models and self-assessment that focus on measuring management field and manufacturing processes and are based on quality improvement of processes and conclusions.
- 3- Integrated models that focus on financial, human resources and manufacturing processes management measuring, and are based on strategy implementation (Ali, 2005; Farzin, 2007).

Each of models for system design suggests a specific layout and organizational performance indicators should be structured accordingly. In some of these models some processes have been considered to explain how to design indicators and implementing performance measurement system. Some of the models mentioned in the designing performance measurement systems will be here (Al-Matarneh, 2011; Ayesha *et al.*, 2011; Andersen *et al.*, 2004).

Sink and Tuttle Model

Sink and Tuttle model suggests that an organization's performance due to the complex relationships between the seven performance indicators is as follows:

Effectiveness, efficiency, quality, productivity, quality of work life, innovation and profitability.

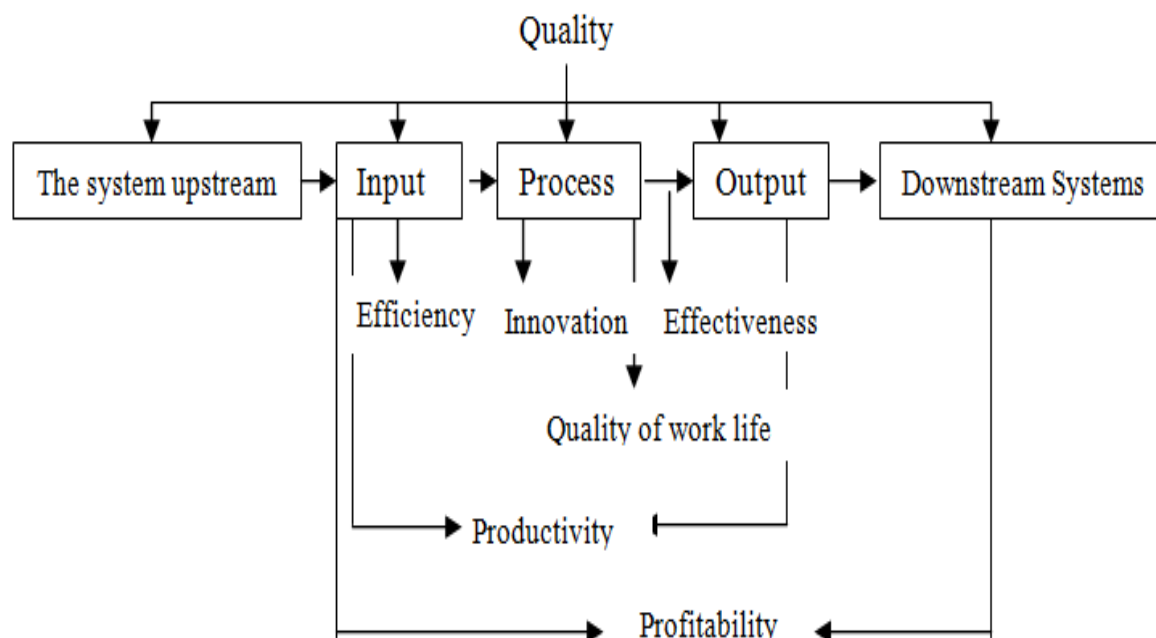


Figure 1: Model of Sink and Tuttle

Performance Matrix

"Keegan" in 1989 introduced the performance matrix; this matrix is shown in this Fig.

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	Non-financial	Financial
Foreign	The number of repeat purchase Number of customer complaints The market share	Competitive cost position Costs related to R & D
Internal	Design cycle time Percentage of on-time delivery New Products	The cost of design Cost of materials Cost of production

Figure 2: Performance Measurement Matrix

Results and Determinants Model

One of the problems that remove the performance matrix problem is "the results and determinants model". This framework is based on the assumption that there are two types of basic performance indicators in every organization.

ISO Quality Management System

ISO quality management system is not presented as a system for comprehensive measurement. This system considers how to manage processes influencing quality and it defines requirements for this subject to be fulfilled all of the obligations and requirements appropriately (Gholami and Nooralizadeh, 2002)

Performance Pyramid

One of the models that cover how to create the relation is performance pyramid model. The purpose of the performance pyramid is the linking strategy and operations.

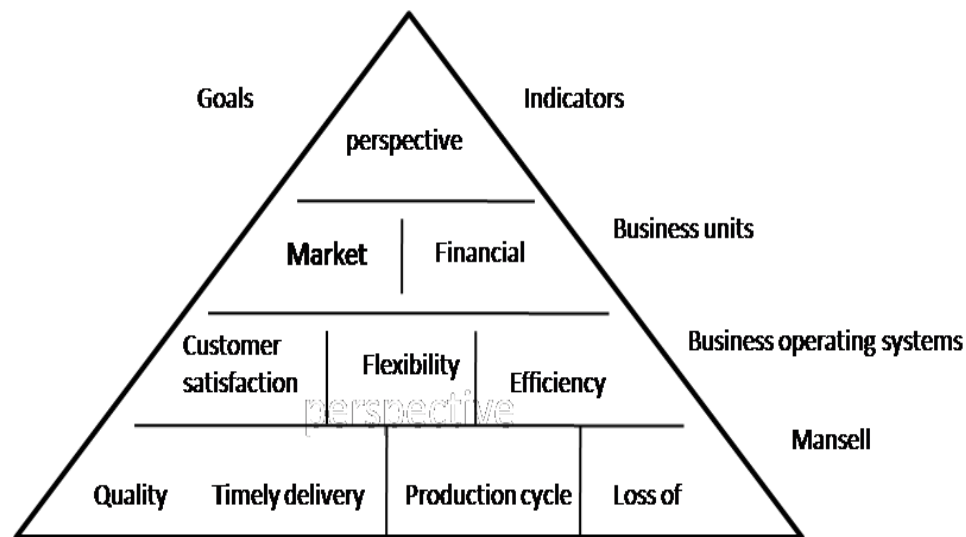


Figure 3: Performance Pyramid

Business Process

There are frameworks that encourage managers to be more considerable to horizontal flow of material and information in organizations. According to this model, in an organization input, process, output and results to determine indicators and performance measurement are:

- **Inputs:** Skilled and motivated employees, our customers' needs, raw materials, capital and ...
- **Processing System:** Products certification, production and delivery of products and ...
- **Outputs:** Products, Services, Financial Results and ...
- **Results:** Meet the needs of customers, customer satisfaction, etc. (Karimi, 2005; Mohammadi, 2010).

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Circular and Staple Frame

The circular and staple model is one of the integrated frameworks for auditing and enhancing performance measurement systems. The approach consists of six interrelated stages.

Stakeholders Analysis Method

Performance measurement system designing starts with the identification of organization goals and strategies and that is why the Balanced Scorecard model, starts performance measurement system designing with the question "What are the demands of our shareholders?" The Balanced Scorecard model implicitly assumes that only shareholders affect the organization's goals and other stakeholders have no role in setting goals (Belkaoui and Riahi, 1993). Stakeholder analysis model provided by doctor "Li" divided stakeholders into two categories: Key stakeholders and non key stakeholders. Key stakeholders have direct control over the organization and their goals and objectives are featured in organization (such as shareholders) and non key stakeholders use external mechanisms to protect their interest such as market and culture and they do not affect the target (Biddle *et al.*, 1996; Botten Neil *et al.*, 1995).

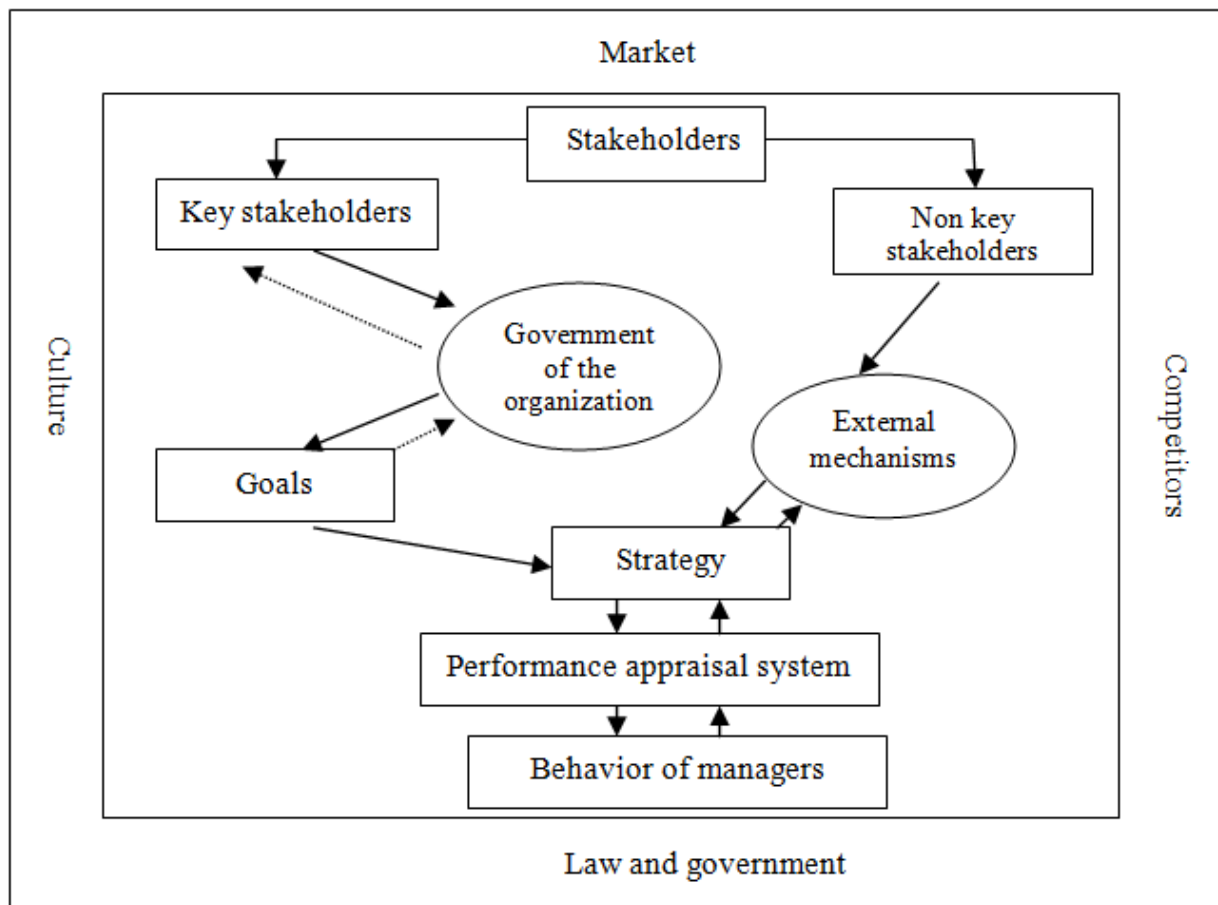


Figure 4: Model of Stakeholder Analysis

Management System Based on Objective

Management system philosophy based on its Genesis field goal is that in people measurement, rather than their specific characteristics and behavioral assessment, their performance will be assessed according to the achievement of goals that have been set (Giesecke, 1998).

Comprehensive Quality Management System

Total quality management is a particular attitude and philosophy that the concept of quality and customer satisfaction is in every part of the current organization based on it. Total quality management has some

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traditional tools including flowchart, histogram, Pareto charts, cause and effect diagrams, Shewart control charts, and scatter diagram while the seven new management tools are based on the conceptual and logical thinking (Chiang, 2005).

Malcolm Baldrige Method

Malcolm Baldrige method is a method that helps in the implementation of total quality management in the organization. The seven criteria method and total quality management implementation method are provided (Johnson, 2001).

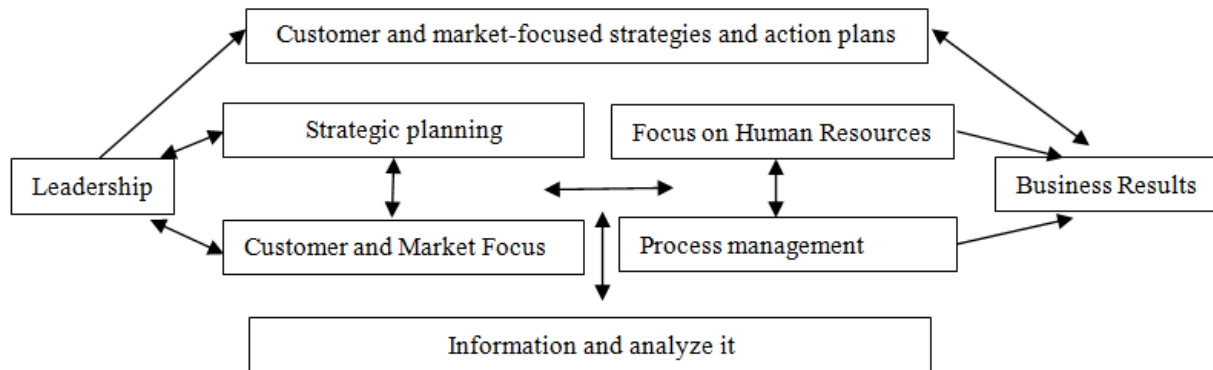


Figure 5: Malcolm Baldrige framework

The Balanced Scorecard and its History

One of the most famous and best-known models of performance measurement system is "Balanced Scorecard" model. The Balanced Scorecard for the first time was provided By Kaplan and Norton (1992) in an article entitled "The Balanced Scorecard, a measure that is performance drive", in Harvard Business Journal. Kaplan and Norton considered four main areas by focusing on both operational and financial indicators (Dyson, 2004).

- 1- How are attitudes about shareholders? (Financial aspects)
- 2- On what grounds we should be good? (business internal perspective)
- 3- How do customers see us? (Client side)
- 4- How can we continue to improve and create value? (Innovation and learning perspective).

Table 1: Financial indicators / measures

Indicators of Financial Perspective	
Ratio of value added to the number of employees	Total Assets
Dividend	Ratio of total assets to employees
Market value	Profit as a percentage of total assets
Shareholders' stock price	Return on net assets
Cash flow	Ratio of income to total assets
The total cost	Gross profit
Debt	Net profit
coverage times of interest expense	Profit as a percentage of sales
Average of daily credit sales	Income
Receivable accounts turnover	Income to Staff ratio
Medium-term debt	Return on equity (ROE)
Ratio of value added to the number of employees	Return on capital employed (ROCE)
Report of Cash	Return on investment (ROI)
Market Value Added (MVA)	Economic Value Added (EVA)

Kaplan and Norton considered four main areas by focusing on managers' need for having both operational and financial indicators.

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- Customer Perspective: How to evaluate the performance of the company's customers.
- Internal perspective: identifying key processes and improving them.
- Learning and growth perspective: to enable the provision of value in the future.
- Financial perspective: taking into account the interests of shareholders.

Table 2: Indicators / measures of the customer perspective

Measures of customer perspective	
The frequency of loss of customer	Customer Satisfaction
Sales volume	Annual sales in terms of number of clients
Rates of attract new customers	Rates of repeating sales to customers
The company's share of the target customers' costs	The number of customers' visiting the company
Percentage of revenue earned from new customers	Customer Loyalty
sales made through each of distribution channels	Hours spent with customers
Number of clients	Market share
Customers to staff ratio	Marketing expense as a percentage of sales
Win rate (the proportion of sales made to sales calls)	Returning good rate
The complaints that were investigated in the first call	Number of ads
Customer profitability	Cost of service per customer
The frequency of attendance at trade fairs	Number of presented sales proposals
The total cost for the customer	Response time to customer requests
	Brand recognition
	Competitive price
	Response rates

Table 3 refers to some of certain measures of internal processes.

Table 3: Indicators / measures of internal processes

Measures of internal processes perspective	
Lesions	The average fee on each transaction (transactions)
Duplication	Timely delivery
Time to breakeven	The average waiting time to receive the goods
Provide improved cycle time	Inventory turnover
Continuous Improvement	Availability of customer data base
Leading Member ID	Research and development costs
Developing new products and services	Participation in community
Internal Rate of New Projects	The average age of patents
Reducing waste (tails)	ratio of new products to total products
Introduced New products	times of inventory run out
Make good use of space	Usage rates of labor force
Frequency of returned purchases	Response time to customer requests
Stop time of machine	Time for rendering new products and services to markets.
	Accuracy planning

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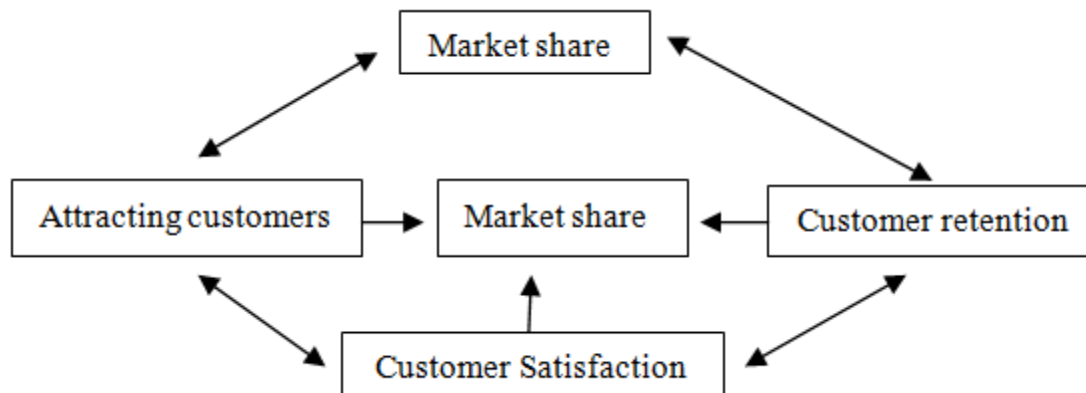


Figure 6: The relationship between the five customer perspectives

Table 4: Indicators / measures of growth and learning

Indicators of growth and learning perspective	
Employee productivity	Employees' participation in professional or commercial associations
Features coverage rate	Value added per capita
Number of prepared scorecards tables	Employee participation in professional or commercial associations
Achieving personal goals	Value added per capita
Number of trained employees	Educational investment per capita
Community planning	Motivation Index
Absenteeism rate	The average years of employees service
Percentage of employees who have computer	Number of applications not to be handled
The withdrawal rate	% of employees with higher qualifications
Multitasking missions assigned to employees	Diversity of Jobs Rate
Comments of employees	Quality of work environment
Violations of professional ethics	Promoting Health
Employees Satisfaction	Internal communication rate
Empowerment index (number of managers)	Hours of training
	Knowledge management (progress percent)
	Accidents that result in wasting the time
	Participation in share ownership plans

Advantages and Disadvantages of Balanced Scorecard

According to comprehensive study of the literature, this method has several advantages as follows:

- Balanced Scorecard is highly flexible, unlike many of the TQM tools such as models of excellence, these cards are designed specifically for each organization.
- It focuses on objectives-based management; it is a kind of information system, and also enables to make a draft of cause and effect relationship between different perspectives.
- It has strategy map so it can portray causal relationships between aspects of balanced scorecard.
- It facilitates moving the vision and strategy to lower levels
- The main difference between this system and other systems is Institutionalizing a culture of evaluation and measurement in organizations.
- Balanced scorecard by means learning and growing and feedback mechanism provides an effective loop for strategic management.
- Balanced Scorecard checks organization Strategic Health Continuously.

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- The system deals with the situation actively not passively, if the organization relies solely on financial measures, fore sighting may be weak and passive behavior occurs in organizations (Kaplan and Norton, 2011).

Along with all the benefits of balanced scorecard, this method also has some shortcomings, of which the following can be noted:

- Implementation of Balanced Scorecard in the organization is costly, so its benefits depend on the amount of improvement in management decisions. Each unit in the organization establishes its balanced scorecard measures that reflect the unit's goals and strategies, while some of these measures are the same in units and some are exclusive.

- Also, research has shown that common scales must be more important than unique scales. So one of the errors of this method is to underestimate and even ignore the scale that corresponds to a particular unit.

- Balanced Scorecard is weak in defining a set of quantitative indicators consolidating the values of performance either individually or in combination and integration of indicators. So it cannot provide a technique for quantitative estimation of the contribution of each group to achieve the goals relatively or absolutely and it specifies the relative importance of each indicator in its perspective.

- In some projects because of the imprecise and subjective indicators of this method using inappropriate models for assessment, significant tension has been reported between top management and operational managers (Varma *et al.*, 2008).

- Although one of the advantages of the method is to set a integrated strategic plan, empirical evidence suggests that the most common ways to develop a balanced assessment system does not indicate the anticipated results (Zanjirdar *et al.*, 2008).

- Also integrating Balanced Scorecard results by users is performed subjectively, so these shortcomings is inconsistent with the special feature of this system that Kaplan and Norton had special emphasis on it (Kaplan and Norton, 2000).

MATERIALS AND METHODS

Given that the present study sought to evaluate the measuring performance of Gachsaran oil and gas exploitation company using balanced scorecard and rating dimensions and the corresponding index, so this type of research is a descriptive research and since the data is obtained at a point in time rather than longitudinally and Delphi, so this study is a sectional study. In terms of the aim, this research is an applied research, also in terms of the location it is a field research; because the data is collected by being in population or statistical sample using a questionnaire. A sampling method used in this study is simple random method among the experts. In this approach it is more likely that the distribution patterns of features that are interested in our research, are distributed accordingly in the same elements we select for the sample, in this method all members of society have the same chance of being selected, and have the lowest bias and the most generalization. Experts in this industry are people who have a history of over 10 years of executive experience in the company. By studying Gachsaran oil and Gas Company it was showed that they were 75 people.

Table 5: The valuation relative to each other

Preferred values	Compare i to j	Explanation
1	Equal importance	Index i to j equal importance.
3	Relatively more important.	Index i to j is a bit more important.
5	More important	Index i is greater than j.
7	Very important	I Index have a lot more preferable than the index j.
9	Quite important	More importantly, the index i to j and j are not comparable.
2,4,6,8	Comparative	Intermediate value between the values of preferred shows.

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The survey questionnaire was distributed among the participants and finally 67 accepted questionnaires were returned (89% return rate) and they were analyzed and processed.

Reliability: Cronbach's alpha

Data Analysis

First, before doing any analysis it should be tested for reliability. This is done by software SPSS that shows the alpha coefficient as the output.

Table 6: Cronbach's alpha coefficients for each variable

Alpha coefficient	Items	Variable
0.721	6	Financial
0.872	6	Internal processes
0.819	10	Learning and growing
0.832	7	costumers
0.816	4	Four dimensions
0.795	33	Total questionnaire

As the values in Table 6 for the studied structures show, the survey instrument has highly acceptable reliability because the values of Cronbach's alpha is 0.7.

Table 7: Matrix combined financial indicators

6	5	4	3	2	1	Financial Index
1.5058	1.821	1.6368	1.2056	0.7423	1	A1
1.9478	2.2852	2.1261	1.6467	1	1.3946	A2
1.2339	1.6151	1.4093	1	0.6273	0.8457	A3
0.887	1.1629	1	0.7096	0.4808	0.6005	A4
0.7447	1	0.8685	0.6331	0.4421	0.5437	A5
1	1.2822	1.14	0.8246	0.5109	0.6724	A6
7.3192	9.1664	8.1807	6.0196	3.8034	5.0659	Sum

Table 8: Normalized Matrix Financial Indicators

6	5	4	3	2	1	Financial Index
0.2057	0.1987	0.2001	0.2003	0.1952	0.1974	A1
0.2660	0.2493	0.2599	0.2736	0.2629	0.2753	A2
0.1686	0.1762	0.1723	0.1661	0.1649	0.1687	A3
0.1212	0.1269	0.1222	0.1179	0.1264	0.1185	A4
0.1017	0.1091	0.1062	0.1052	0.1162	0.1073	A5
0.1366	0.1399	0.1393	0.1370	0.1343	0.1327	A6

Table 9: Ranking Financial Indicators

Ranking Factors	Arithmetic mean	Dimension	Index
2	0.1995	Organizational performance in division of funds among the respective units	A1
1	0.2645	Reducing costs caused by mistakes	A2
3	0.1695	The organization performance impact in increasing profitability	A3
5	0.1222	reducing administrative costs of oil and gas exploitation company	A4
6	0.1076	accuracy and transparency of the activities of each organization	A5
4	0.1366	The organization performance impact in increasing profitability	A6

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Table 10: D × W

1	0.7423	1.2056	1.6368	1.821	1.5058	1.202
1.9346	1	1.6467	2.1261	2.2852	1.9478	1.594
0.8457	0.6273	1	1.4093	1.6151	× 1.2339	= 1.02
0.6005	0.4808	0.7096	1	1.1629	0.887	0.7358
0.5437	0.4421	0.6331	0.8685	1	0.7447	0.6482
0.6724	0.5109	0.8246	1.14	1.2822	1	0.823

$$CV = \begin{bmatrix} 1.202 \\ 1.594 \\ 1.02 \\ 0.7358 \\ 0.6482 \\ 0.823 \end{bmatrix} \div \begin{bmatrix} 0.1995 \\ 0.2645 \\ 0.1695 \\ 0.1222 \\ 0.1076 \\ 0.1366 \end{bmatrix} = \begin{bmatrix} 6.0233 \\ 6.0253 \\ 6.0222 \\ 6.022 \\ 6.0232 \\ 6.0227 \end{bmatrix}$$

$$\lambda_{\max} = (6.0233 + 6.0253 + 6.0222 + 6.022 + 6.0232 + 6.0227) / 6 = 6.0231$$

RESULTS AND DISCUSSION

The First Hypothesis

It was noted that the performance measurement indices of Gachsaran oil and Gas Company, have not had the same priority in the growth and learning dimension. According to data analysis this hypothesis was confirmed.

Based on surveys from experts about the ten factors identified in the company's growth and learning and factors rating using the balanced scorecard process it should be demonstrated that the use of detailed method of performance assessment (0.126), the use of new ideas and suggestions (0.117), To design an information system (0.115), the use of performance-based remuneration system (0.108), Encourage employees to learn new techniques (0.100), to enhance staff by training session (0.095), Managers decision making based on good information (0.091), the use of teamwork and specialized committees for teamwork (0.085), Acceptance of the organization policy by staff (0.082) or determining mission of the organization by managers (0.078) form the ten priorities to grow and learn. Our findings resulted from the hypothesis of the present study are consistent with Farzin (2007), Mohammadi (2010) and Siraki (2004).

The Second Hypothesis

This dimension is used to identify the needs and financial performance of the organization. Financial measures are important components of a balanced assessment system. As it was seen in the obtained results, it should be noted that reducing the cost of mistakes (0.2645), the Organizational performance in ivision of funds among the respective units (0.1995), The organization performance impact in increasing profitability (0.1695), the organization performance impact on expanding market share (0.1366), reducing administrative costs of oil and gas exploitation company (0.122) and reduction of personnel costs based on the EPC (0.1076) have the highest priority respectively. Reducing costs caused by mistakes is the most important priority in financial dimension from the perspective of experts. Holding a training course for staff is a necessity to reduce the cost of mistakes. The second hypothesis results are consistent with El Mtarn (2011) results.

The Third Hypothesis

(This studied dimension is used to evaluate the required processes in organization. In this perspective, organizations should identify processes that by transcending in them, they can create value for customers and ultimately shareholders.) According to prioritization the following six indices involved in this dimension, Increasing the quality of the provided services (0.192), using new ways of doing things (0.179), accuracy and transparency of the activities of each organization (0.1779), improving the

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processes involved in carrying out activities (0.1658), tasks performed by computers and automation administrative systems (0.1431) and access to staff regulations and guidelines (0.1423) Priority are the next financial priorities from the experts' point of view.

The Forth Hypothesis

As it was stated prestige of clients enables organizations to determine and improve the key metrics of measuring customers including customer satisfaction, loyalty, maintenance, obtaining new clients, etc. Regarding the prioritization of seven dimensions of this aspect from the experts' point of view, each of these factors including considering interests and wishes of the clients (0.168), Fulfilling the information and research needs of companies and organizations (0.154), and accountability to other departments and organizations (0.152), covered entities satisfaction from quality of service (0.143), companies and organizations trust to the organization's performance (0.134), identifying the needs of covered companies and organizations (0.125) and putting the companies under coverage (0.119) in the effective customers were detected.

Also the prioritization of balanced scorecard four key indicators that was studied in the fourth chapter as the second level of the model was carried out and the results showed that the customers dimension (0.263), financial dimension (0.251), internal processes (0.244) and the learning grow and development (0.240) were identified in determining four dimensions of the effective Scorecard . However, the prioritization results of these four dimensions show that the difference between the importances of these aspects is not much and the organization should consider all four perspectives in determining strategy. The resulted findings were consistent with findings from Babaie (2005), Farzin (2007), Stuart and Mohammad (2001) and Michalska (2005) and confirmed their findings by confirming the fourth hypothesis.

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