

A Case Study of Evaluation the Effectiveness of Implementing Quality Management System (ISO 9001:2000) in Gas Processing Plants of National Iranian Gas Company (NIGC) using Balanced Scorecard (BSC) Methodology

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Abstract

The purpose of this study was to evaluate the gas treating companies of National Iranian Gas Company and measure their quality management performance (ISO 9001:2000) by "Balanced Scorecard" approach which is a useful technique in this subject. The Balanced Scorecard approach suggests a framework for each organization to look at itself from four different perspectives to provide a more extensive view of organizational performance: the financial perspective, the customer perspective, the process perspective, the innovation and learning perspectives. The case study is done in five gas treating companies with different ages of quality systems registration. The results indicate the following important points: The first, the Balanced Scorecard successfully used to measure the performance of quality systems in studied companies. Second, the productivity of the internal process is increased as well after establishing this quality system; and the third, the innovation and learning perspective in somehow is neglected in these companies. Meanwhile it can be concluded that investments in quality systems increase organizational performance.

Keywords

Organization performance management, Quality management (ISO 9001:2000), Balanced Scorecard, Gas Treating Plants (companies) of NIGC

1. Introduction

1.1. ISO 9001:2000: ^[1-5]

This type of standard now requires the Quality Manual to 'include the scope of the system, any justifications for exclusions, refer to established procedures and describe the interaction between processes'. ISO 9001:2000 specifies the national, regional and international accepted procedures and criteria that are required to ensure that products and services meet customers' requirements. It identifies the basic disciplines of a Quality Management System and can be used by manufacturers, suppliers, service industries and end users – large or small – with equal effect. These processes, procedures, disciplines and criteria can be applied to any firm, no matter its size – whether they employ just a few people or many thousands. It can also be used by companies to set up their own Quality Management System and can form the basis for assessing a manufacturer's Quality Management System (i.e. to ensure that a supplier or service industry has the ability to provide satisfactory goods and/or services).

The aim of ISO 9001:2000 is that it:

- is flexible enough to fit any sort of organization (the manufacturing emphasis is gone);
- no longer consists of 20 isolated elements;

- has a new quality process management model;
- defines responsibilities and authorities within the process areas;
- has a new emphasis on the identification of stakeholders and how the organization plans to meet their needs;
- includes quality planning
- sets a requirement for the regular review of quality objectives;
- provides a flexible approach to quality documentation;
- provides useful rules for presenting the Quality Manual;
- enables an organization to assure that its infrastructure is sufficient to meet its quality objectives;
- provides a method for continually reviewing the work environment and its effect on quality;
- emphasizes the identification and review of customer needs and expectations;
- needs a formal review of an organization's ability to meet customer needs;
- emphasizes close communications with customers;
- includes process capability studies;
- includes design control based on project management;
- includes expanded validation of design requirements;
- requires configuration management;
- gives a better definition of the function of purchasing and procurement;
- verifies purchased products;
- validates the output of processes within an organization;
- replaces service requirements with delivery and post delivery service requirements;
- needs process measurements and process audits;
- documents how a product is measured and evaluated using a Quality (Control) Plan;
- includes the requirement for regular revalidation of products or services to ensure that they continue to meet customer expectations;
- requires a formal system of measuring customer satisfaction;
- gives a more aggressive definition of corrective and preventive action;
- requires a formal policy on continuous improvement;
- is in line with other management systems.

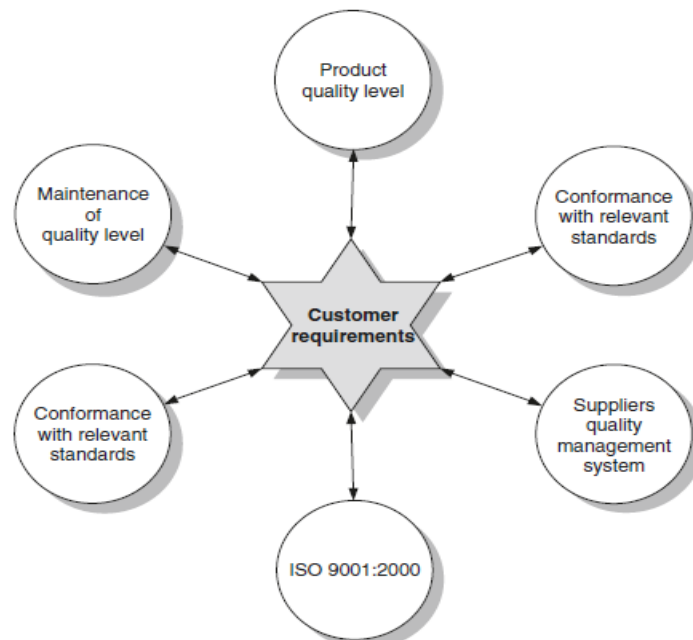


Figure 1: The ISO9001:2000 elements and their relations ^[1]

It can be shown in Figure 1. The ISO9001:2000 the requirement standard is used to assess the ability to meet customer and applicable regulatory requirements and thereby address customer satisfaction. It is now only standard in the ISO 9000 family against which third-party certification can be carried.

1.2. The Balanced Scorecard ^[6-8]

The balanced scorecard (BSC) is a strategic performance management tool for measuring whether the smaller-scale operational activities of a company are aligned with its larger-scale objectives in terms of vision and strategy. By focusing not only on financial outcomes but also on the operational, marketing and developmental inputs to these, the Balanced Scorecard helps provide a more larger view of a business, which in turn helps organizations act in their best long-term interests. This tool is also being used to address business response to climate change and greenhouse gas emissions. Organizations were encouraged to measure, in addition to financial outputs, those factors which influenced the financial outputs. For example, process performance, market share / penetration, long term learning and skills development, and so on. The underlying rationale is that "organizations cannot directly influence financial outcomes", as these are "lag" measures, and that the use of financial measures alone to inform the strategic control of the firm is unwise. Organizations should instead also measure those areas where direct management intervention is possible. In so doing, the early versions of the Balanced Scorecard helped organizations achieve a degree of "balance" in selection of performance measures. In practice, early Scorecards achieved this balance by encouraging managers to select measures from three additional categories or perspectives: "Customer," "Internal Business Processes" and "Learning and Growth."

The balanced scorecard rests on two basic assumptions:

- Running a business is a complex task, so much so that one measure, e.g. return on capital, is not enough to guide anybody in the company. Several indicators are needed, preferably from several perspectives.
- Measuring something is a way of directing attention to it, or put more popularly; what you measure is what you get.

Implementation of the balanced scorecard starts with the company's vision and strategy. Based on the vision and strategy, the same four questions are posed in turn, for each of the four perspectives: financial, customer, process and innovation and learning.

For the financial perspective the questions are:

- How will we appear as a company if we reach our financial goals?
- What are the key success factors for reaching our financial goals?
- What actions have to be taken in order to reach our financial goals?
- What is it critical to measure in order to reach our financial goals?

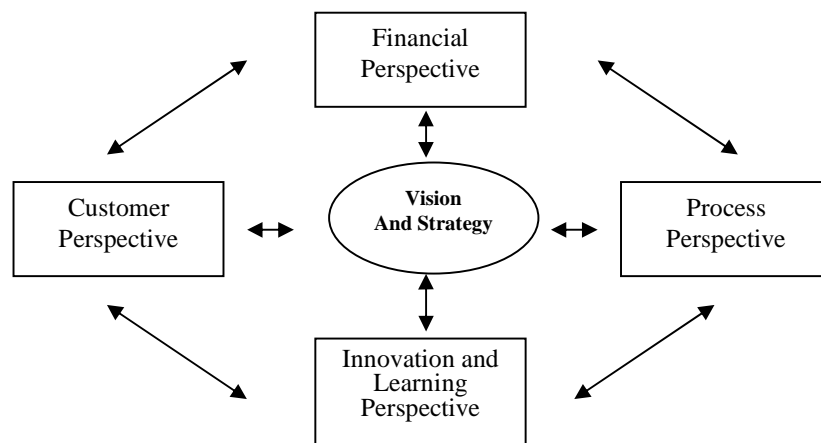


Figure 2: The Balanced Scorecard strategy and perspective causality ^[6]

For each of the remaining perspective the word financial is substituted for in term: customer, process and innovation and learning. The balanced scorecard is usually presented in the form of four boxes around a circle, (see Figure 2). The perspectives are arranged in three horizontal layers, from top to bottom:

- The past: financial perspective
- The present: process and customer perspectives
- The future: innovation and learning perspective

These layers provide a balanced time horizon, some very short-sighted measures, such as financial measures, and some medium- and long-term measures. Furthermore, the perspectives are related in a logical manner, as indicated by the arrows. For example in order to achieve financially good results the customers have to be satisfied. How do we keep customers satisfied? The answer is: Through a well-organized internal process and by continuously learning more and upgrading the processes and innovating new products. In general, the balanced scorecard has been recognized and met with enthusiasm in several industries. Since the mid-1990s, many larger corporations have implemented the balanced scorecard; Ericsson, Atlas Copco and Scandia, to mention a few. Many medium-sized and small companies are presently implementing balanced scorecards. The primary criticism of the model so far is related to:

- The problems of coordinating information gathering with several IT systems within a company
- Grasping scorecards with many parameters (systems with 20 different measures)
- The four perspectives not being sufficient (common additional perspectives are the employee perspective and the environmental perspective)

1.3. Review

Quality systems such as ISO 9001:2000 are gradually being implemented in the gas industry, but their purpose is not fully understood at any level of many companies in this sector. Other novel management systems such as the balanced scorecard are also not well understood. Therefore, a brief review of the underlying philosophies is presented.

2. Methodology

The case study was carried out of the indicators used by five gas treating company in National Iranian Gas Company to monitor the performance of their quality systems with the aim of determining how far these could be constituted as a balanced scorecard. The companies were selected so as to encompass various quality systems used within their internal process, and were judged to be at the forefront of quality assurance with considerable experience of the gas industry. The criteria for the selection of the companies were:

- They must have had ISO9001:2000 certification in the company for at least three years.
- They should have a genuine interest in quality issues, as evidenced by, e.g. active participation in conferences or debates
- They should be able to show a quality plan for their processes

The project was limited to companies in gas treating plants within the gas production sector, and among the companies, five companies out of eight gas treating plants were represented. These categories were judged to represent the construction process. The specification of these companies is listed in Table 1.

Table 1: The studied Gas Treating Companies ^[12]

Gas Treating Plant	Number of Employees	Gas Production (MMSCM/y)	Condensate Production (MMCM/y)	Sulfur Production (Tones/y)	LPG Production (Tones/y)
1	770	12206	11265	508418	0
2	655	2322	0	0	0
3	1105	17100	4472220	99138	0
4	908	32732	2087154	0	17001
5	327	5464	583265	0	31899

The questioner was designed base on ISO9001:2000 requirements (which was mentioned on introduction) and as per statistical formulas there were 72 questioner was dispatched among the personnel of gas treating companies and the data was acquired by interview and after that statistical calculation was carried out by SPSS (v.12). The methodology is shown in Figure 3.

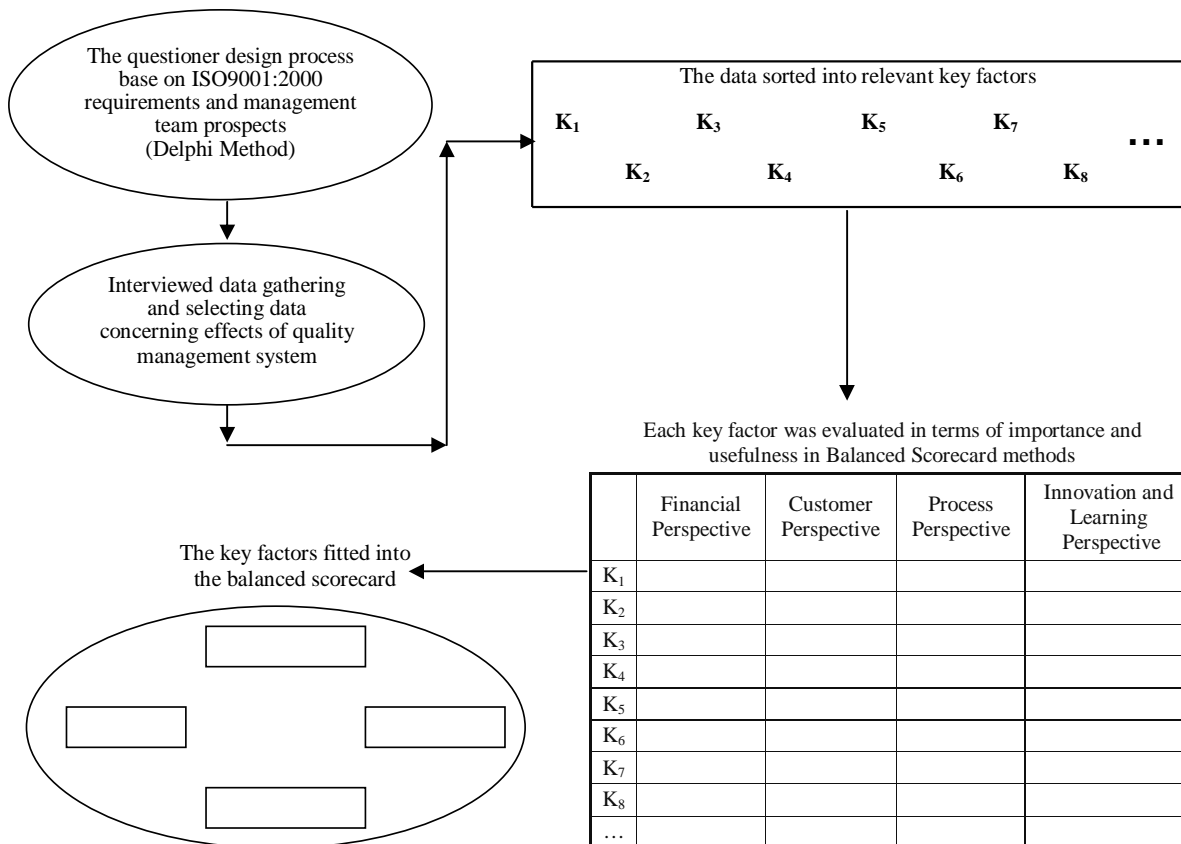


Figure 3: The BSC Performance evaluation methodology of ISO9001:2000 quality management system in brief ^[6]

3. Results and Conclusion

3.1. Results

The statistical results in brief show that:

- The Balanced Scorecard successfully measured the performance of quality systems in studied companies.
- The efficiency of the internal process was increased as well;
- The innovation and learning perspective in somehow is neglected in these companies and the personnel had not enough motivation in their job.
- Most of the companies believe that that the productivity increases after establishing quality management system that means investment in quality systems increase organizational performance.
- In most of the companies personnel were interested in knowing their company strategy; so the establishing Balanced Scorecard totally was highlighted.
- The companies did not have any feed-back system from the customers.

3.2. Conclusions

After presenting the results for management team of these companies it is concluded from management review meetings (which were common between these companies):

- Lack of information about products nonconformity and customers in these companies (customers feed back system) was shown that this system must be lunched in near future and also it was suggested that this information system must mirror the customers quality requests for better products quality as the main ISO 9000 requisition.

- It was suggested that the balanced scorecard method and its structure fully implemented to the studied companies in order to achieve the better results and real performance of different quality management systems which was implemented before.
- The financial factors evaluation of the companies and personnel performance (which are common between governmental sector) were not satisfaction among the management team of these companies and the non financial factors must take into account as BSC method emphasizes,
- Due to lack of training standards for the jobs of gas treating sectors the current training schedules were not satisfied the personnel training needs and these standards must be ready and implemented as soon as possible.

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