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Evaluation of the economic efficiency of process-oriented management system at healthcare organizations

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Abstract

The article deals with the issues on theory of evaluation of the operating efficiency of an organization as well as the approach selected by the authors to evaluate the operating efficiency of medical organizations, particularly at an outpatient polyclinic department. This approach is based on formation of a system of process-oriented management in an outpatient polyclinic department of a medical organization based on integration of information technology and on building models of modern management. Besides, the authors developed a group of indexes of economic efficiency based on the balanced scorecard. On top of that, an analysis of social indexes was carried out in this article, which allowed demonstrating more accurately the extent of satisfaction of patients with the rendered medical services.

Keywords: Medical services; medical organization; outpatient polyclinic department; business process; health management; process-oriented management system; automated information system; balanced scorecard.

Introduction

Currently in the Russian Federation, there is a global modernization of the healthcare system going on. In 2010-2011, two key federal laws #323-FZ and 326-FZ were adopted, the result of which was virtually total change of the regulatory base; the system of healthcare financing was reformed, the volume of monetary funds allocated for medicine was increased [1-3]. The goal of the reforms was the urgent demand in improvement of the quality of medical aid to the people of Russian Federation.

However, it is to be noted that the existing trend of permanent growth of prices for medical services adds to decreasing affordability of medical aid. As a result, consumers of medical services are not satisfied with the quality of medical aid rendered. In this view, two criteria of the processes of reforming must be given top priority according to Yu. Komarov, Vice President of the Russian Medical Association:

- 1) Satisfaction of patients with the medical aid rendered to them.
- 2) Satisfaction of health workers with organization of medical aid [4].

Compliance with the first criterion is possible due to the improvement of quality, the

level of service, and affordability of the rendered medical aid to the people of Russia. The second criterion can be achieved by introduction of an employee incentive program, including financial motivation as well as existence of the opportunity of qualification upgrade and qualitative and career development [5].

In order to solve these issues, we find it timely to form a system of process-oriented management at an outpatient polyclinic department, which would be able to solve efficiently the above-listed issues based on integration of information technology and building models of the modern management.

The key performance indicator for the system of process-oriented management in the outpatient polyclinic practice is the development of a group of indexes of economic efficiency based on the balanced scorecard. The comprehensive approach suggested by us provides for orientation to the prevailing role of the analysis of social indexes with account of the considerable social role and the mission of medical organizations in protecting the health of Russian population. The social indexes reflect most accurately the extent of satisfaction of patients with the medical services rendered.

The issue on evaluation of the efficiency of results of an organization's performance arose in the early 20th century. At that time, efficiency evaluation was based only on the analysis of financial readings, such as the multiplicative model of DuPont and the index of the investments profitability. In recent years, foreign and Russian literature has been noting the inability to make effective managerial decisions, using only data on the financial status of an organization, because relying solely on accounting data, the system will be retrospective, which significantly reduces its information content and hinders taking managerial decisions of strategic nature.

The increasing competition in the market of medical services requires improving the quality of care, as well as improving the quality of services provided in medical establishments. In order to achieve these goals effectively, it is necessary to build integrated systems of indicators that, in addition to financial, would include marketing, logistics, and other components. These systems must be individual and meet the requirements of certain sectors of the economy, as well as be consistent with the strategic goals and objectives of management [6].

In the 1990s, the scientists R. Kaplan and D. Norton developed the Balanced Scorecard (BSC). In foreign theory and practice of dealing with BSC, four aspects of the balanced scorecard are distinguished:

- 1) Financial – the financial line, considering the company's performance in terms of return on invested capital.
- 2) Customer – the success of customer service.
- 3) Internal process – the optimal performance of internal business processes.
- 4) Learning and growth/employees – the overall competence of the personnel, focus on permanent improvement.

The researcher of BSC P.R. Niven says that the four components of the system contribute to achieving a balance between long-term and short-term objectives, between desired outcomes and factors of their achievements, as well as between the rigid objective criteria and softer indexes.

Such a multilateral system of indexes may seem rather complicated and confusing, but in practice, if it is correctly compiled, it turns out to be quite effective as it displays the commonality of purposes, as all indicators are directed to perform a single strategy [7].

The main characteristics of the BSC according to D. Norton and R. Kaplan are:

- The ability to measure and optimize the activities of the organization continuously and effectively.
- The concept, on which BSC is based – it is the accessibility of information for the personnel at all levels of the organization: the employees of the “medium” level should be aware of the responsibility for their decisions and actions and in what financial implications they may result; the management of the organization needs to have information about what actions exactly will lead the organization to long-term financial success.
- Financial and nonfinancial indicators of the BSC should be a balance between external reporting data for shareholders, customers and internal business processes, learning, and development.
- Objective quantifiable results and subjective and to some extent arbitrary parameters of the future growth, which are combined by BSC.
- The advantage of BSC over traditional control systems is that it provides feedback on the organization's strategy, i.e., the top management focuses its activities on the long-term strategy, and the current management of the organization is based on the BSC use.

P.R. Niven supports the theory of D. Norton and R. Kaplan and draws attention to the fact that BSC along with analyzing the financial results can also contribute to the emergence of new opportunities and manage the completion of amortization for the further growth of organizations [8].

Thus, it is obvious that structuration and accumulation of comprehensive information for several periods for further analysis in its dynamics requires presence of modern information-analytical systems in the organization.

The rapid development of IT represented in the market of medical services at the moment, and the successfully operating large number of innovative companies working at the intersection of information and management technologies have added for the development of products that enable automation and modernization of the key business processes in healthcare organizations.

Methods

The object of our research is the Specialized Consulting and Diagnostic Center (SCDC) of the

Samara State Medical University, which in 2010 implemented the automated information system (AIS) "IMC Poliklinika".

The automated information system "Poliklinika" is designed to automate the document and medical records management process, the process of analytical data processing and representation of the results in the form of independent reports, the required format.

The AIS allows for comprehensive accounting of basic steps of providing medical services to patients, since the patient's admission to a medical facility, including visits to doctors and specialists, paraclinical services, laboratories, and ending with the necessary documents at discharge. The system supports databases of patients, including an expanded set of personal data, and takes into account other information about the patient, such as comorbid diagnoses, medical services rendered by other medical and preventive institutions (MPI), referrals to various treatments and examinations [9].

Such capabilities of the system allow getting quickly the necessary accurate information on various indexes describing the quality of medical services rendered to the population. This would be very difficult to implement without modern information technology, and, most importantly, it would be impossible to obtain and analyze the dynamics of most of the indicators characterizing the quality of medical care, or to do so would be extremely difficult and time-consuming (e.g., the patient waiting time in the line, the attendance of a doctor, duration of the visit to the doctor, occupation of the doctor, etc.).

In order to illustrate the effectiveness of the system of process-oriented management in SCDC, which we have developed and an integral part of which is the automation of key business processes using AIS, and ascertaining the benefits of business process automation in the outpatient polyclinic practice, it is necessary to analyze the balanced scorecard of medical activity. The evaluation of the effectiveness of the process approach should be based on the comprehensive analysis of the results of a medical organization before and after the revision of the business processes, which analysis would provide answers to a number of questions in the compared periods [10].

Results and Discussion

In this paper, we conducted a study of indexes of the Samara State Medical University's clinics

between 2010 and 2013. The choice of the periods is substantiated by the fact that after the implementation of the AIS Poliklinika, the first identified positive changes in substantive outcomes were revealed in 2010, and the persistent positive trend with regard to a prevailing number of indexes was determined in 2013.

The analysis is based on breaking up all indexes into groups by four aspects: (1) financial, (2) success of customer service, (3) optimality of internal business processes, and (4) overall competence of the personnel, focus on permanent improvement of the quality of the medical services rendered (Figure 1).

In this article, we would like to give special attention to the analysis of social indicators (two to four groups) in order to emphasize their importance for evaluating the performance of medical organizations. And evaluation of financial indicators will be considered by us further. The data available for each group are presented in Tables 1-3.

Having considered the indicators related to the group "Success of customer service", we note that most of them have improved since the introduction of AIS. Thus, the number of attached patients increased by 31%, and clinic attendance – by 71%, which can be explained by the multispecialty nature of the clinic, patients' satisfaction with the work of the medical establishment as a whole, improvement of the level of rendered medical services (availability of electronic/online appointment), improvement of quality of medical aid (see Figure 2). These causes determine the growth of indicators such as attendance of a doctor (increased by 66%), as well as the load of the doctor by services (increased by 35%). In addition, we observe the increase in the number of repeated visits of patients with the same disease by 20%, which may evidence that patients were satisfied with the rendered medical aid and decided to apply to the clinic again.

In general, the degree of patient satisfaction according to the results of the survey increased by 20%, which is likely due to the improved indexes in the second group – "Optimality of internal business processes", which will be discussed below (see Table 2). The specified group of indicators demonstrates considerable improvement. The time of patients' expectation in the line at the doctor's office reduced by 50%, and the time of waiting for a pre-appointed visit by a patient decreased by 67%, which may be due to the fact that all

Figure 1: The scheme of balanced scorecard for comprehensive evaluation of the operating efficiency of a medical organization.

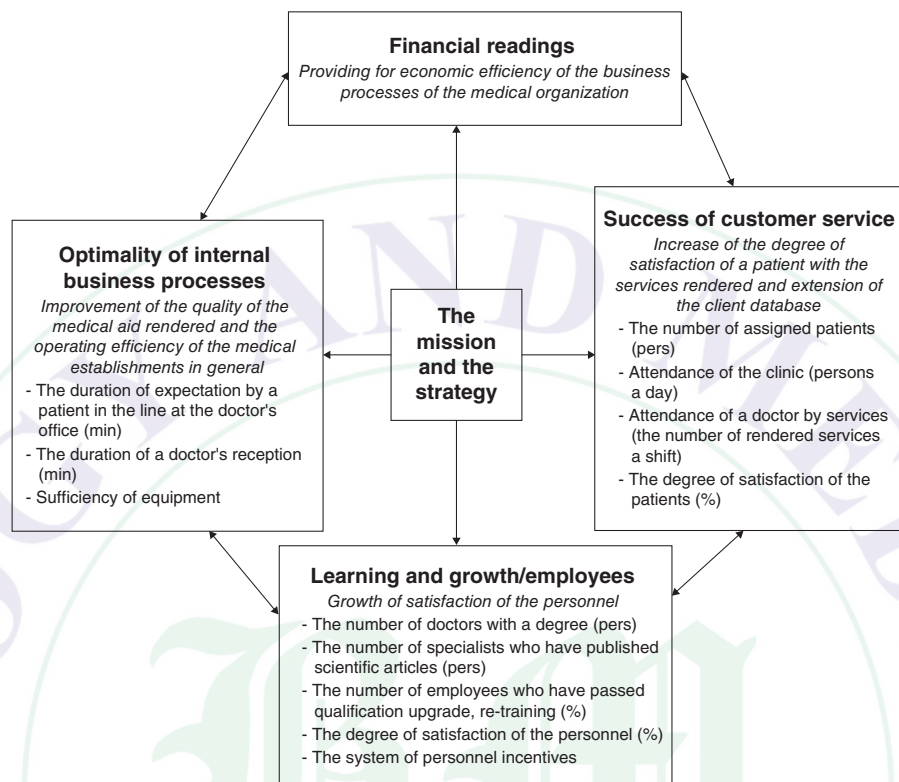


Table 1: Success of customer service.

Index description	Units	2010	2013
Number of assigned patients	Persons	13,250	17,411
Attendance of the clinic	Persons a day	318	543
Attendance of a doctor	Number of visits to a doctor per year	106,075	175,690
Services range of a doctor	Number of rendered services during a shift by a doctor	23	31
Repeated attendance of patients because of the same disease	%	25	30
Degree of satisfaction of patients	%	70	83

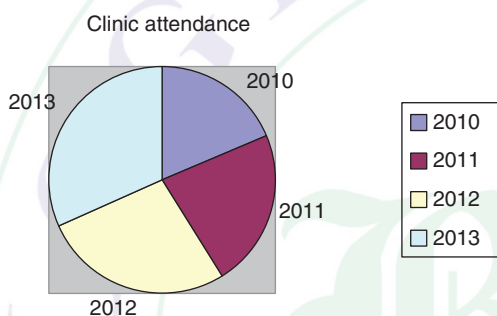
Table 2: Optimal structure of internal business processes.

Index description	Units	2010	2013
Duration of expectation by patients of their turn in the line at the doctor's office	Minutes	30	15
Duration of expectation by patients of pre-appointed visits	Days	90	30
Duration of a doctor's reception	Minutes per visit	10	15
The relative share of the time consumption for recording and accounting procedures by medical personnel	% of the patient reception duration	20	30
Level of equipment (computerization, automation of work places)		No	Abidance by federal procedures
An integrated information system		AIS Poliklinika	AIS Poliklinika

Table 3: Learning and growth/employees.

Index description	Units	2010	2013
Number of doctors with a degree	Persons	2	2
Number of specialists who have published scientific articles	Persons	3	5
Number of employees who have passed qualification upgrade, retraining	%	100	100
Degree of satisfaction of the personnel	%	80	90
Employed	Persons	13	29
Dismissed	Persons	6	12
System of personnel incentives		No	Financial

Figure 2: The diagram of attendance of the clinic in 2010-2013.



patients use the convenient system of electronic/online pre-appointment and come by the exact time of appointment (see Figures 3 and 4). Duration of the visit to the doctor increased by 50%, which may be due to the fact that as the AIS was implemented, in addition to the examination of the patient, making the diagnosis and putting on appropriate medication, doctors also have to put all data into the database. However, we believe these time costs justified because in the future, all information about a patient, his medical history, including laboratory tests, will be easily and quickly accessible to any doctor of the

Figure 3: The diagram of the period of patients' expectation in line at the office in 2010-2013.

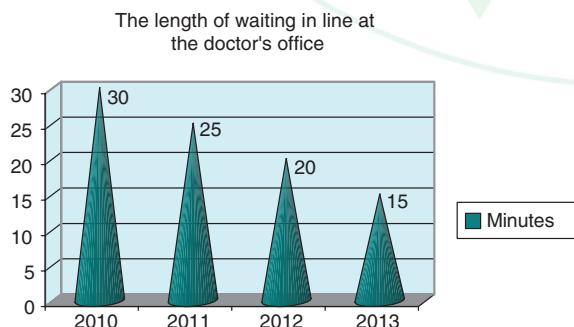
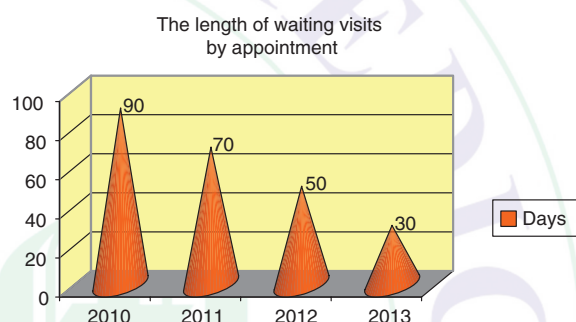


Figure 4: The diagram of the period of patients' expectation of pre-appointed reception in 2010-2013.

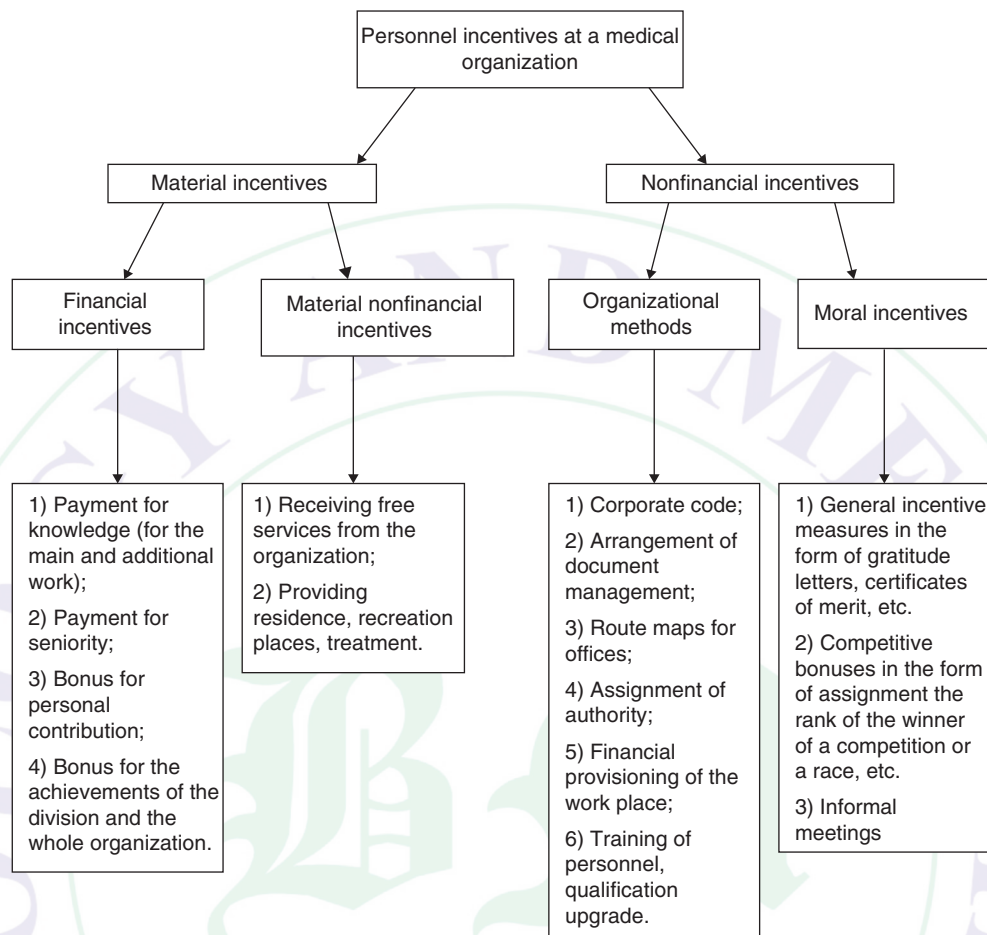


clinic to whom the patient will address, and this will significantly facilitate the doctor's actions at choosing the right tactics of treatment.

The share of the time spent for accomplishment of accounting and registration procedures by medical personnel increased by 50%, which may be due to the need to fill in substantial amount of data into the AIS database on the patient who has appealed for the first time. However, in the long-term, as the customer database will be increasing, considerable amount of time currently spent for servicing consumers of medical services in the reception will be saved.

The third group of indicators learning and growth/employees evidences the desire of the medical establishment to permanently improve the quality of medical aid by forming team approach, training and improving practical skills (Table 3). Namely, the number of specialists who had scientific publications has increased from three to five persons; all employees undergo regular refresher courses. In addition, the organization has developed a system of personnel incentives, which contributed significantly to improve management efficiency (see Figure 5).

Figure 5: The scheme of the system of personnel incentives at a medical organization.



The top executives of the medical organization place great emphasis on the level of satisfaction of patients with the provided medical services and quality of the aid rendered. Before, they introduced a system of feedback with the consumers of the medical services. This takes place by means of polls, which evidences improvement of the efficiency of medical organization management.

Thus, the carried out reforms increased the personnel satisfaction level by 13%.

Summary

At analyzing the effectiveness of the use of process-oriented management in an outpatient polyclinic establishment, it is necessary to consider all of the above parameters over time and to compare their growth rates. If a more detailed analysis of indicators is required, one can carry

out the factor analysis using the methods of chain substitutions, absolute differences and so on. At the factor analysis of labor productivity, such private indicators as productivity, average daily and hourly output are considered. The latter two ones are calculated by the average annual output per health worker during the total number of working days and hours, accordingly.

All indicators specified above are needed to build a balanced scorecard, which will allow assessing the process management in a healthcare organization, suggesting measures to optimize the existing business processes, and provide for their further re-engineering in order to improve the quality and the profitability of the healthcare establishment. The balanced scorecard is a medical institution management system, which provides for the opportunity to implement its strategic plans due to operative control and management of implementation of the strategy based on the key performance indicators.

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