Evaluation of the company intellectual capital based on the Norton–Kaplan balanced indicator system

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Abstract. The paper is devoted to the issue of evaluating the intellectual capital of companies. The authors propose a model based on the Norton-Kaplan balanced indicator system. For each of the projections, such as “Finance”, “Clients”, “Business processes”, “Education”, indicators are systematized, determined by the company reporting data. The practical application of the Norton-Kaplan balanced indicator system modified by the authors on the example of PJSC Tatneft has shown that the proposed model allows for a comprehensive evaluation of the intellectual capital of companies.

1. Introduction

In modern conditions, the competitiveness and profitability of companies is largely determined by the availability and effective use of intellectual resources with their subsequent transformation into intellectual capital.

The category of “intellectual capital” is a multi-faceted concept, and currently there are many definitions of this category. The basis of intellectual capital is knowledge [1]; however, intellectual capital is more than just “knowledge”, as it includes not only the mental abilities and ingenuity of a person [2], but also intellectual property, business relationships with partners, etc.

The interpretation of S.M. Klimov, who deals with the issues of human capital, is noteworthy: “intellectual capital is the knowledge, information and creative abilities of a person formed in the course of training” [3]. On the one hand, training measures allow increasing the return on labor of each individual employee [4]; on the other hand, the company receives various technological and organizational advantages over competitors. In this regard, we can say that the intellectual capital is the sum of the knowledge of all employees of the company, which ensures its competitiveness [5].

Currently, the issues of intellectual capital evaluation are particularly relevant. For the first time, the problem of monitoring became particularly acute when companies with small tangible assets but high development potential due to a high level of intellectual capital appeared.

It is necessary to highlight the main reasons that caused the need to monitor intellectual capital:
- evaluation of intangible assets allows measuring the so-called “driving forces” that affect the company performance;
- monitoring of intellectual capital allows evaluating more accurately the value of the company, as well as presenting a detailed reporting system, offering investors more complete information about the company to analyze the effectiveness of investment programs [6];
- monitoring contributes to improving the efficiency of intellectual capital management, which contributes to improving the company rating.

2. Methods
Currently, both quantitative and qualitative models for evaluating intellectual capital have been developed. The use of high-quality models does not imply strict settings; these models are more flexible and, as a rule, are based on expert assessments [7]. When applying quantitative methods, one should adhere to a rigid model and use a clear research plan [8]. Indicators of intangible assets that are subject to measurement are individual (important) aspects of the company activities (for example, results or certain processes), and the evaluation methodology is a selected tool that helps measure indicators by qualitative and quantitative criteria.

Among the quantitative methods for evaluating the intellectual capital of companies, we can distinguish a balanced system of indicators developed by D. Norton and R. Kaplan [9]. The basis for the development of this model was to achieve goals and identify new ways to improve the company performance. The hypothesis of the authors of the model was based on the fact that information limited by financial indicators is not sufficient for making managerial decisions, which is due to an increase in the value of intangible assets.

The model is a mechanism for bringing consistently the company goals and development strategy to employees, as well as monitoring the achievement of goals based on key performance indicators (KPI). KPI allow evaluating the degree of achievement of goals, determining both the effectiveness of business processes and the efficiency of each employee. The balanced indicator system covers four main projections:
- finance;
- clients;
- business process;
- education.

Indicators that evaluate these projections are determined based on the company strategic goals. In this model, knowledge management based on learning and growth is evaluated separately as part of the overall effectiveness of the organization.

To evaluate the company intellectual capital on the basis of a balanced indicator system, it is advisable to allocate coefficients that allow evaluating the four specified projections based on financial statements (table 1).

Table 1. Distribution of coefficients for evaluating the company intellectual capital by blocks of the balanced indicator system.

| Projections       | Indicators                                      |
|-------------------|------------------------------------------------|
| Finance           | 1. Operating profit                            |
|                   | 2. Free cash flow                               |
|                   | 3. Return on invested capital                   |
|                   | 4. Return on assets                             |
| Clients           | 1. Rate of revenue growth                       |
|                   | 2. Return on sales (profit margin)              |
|                   | 3. Turnover period of accounts receivable       |
| Business processes| 1. Share of management expenses                 |
|                   | 2. Throughput time                              |
|                   | 3. Labour productivity                          |
| Education         | 1. Expenditure on staff development              |
|                   | 2. Employee turnover rate                        |

Source: compiled by the authors

It should be clarified that indicators related to personnel evaluation (labor productivity, personnel development expenses, staff turnover) can be estimated based on data from annual reports of the companies.
3. Results

To assess the intellectual capital through the Norton-Kaplan balanced indicator system PJSC “Tatneft” was selected. Tatneft is one of the leading Russian oil and gas producers. The indicators required for evaluating the intellectual capital of PJSC Tatneft based on the Norton-Kaplan model are presented in Table 2.

Table 2. Indicators for evaluating the intellectual capital of PJSC Tatneft based on the Norton-Kaplan balanced indicator system.

| Indicators                                      | 2014   | 2015   | 2016   | 2017   | 2018   |
|------------------------------------------------|--------|--------|--------|--------|--------|
| **Projection “Finance”**                       |        |        |        |        |        |
| Operating profit, billion rubles               | 91.7   | 119.4  | 136.6  | 161.4  | 265.1  |
| Free cash flow, billion rubles                 | 74.0   | 47.6   | 45.7   | 105.3  | 147.7  |
| Return on invested capital, %                  | 15.5   | 14.4   | 15.8   | 15.5   | 28.0   |
| Return on assets, %                            | 14.8   | 14.0   | 15.3   | 13.6   | 24.5   |
| **Projection “Clients”**                      |        |        |        |        |        |
| Rate of revenue growth,                        | 1.08   | 1.18   | 1.05   | 1.20   | 1.36   |
| Return on sales (profit margin), %             | 23.4   | 25.8   | 28.1   | 27.7   | 33.4   |
| Turnover period of accounts receivable, days   | 74     | 73     | 72     | 110    | 136    |
| **Projection “Business processes”**            |        |        |        |        |        |
| Share of management expenses, %                | 0.001  | 0.02   | 0.04   | 1.66   | 1.53   |
| Throughput time, days                         | 58     | 54     | 62     | 63     | 67     |
| Labor productivity, million rubles/person      | 19.0   | 22.5   | 22.9   | 27.5   | 37.1   |
| **Projection “Education”**                    |        |        |        |        |        |
| Personnel development expenses, million rubles| 129    | 160    | 130    | 138    | 152    |
| Employee turnover rate, %                     | 4.84   | 3.44   | 3.13   | 3.72   | 3.70   |

Source: compiled by the authors

According to the “Finance” projection, we can conclude that in general, during the period under review, there is an increase in the coefficients that characterize the analyzed direction of the balanced indicator system. According to the presented data, the best year for the analyzed company is 2018, as it is characterized by an increase in all the considered coefficients compared to the previous period; the increase in return on invested capital is due to an increase in net profit, while the increase in return on assets is observed at the same time as an increase in net profit and a decrease in the value of assets, which indicates an increase in the efficiency of using assets available to the company.

As for the projection “Clients”, according to the results obtained in 2016, there is a decrease in the rate of revenue growth, but the growth of revenue in absolute terms is positive by 5% compared to the previous period. In 2017, there was a slight decrease in the return on sales (from 28.1% in 2016 to 27.7% in 2017), due to a decrease in net profit. However, in the period under review, the overall growth rate of revenue and profit margin tend to increase, which is positive. As a negative trend, we should note a sharp increase in the period of turnover of receivables in 2017-2018 – by 38 days in 2017 (from 72 days in 2016 to 110 days in 2017) and 26 days in 2018 (from 110 days in 2017 to 136 days in 2018). The results show that the work with consumers is not effective enough.

According to the “Business processes” projection, such indicators as the share of management expenses and labor productivity are characterized by positive changes. Thus, in 2017, there is a significant increase in the share of management expenses in the cost of sales (from 0.04% in 2016 to 1.66% in 2017); for 2017, there is a significant increase in labor productivity (from 27.5 million rubles/person in 2017 to 37.1 million rubles/person in 2018). As negative changes, we should highlight the increase in the length of the production cycle – a significant increase in this indicator compared to previous periods is observed in 2016 (the duration of the operating cycle increased by 8 days – from 54 days in 2015 to 62 days in 2016) and 2018 (the duration of the operating cycle
increased by 4 days - from 63 days in 2017 to 67 days in 2018). The increase in the length of the operating cycle indicates that the company business processes are not arranged effectively enough.

In general, in the period under review, the analyzed indicators of the “Education” projection have a positive dynamics. Thus, staff development expenses increased from 129 million rubles in 2014 to 152 million rubles in 2018; staff turnover decreased from 4.84% in 2014 to 3.7% in 2018. At the same time, we should highlight the reduction in personnel development expenses in 2016 (from 160 million rubles in 2015 to 130 million rubles in 2016) and a slight increase in the company staff turnover in 2017 (from 3.13% in 2016 to 3.72% in 2017).

Thus, the obtained results allowed to distinguish two problematic factor in projections of the balanced indicator system, PJSC “Tatneft” - the value of the turnover period of receivables in the projection “Clients” and record the duration of the production cycle in the projection “Business processes”.

4. Discussion
A balanced indicator system is a strategic management tool aimed at achieving goals. Evaluating the main goal of the “Finance” projection is to establish a link between the company strategy as a whole and its financial objectives. At the same time, the financial component has a dual character – on the one hand, it determines the financial result, on the other hand, it forms the basic goals for other components of the balanced indicator system. The “Clients” projection as the next stage of the system under consideration is based on market segmentation and evaluates the consumers with whom the company operates. Despite the fact that companies currently pay great attention to consumers, it should be borne in mind that the goal of the projection “Clients” cannot be achieved without the effective work of the company staff. The “Business processes” projection builds on the previous two projections and describes activities that provide the expected financial result (the “Finance” projection) and customer satisfaction (the “Clients” projection). The considered three projections of the balanced indicator system are aimed at improving the company performance, while the goal of the “Education” projection is to provide the enterprise with the necessary infrastructure to solve the tasks of previous projections. In addition, the “Education” projection, providing professional competence of employees [10] in accordance with the requirements of the modern (digital) economy [11], is directly related to the basis of intellectual capital – knowledge that determines the sustainable development of the company and ultimately contributes to the growth of social production [12].

Despite the widespread use of the Norton-Kaplan balanced indicator system in many companies, a number of authors have criticized this system. Thus, K. Ittner and D. Larker [13] believe that individual companies are formally related to non-financial indicators and do not take into account the cause-and-effect relationships between indicators and the goals of the organization. According to A. Fisenko and E. Kuleshova [14] the balanced indicator system does not take into account a number of important components, such as indicators of operational, strategic budgets, etc. Agreeing with the opinion of these economists, it should be emphasized that the system of indicators proposed in this paper is a modified Norton-Kaplan model, which includes only that part of the indicators of the original system that can be calculated on the basis of enterprise reporting data. Also it is worth noting the remark of P. Schonberger [15], who challenges not the balanced indicator system itself as a whole, but the weak relationship between strategic goals and key performance indicators (KPI). In this paper, the authors attempt to link key performance indicators primarily with the organization intellectual capital.

In our opinion, the use of a balanced indicator system allows for a comprehensive assessment of the company intellectual capital. The Finance section describes intellectual capital in terms of absolute (operating profit, free cash flow) and relative (return on invested capital, return on assets) financial indicators and describes the quantitative side of the studied category. The “Clients” section describes the company marketing activities, i.e. the effectiveness of using intellectual capital in the marketing concept. Indicators of this block allow formalizing intellectual capital through such indicators as the period of turnover of receivables, the growth rate of revenue, profit margin. The “Business processes”
section describes activities to create a product or service for consumers. Indicators of this block, such as labor productivity, the share of management expenses, and the duration of the production cycle make it possible to identify intellectual capital in terms of optimizing production and improving the efficiency of business processes. In the end, the indicators of this block determine the creation of value for consumers, which in turn affects the value of the company intellectual capital, as well as the value of the company itself. The “Education” section determines the further development of the company by means of indicators of staff turnover and personnel development expenses, which primarily determines the quality side of intellectual capital.

5. Summary
The balanced indicator system covers projections that evaluate the company performance from various angles. In this regard, the use of this system allows evaluating the intellectual capital, identifying the category in question in the projections “Finance”, “Clients”, “Business processes”, “Education”.

According to the authors, to simplify the formalization of intellectual capital, it is advisable to use indicators calculated on the basis of company reporting data. The results of calculations tested on the example of PJSC Tatneft indicate that the model proposed by the authors, based on the Norton-Kaplan balanced indicator system allows for a comprehensive assessment of the intellectual capital of companies.

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