

Methodical Approach to the Supply Chain Strategy Development for Large Enterprises Based on a Balanced Indicator System

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Abstract- The article describes a methodological approach to the supply chain strategy development, consisting of seven stages and allowing taking into account the specific nature of the activities of large enterprises. This approach includes one of the most important stages in the supply chain strategy development, that is, its evaluation. Many authors exclude this stage during consideration. The use of a balanced indicator system (hereinafter - the BIS) in the supply chain strategy development for the enterprise allows taking into account a greater number of performance indicators for a detailed analysis of a large enterprise, which helps to identify problem areas in their activities in exchange. The article presents the developed methodology for assessing the effectiveness of the supply chain strategy for large enterprises based on the BIS: we improved the traditional performance indicators and developed additional indicators within each prospect of the modified BIS. The author's methodology includes the development of integrated indicators of the effectiveness of the supply chain strategy based on expert assessment, with the help of which the supply chain strategy is evaluated from the perspective of all the prospects considered within the framework of the modified BIS.

Keywords- *balanced indicator system, supply chain strategy, large enterprises, personnel performance indicators, prospects of a balanced indicator system.*

1. Introduction

In modern conditions of the formation of market relations, the competitiveness of large enterprises is largely determined by the initiative and flexibility of their workers. The effectiveness of all its activities largely depends on whether a large enterprise is able to attract and retain the most capable and qualified personnel. Therefore, the human resource management is a rather difficult task, the solution of which is achieved through the development and implementation of supply chain strategy at large enterprises.

The domestic business of large enterprises is not yet distinguished by the high quality of the formed strategies and long-term development plans. The disadvantages of managing large enterprises are as follows: frequent absence of a specially formulated competitive strategy that takes into account the effect of a complex of exogenous and endogenous factors for increasing competitive advantages; inability to establish systematic monitoring of the activities of large enterprises of competitors in order to assess the level and dynamics of key competitiveness indicators (structure, price, design products parameters; quality of business models, financial and human

resources; business performance); inconsistency of the tasks of ensuring competitiveness with the tasks being solved within the framework of implemented functional strategies.

Improving the supply chain strategy development methods for large enterprises based on a balanced indicator system will significantly improve their performance.

2. Degree of Scientific Development of the Problem

The research of scientific works showed that the theoretical aspects of consideration of the "supply chain strategy" concept have a serious scientific basis.

Issues of the essence of supply chain strategy are highlighted in numerous studies of domestic and foreign scientists, for example: Kibanov A.Ya., Chernykh M.N., Knyazeva O.V., Armstrong M., Komissarova T.A., Maslov E. V., Beloborodova N.A., Petrachkova Yu.L., Bednenko A., Ivanovskaya L., Avdeev V.V., Kornilov D.A., Petrova V.N., Pchelnikova T.G., Vinokurova M.A., Ozernikova T.G., Petruk G.V. et al. [1-11].

Existing approaches to the supply chain strategy development are considered in the works of such authors as: Knyazeva O.V., Kolomytseva A.O., Izhbulatova O.V., Sharunova E.V., Chikishnev N.M., Semyannikova O.G., Petrachkova Yu.L., Ryabikova S.S. et al. [4, 12-19].

Various methodological aspects of strategic management were investigated by Thompson A.A., Strickland A.J., Mintsberg G., Panov A.I., Solodukhin K.S., Lugov R.A. and other scientists [20-24].

Based on the goals and objectives of our study, we analyzed the scientific literature on the development of BIS, which are reflected in the works of [25-30].

However, despite the large number of works devoted to various aspects of the supply chain strategy development, it has to be noted that constant changes in the external environment require the development of new approaches and concepts for managing labor resources of the enterprises.

3. Theoretical And Methodical Approach To The Supply Chain Strategy Development

The "supply chain strategy" concept is interpreted ambiguously in the scientific literature. There are different points of view on the definition of the "supply chain strategy" concept and methods for its development.

The supply chain strategy refers to decisions, a set of actions or directions, intentions, as well as the way of thinking and management necessary to achieve the goals of a large enterprise to create and develop the highly qualified personnel [4, 6].

The personnel potential of a large enterprise is a quantitative and qualitative personnel feature associated with the fulfillment of production functions and achievement of the long-term development goals of a large enterprise [13, 14, 16].

We consider the most relevant the application of a methodological approach to the supply chain strategy development for large enterprises based on the BIS, consisting of seven stages.

The presented theoretical and methodological approach to the supply chain strategy development for large enterprises using the BIS is based on the application of SWOT and VRIOMD analysis of human potential adapted for the activities of large enterprises. At the same time, SWOT analysis of personnel potential is the basis for VRIOMD analysis of the personnel potential of large enterprises. These methods were considered within the framework of five prospects of the BIS.

The proposed methodological approach has also the

feature, which consists in the fact that a methodology based on the BIS is used to obtain a comprehensive and objective assessment of the effectiveness of its implementation at the last stage of strategy development (supply chain strategy assessment) based on various activity areas of large enterprises, since human resources are the central link in effective activities of large enterprises. There are other areas besides it without which the assessment of the developed supply chain strategy of a large enterprise is unreliable.

In our opinion, the approaches to the supply chain strategy development of other researchers include a large number of stages that complicate the formation of supply chain strategy and can lead to erroneous results. Other authors, on the contrary, emphasize a too narrow range of stages in the supply chain strategy formation that can be adapted for the small and medium-sized businesses than for the large enterprises.

Given the features of activities of large enterprises, it is advisable to use the following approach to the supply chain strategy development for large enterprises (Figure 1), then the supply chain strategy will be logically consistent, feasible and effective.

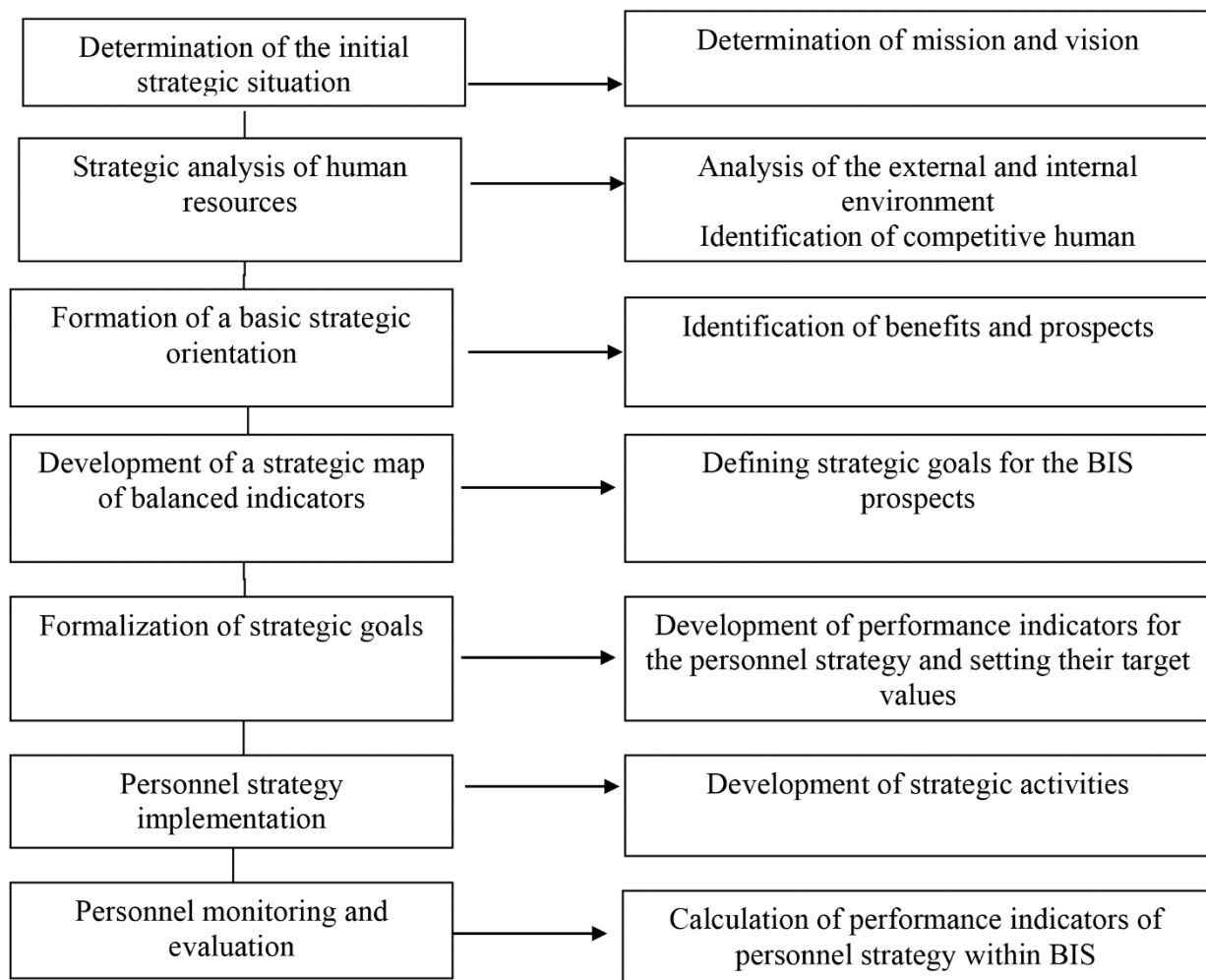


Figure 1. Methodological approach to the supply chain strategy development for large enterprise

The methodological approach allows improving the supply chain strategy development methods for large enterprises on the basis of BIS, supplementing the indicator system of the personnel potential effectiveness

of large enterprises in developing a supply chain strategy, as well as evaluating the effectiveness of its implementation.

To analyze the specific nature of the supply chain strategy of large enterprises, we propose modifying the traditional balanced indicator system by introducing a new group called “Partners”.

Achievement of the identified goal - “Partners” - can be considered interconnected with the goals of other groups of traditional indicator system. The “Partners” group gives an understanding of how the partners are interested in working with our enterprise. The representatives of this group are the candidates searching for work and being ready for long-term mutually beneficial cooperation.

By satisfying the interests of the “Partners” group, the enterprise will be able not only to increase its image and reputation, but also to employ highly qualified specialists. Due to such specialists, the enterprise will be able to increase its competitive advantages and receive commercial benefits.

For the supply chain strategy, the representatives of the “Finance” group include the branch management, which allocates a budget for the recruitment and the personnel service functioning.

Representatives of the “Clients” prospect are the consumers of products and services of a large enterprise. By satisfying the interests of the “Clients” group, a large enterprise will be able not only to increase its image and reputation, but also the sales level.

If we consider the business processes of staff recruitment, then the representatives of the “Internal Business Processes” prospect are the personnel service officers involved in the recruitment and placement of candidates for vacant positions.

Representatives of the “Training” prospect include trainers, who train all the personnel of a large enterprise (both the officers of personnel service and other departments).

4. Methodological Tools for the Development and Assessment of the Efficiency of Supply Chain Strategy

The supply chain strategy development is continuous. This statement is reflected in its close relationship with the solution of strategic tasks of a large enterprise both for the short and medium term, as well as for the long term.

The basis for calculating the performance indicators of a supply chain strategy uses an approach to assessing target effectiveness, since the indicators are calculated based on the result to goal ratio. The final value of the calculated indicator

should be closer to unity, which indicates the goal achievement.

We improved the traditional performance indicators within each group of the modified balanced indicator system. In addition, we developed additional indicators that can be used to assess the strengths and weaknesses of the supply chain strategy. Modified performance indicators make it possible to evaluate not only the supply chain strategy as a whole, but also the contribution of each recruitment specialist, which will help to identify problem areas of each process of a large enterprise. We evaluated the supply chain strategy on the basis of the methodology developed by us, consisting of the following steps (Figure 2).

One of the main stages in the supply chain strategy development is to assess the personnel potential of a large enterprise. The personnel potential assessment methodology for large enterprises has already been described in detail by the author in this article [30].

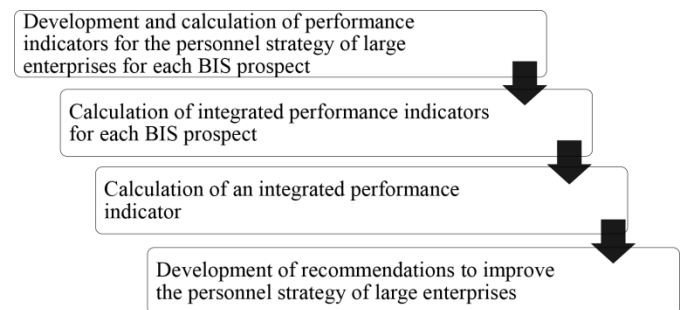


Figure 2. Supply chain strategy assessment stages

The supply chain strategy assessment methodology includes the development of an integrated indicator of the supply chain strategy effectiveness based on expert evaluation, with which one can evaluate the strategy in more detail, from the point of view of all the groups considered within the framework of a modified balanced indicator system.

There are various indicators of the supply chain strategy effectiveness within the framework of traditional groups of BIS in the scientific literature. At the first stage of the supply chain strategy assessment, we will develop and calculate the supply chain strategy performance indicators for each BIS prospect. In order to improve the supply chain strategy assessment, we propose using additional indicators that will relate to the components of the modified balanced indicator system reflected in Table 1.

Table 1. Efficiency indicators of the supply chain strategy based on the modified balanced indicator system

Opportunity	Prospect efficiency indicators
Education and development	Advanced personnel training rate (Ko)
	Personnel training rate (Ko)
	Training effectiveness rate of recruitment specialist (Δoc)
	Satisfaction with equipped facilities (Ym)
	Satisfaction with training conditions (Yy)
Business processes	Effectiveness of one recruiter (Δpn)
	Recruitment efficiency (Δn)
	Supply chain strategy efficiency (Δkc)
	Recruitment rate indicator (Yn)
	Flow rate (Km)

	Salary satisfaction level (Y_3)
Partners	Candidate satisfaction (Y_k)
	Telephone interview performance (Ξu)
	Satisfaction with personnel service performance (Y_p)
	Ad effectiveness ($\Xi p e$)
Finance	Efficiency rate of spending money on recruiter salaries ($K_{\Xi p}$)
	Efficiency rate of spending money on ad ($K_{\Xi o}$)
	Salary satisfaction ratio of sales assistants (Y_3)
	Rate of spending money due to personnel flow ($K_{o m}$)
Clients	Satisfaction rate with the personnel number (K_n)
	Sales assistant satisfaction ratio ($K_{y p}$)
	Client satisfaction rate ($K_{y n}$)

From the point of view of the “Finance” prospect, it is possible to develop such indicators of supply chain strategy effectiveness as: “Efficiency rate of spending money on recruiter salaries”, “Efficiency rate of spending money on ad”, “Salary satisfaction ratio of sales assistant”. Calculation of the indicator "Rate of spending money due to personnel flow" is given in Annex 1.1. When these indicators are calculated, it is possible to determine the efficiency of spending money on salaries of recruiters and sales assistants, as well as to identify the effectiveness of spending money on finding candidates for vacant positions.

Given the values of these indicators, it is possible to develop an algorithm where less financial resources will be spent on the recruitment of candidates, as well as on recruiter salaries, then the supply chain strategy of a large enterprise will be implemented more efficiently from the point of view of the considered group of balanced indicator system. To solve the problem associated with personnel flow, it is necessary to improve the motivation at in a large enterprise.

The indicator “Efficiency rate of spending money on recruiter salaries” represents the cost ratio for finding candidates to the recruiter salaries. This indicator includes the costs for posting ads on the websites, in the newspapers and other media sources. This indicator allows understanding the effectiveness of spending money on recruiter salaries based on how it manages the recruitment budget.

The indicator "Efficiency rate of spending money on ad" is calculated by the ratio of the number of vacancy responses to the costs for finding candidates. Using this indicator, we can understand how efficiently the recruiter spends money on attracting candidates.

The indicator "Salary satisfaction ratio of sales assistants" is calculated by the ratio of the number of positive reviews on salary level to the number of surveyed sales assistants. The calculation of this indicator allows making a conclusion how the employees of a large enterprise evaluate their salary level.

From the point of view of the “Training and development” group, it is possible to develop such indicators of supply chain strategy effectiveness as:

“Advanced personnel training rate”, “Personnel training rate”, “Training effectiveness rate of recruitment specialist”, “Satisfaction with equipped facilities”, “Satisfaction with training conditions”.

Personnel recruitment specialists should be trained to implement an effective supply chain strategy for the enterprise. It is worth noting that the performance indicators for the first two indicators of this group should be calculated for all the enterprise's employees in order to check the qualification level of the recruited personnel, since the development of qualified workers should be carried out systematically, then their activities will be more effective, which will create new competitive advantages for the enterprise. The third indicator is intended directly to determine the recruitment specialist's qualification level. Using the last two indicators, one can determine the satisfaction level with the training conditions.

The “Advanced personnel training rate” allows determining the number of employees who have completed training at a higher level than all other employees, who participated in the planned training. This indicator is calculated as the ratio of the number of employees, who have completed advanced courses, to the total number of employees, who took part in the training.

The indicator "Advanced personnel training rate" is defined as the ratio of the number of employees, who have undergone training, to the average number of employees. Using this indicator, it is possible to calculate how many employees of a large enterprise underwent training, thereby assessing the effectiveness of supply chain strategy implementation at the enterprise from the point of view of the "Training and development" group.

The indicator "Training effectiveness rate of recruitment specialist" in the "Training and development" group is calculated as the ratio of the number of employees accepted after completing continuing training courses by the recruitment specialist to the number of employees accepted by the recruitment specialist before training.

Using this indicator, one can determine the competence level of recruitment specialists both before and after training. A competent, well-designed action plan

for attracting, selecting and evaluating candidates can be carried out by the high-level specialists.

It depends on recruitment specialists which candidates will be hired and how long they will work at the enterprise.

The indicator "Satisfaction with equipped facilities" is defined as the ratio of the number of positive reviews on the satisfaction with equipment necessary to implement the training to the number of trainees surveyed.

The indicator "Satisfaction with training conditions" is defined as the ratio of the number of positive reviews on the satisfaction with available training facilities to the number of trainees surveyed. Let us define the "Satisfaction with training conditions".

The following indicators of supply chain strategy effectiveness have been developed for the "Business processes" prospect: "Effectiveness of one recruiter", "Evaluation of the supply chain strategy effectiveness", "Recruitment efficiency", "Salary satisfaction level".

Using these indicators, we calculated the effectiveness of individual recruiters, which allows creating a clearer picture of the current situation related to the personnel recruitment at a large enterprise, as well as assessing the salary satisfaction level of recruiters, thereby assessing the effectiveness of the supply chain strategy as a whole.

The indicator "Effectiveness of one recruiter" is calculated as the ratio of the number of accepted candidates by one recruiter to the total number of accepted employees. With its help, one can assess the effectiveness of each individual recruiter.

The indicator "Recruitment efficiency" is calculated as the ratio of the number of candidates, who came for an interview, to the number of candidates invited for an interview, or to the number of candidates to whom the recruiter phoned and offered a vacancy.

The indicator calculation allows making a conclusion on how many candidates came to the interview from the total number of invited ones. If the number of candidates, who came for an interview, is much less than the number of invited ones, then one should look for additional candidate recruitment channels, or change the structure of the telephone interview in order to increase the number of candidates under consideration.

The introduced indicator "Evaluation of the supply chain strategy effectiveness" is calculated as the ratio of the number of candidates, who have been interviewed, to the number of candidates invited for an interview. This indicator most fully reflects the supply chain strategy effectiveness, as it makes it clear how many candidates are selected after the interview.

The indicator "Salary satisfaction level" is defined as the ratio of the number of positive reviews on the salary level of recruitment specialists to the number of recruiters surveyed.

From the point of view of the "Clients" prospect, according to a balanced indicator system, we developed the following indicators to assess the supply chain strategy: "Client satisfaction rate", "Sales assistant satisfaction ratio", "Satisfaction rate with the personnel number". Due to the calculation of these indicators, it is possible to determine how the clients evaluate the sales specialists, products and services of the analyzed large

enterprise and the essence of the large enterprise reputation as a whole.

The "Client satisfaction rate" is defined as the ratio of the number of positive reviews on the company that the clients left to the total number of large partner enterprises surveyed. The calculation of this indicator allows making a conclusion about the client's assessment of our large enterprise. A positive assessment of the clients will indicate full cooperation with the employees of the analyzed large enterprise, which will reflect the effectiveness personnel and overall strategies of the large enterprise.

The indicator "Sales assistant satisfaction ratio" is calculated as the ratio of the number of positive reviews on the enterprise's employees left by the clients to the total number of partner enterprises surveyed. The calculation of this indicator allows making a conclusion about the client's assessment of our enterprise. A positive client's assessment will indicate a high qualification level of sales assistants.

From the point of view of the "Partners" prospect, we single out the following indicators of the supply chain strategy assessment: "Sales assistant satisfaction ratio", "Telephone interview performance", "Satisfaction with personnel service performance", "Ad effectiveness". These indicators allow assessing the satisfaction degree of candidates with the work of the recruitment service. The image and reputation of a large enterprise will depend on the subjective assessment of this group, therefore this indicator is the most important.

The "Satisfaction rate with the personnel number" is defined as the ratio of the number of positive reviews on the optimal personnel number to the number of clients surveyed.

By calculating this indicator, it is possible to determine the lack of personnel in order to take the necessary measures to improve the client service at a large enterprise.

The candidate satisfaction rate is defined as the ratio of the number of candidates, who have left their positive feedback on the interview, to the number of candidates interviewed. This indicator reflects the recruiter's work from the perspective of the "Partners" group.

The indicator "Telephone interview performance" is calculated as the ratio of the number of employees, who left their positive feedback on the telephone interview, to the total number of candidates interviewed. Using this indicator, one can determine the effectiveness of the interaction of recruitment specialists with the candidates at the initial recruitment stage.

The indicator "Satisfaction with personnel service performance" is calculated as the ratio of the number of employees, who have left their positive review on the feedback speed of the recruitment specialists, to the total number of candidates interviewed. This indicator estimates the cost of time resources for the selection of candidates.

The indicator "Ad effectiveness" is defined as the ratio of the number of candidates, who have left their positive feedback on the advertising activities of a large enterprise, to the total number of candidates surveyed. It allows assessing the enterprise's recognition and the effectiveness

of its implementation by the candidates for vacant positions.

Calculation and analysis of the above indicators will reveal the problem sides of the enterprise in terms of five prospects of a balanced indicator system, which will allow taking necessary measures to increase the effectiveness of the supply chain strategy. It should be noted that at least two indicators should be distinguished in each BIS prospect for a more accurate assessment. To objectively assess the BIS prospects of the supply chain strategy, it is necessary to adhere to certain rules: if the indicator has a great weight, it cannot be excluded from the calculations;

if the indicator has a small weight among other indicators of an individual BIS prospect, then it is possible to exclude it. After the performance indicators are calculated according to the second methodology stage, the supply chain strategy is assessed on the basis of integral indicators. These indicators characterize various aspects of the human resource service of the organization within the framework of BIS. Each integral indicator is calculated as follows: the performance indicators for each group are multiplied by the importance rate, then they are summed and multiplied by the expert assessment rate (EAR) (Table 2).

Table 2. Integral indicators for assessing the supply chain strategy within the groups of modified BIS

Opportunity	Calculation formula	Note
Finance	$O\Delta\Phi = (k_1 * K\Delta p + k_2 * K\Delta o + k_3 * Y\Delta + k_4 * K\Delta om) * K\Delta O_\Phi.$	$O\Delta\Phi$ - effectiveness assessment indicator for the "Finance" group $K\Delta O_\Phi$ - expert assessment rate of the "Finance" group k_n - importance rate of the group indicator
Partners	$O\Delta n = (k_5 * Yp + k_6 * \Delta u + k_7 * Yk + k_8 * \Delta pe) * K\Delta O_n.$	$O\Delta n$ - effectiveness assessment indicator for the "Partners" group $K\Delta O_n$ - expert assessment rate of the "Partners" group k_n - importance rate of the group indicator
Clients	$O\Delta k = (k_9 * Kyn + k_{10} * Kyp + k_{11} * Kn) * K\Delta O_k.$	$O\Delta k$ - effectiveness assessment indicator for the "Clients" group $K\Delta O_k$ - expert assessment rate of the "Clients" group k_n - importance rate of the group indicator
Education and development	$O\Delta o = (k_{12} * Kon + k_{13} * Ko + k_{14} * \Delta oc + k_{15} * Ym + k_{16} * Yy) * K\Delta O_o.$	$O\Delta o$ - effectiveness assessment indicator for the "Education and development" group $K\Delta O_o$ - expert assessment rate of the "Education and development" group k_n - importance rate of the group indicator
Business processes	$O\Delta b = (k_{17} * \Delta pn + k_{18} * \Delta n + k_{19} * \Delta kc + k_{20} * Yn + k_{21} * Km + k_{21} * Y\Delta) * K\Delta O_b.$	$O\Delta b$ - effectiveness assessment indicator for the "Business processes" group $K\Delta O_b$ - expert assessment rate of the "Business processes" group k_n - importance rate of the group indicator

The weight of indicators of each BIS prospect is calculated by the recruitment service experts. The sum of importance values of the indicators should be equal to 1. This assessment is more subjective. The closer the indicator is to 1, the more significant is the indicator. If the indicator significance is the least important for the assessment, then its value will be closer to 0.

The range of expert assessments is from 1 to 5 points:

- 1 point - "ineffective";
- 2 points - "unsatisfactory, requires special attention";
- 3 points - "satisfactory, there are small problems";
- 4 points - "well, there are small problems";
- 5 points - "effective".

A particular assessment given by experts depends on the effectiveness degree of each individual prospect in the overall BIS. The greater the value of the calculated indicator for an individual group is, the more efficiently the supply chain strategy is implemented. The minimum value of the indicator for the BIS prospects indicates significant problems in the implementation of the supply chain strategy and signals the need to take measures to minimize the weaknesses found in the calculation of indicators. At the third assessment stage of the supply chain strategy, the author's method involves calculation of

the total integral indicator of the BIS concerning the supply chain strategy effectiveness, according to which the resulting total integral indicators for each group of BIS are multiplied by the importance factor, and then summed up. The sum of the importance rate values should also be equal to one.

The calculation of the total integral indicator of the supply chain strategy effectiveness was described in articles [31, 32].

5. Conclusion

Calculation and analysis of the performance indicators of each BIS prospect allows making a conclusion on how effective a particular BIS prospect is, as well as assessing the supply chain strategy implementation as a whole. This methodology makes it possible to identify growth points and problem areas in the supply chain strategy, which will significantly increase the supply chain strategy effectiveness after correction. A comprehensive analysis of all the identified BIS prospects is applicable to the activities of large enterprises, as it allows making a more detailed analysis of each prospect and identifies problem areas in the actions of the recruitment department.

We improved traditional performance indicators within each prospect of the modified balanced indicator system. In addition, we developed additional indicators that can be used to identify growth points and problem areas in each direction of the recruitment service of a large enterprise. Modified performance indicators make it possible to evaluate not only the supply chain strategy as a whole, but also the contribution of each specialist in recruitment, which will help to identify problem areas of each process of a large enterprise. In addition, the author's methodology includes the development of an integrated indicator of the supply chain strategy effectiveness based on expert assessment, with which one can assess the strategy in more detail from the point of view of all the prospects considered within the framework of a modified balanced indicator system.

Conflict of Interests

The authors confirm that the data presented in this article do not contain a conflict of interest.

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