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## **Evaluation of the intellectual potential level at the enterprises of the real sector of the economy of Aktobe region**

Success of innovative innovations in industrial enterprises, in spheres of economy and in economy in total depends on personnel and its professional level, since the primary purpose of modern knowledge-intensive management of production is assuring the effectiveness of the entity and its progressive development. That led to the choice of the level of intellectual potential in enterprise as the object of research. In this article theoretical and practical aspects of forming the level of intellectual potential in enterprises were considered. The article focuses on searching of the ways to improve the efficiency of human resources for enterprises' development. Object of research are some enterprises of the real sector of the economy of Aktobe region. Methodological framework for research comprises methods such as statistical method, index method, chain-linked approach, comparison method. It is proposed to use the intellectual indicator of the enterprise as an evaluation criterion. This indicator quantifies the intellectual potential of the collective, and shows the degree of its manifestation in conditions of its formation, use and development. The intellectual potential and results of activity of the enterprises of JSC «Aktyubinsk Oil Equipment Plant», JSC «AZHS», LLP «Aktyubinsk plant of metal structures» and LLP «Stern-IT» are compared. It has been established that LLP «Stern-IT» has the worst indicators. Specific measures to increase the intellectual potential of the company, such as are the introduction of a system of remuneration of labor in terms of competence; the introduction of a career planning system; stimulation of staff development are proposed.

*Keywords:* potential, intellectual potential, career, salary, level of education, intellectual capital.

Nowadays, in condition of unstable and volatile markets, the success operation of industry enterprise is achieved not so much at the expense of the feasible and financial assets necessary for production, but rather as work of highly qualified personnel adaptive to various innovations. The outcome of these innovations in the development of new products or in improvement of the existing products. Its creation provides long-term profitability of this enterprise and discovers perspective of its further growth. In these processes a main priority is branched for intellectual benefit, which this enterprise has. Research of intellectual capacity is especially important for Kazakhstan and Kazakh companies that are at the low stage of development and use of intellectual resources. Globalization of economic processes, high competition at the food market, the need for innovative development of national economy shape new demands to contents, organization, forms and methods of intellectual potential management in business. Intellectual capacity and its impact on organizational effectiveness, including particular industries, have been reflected in numerous publications of both domestic and foreign researchers. This might be explained by the increasing importance of intellectual innovation as a crucial factor in ensuring the efficiency of industrial enterprises in today's economic relations.

However, today insufficient attention has been paid to the development and use of intellectual potential. For instance, for main part of vocational education provided around 1 per cent the expenditure side of the budget, while in foreign countries this indicator is equal around 3 per cent. Higher and secondary professional education nowadays is disconnected from practical experience and is not involved in innovative activity of industrial enterprises. Moreover, some scientific teams operate in conditions of part-load performance and are often forced to carry out third party non-profile orders.

The experience of using the methods of strategic management in local and international business environments demonstrates that today there're more active looks for the ways to increase the productivity of human resources, to activate their intellectual potential. Namely that employee search activity becomes fundamental source of successful enterprise activity, so the vast majority of the changes are carried out under the label of human factor activation. For local enterprises in order to reach the stable development trajectory a skilled workers required who will make up its intellectual potential, and set and resolve innovational tasks, design and implement appropriate projects.

The intellectual potential of an organization is defined by scientists as «the aggregate intellectual potential of its personnel, first of all, all managers and specialists...» [1].

In practice, often in process of determining the intellectual potential's essence, it is proposed to use the coefficient IQ, which has found wide application in foreign practice and allowing to evaluate the level of intellectual development of any person [2, 3]. It is worth nothing that experts are ambivalent about the IQ test. Scientists at Stanford University, after analyzing for several decades the destiny of dozen people with super-high IQ, have found that few of them achieved outstanding success.

More than a decade ago, a new indicator of intellectual capital assessment - Emotional intelligence, characterizing the ability to work in a team, motivate subordinates, found application in the world. Studies have shown the need to use the third indicator, Practical Intelligence (developed by psychologists at Yale University), which, apparently, is inversely proportional to the academic level of intelligence - IQ. It is recommended that this could be determined what we call «wit», which depends on the level of education, upbringing and the general life-style, and also on the innate abilities.

Named tests mainly used in in foreign firms in recruitment, but not all and not always. Different time needs different approaches to determining this term. Until the late 1980 at the head of various business organizations stood creatives - people with a high level of intelligence and thinking strategically. During this period, there has been high demand for the IQ test observed, because business organizations needed smart intellectuals. Since the early 1990 managers became the first persons in the organizations, and creators began to fulfill their role as advisers. During this period, when recruitment was realized, the «practical mind» coefficient was used - Practical Intelligence.

In our opinion, the general lack of these methods is that they provide a comprehensive assessment of the individual's intelligence, and intellectual potential is, first of all, organizational knowledge that can be used.

The indicator of an estimation of intellectual potential of the organization is a quantitative expression of properties of intellectual potential of collective, showing a degree of their display in the conditions of its formation, use and development.

Indicators for assessing the intellectual potential of the organization are subject to certain requirements. So, they should:

- provide liaison with the objectives of the enterprise;
- provide the comparability of absolute values of the same name levels of different properties;
- contain in its structure a basis (quantitative value) and a set of meaningful features.

For evaluating each property, either one or a combination of indicators can be used. The variety of qualitative indicators of the intellectual potential in the enterprise makes it expedient to classify them. In addition, the proposed indicators for assessing intellectual potential can also be used to characterize the aggregate intellectual potential that provides for the operation of the enterprise as a whole.

In practice, both a comprehensive assessment of the intellectual potential, representing the system resource of the enterprise, and the achievements of individual employees are being implemented. The evaluation procedure begins with top managers and, as the methodology is developed and experience is gained, it spreads to the lower levels of management. The procedure leads to the better results, if it is conducted by line managers with the support and assistance of personnel managers. Some enterprises establish special commissions, but this is not always considered an optimal solution, because often such commissions conflict with line managers, since they are not responsible for the current work in this direction.

As an object of study, indicators of the intellectual potential of four economic entities of the Aktyubinsk region are considered in the paper.

In particular, in the analysis of the activity of the first facility – JSC «Aktyubinsk Oil Equipment Plant» - it was revealed that work with personnel is based on the established special program, the main goals and objectives of which are:

- a planning and control of the number of personnel;
- decreasing in the age level of the middle management level;
- ensuring the evaluation of 100 per cent of personnel sent to the training of the personnel reserve program;
- reengineering and automation of a number of work processes with personnel.

In most cases, in the selection of prospective candidates for promotion, promotion by skill level is usually rely solely on the opinion of immediate supervisors. But this is not enough, because the prospect of creative development of the employee is difficult to assess, especially at the beginning of a career. Therefore, many enterprises often use multi-channel feedback, including feedback from higher-level managers; personnel managers and also the opinion of colleagues.

In process of the selecting prospective candidates for posts, the results of both current and past activities are taken into account, but the main task is to answer the question whether the candidate will be able to perform more complex and responsible work than the one that he is performing now. Since the initial level of employees and the degree of their learning are different, it is rational to assess once a year. At the same time, employees get a chance to re-enter the list of the personnel reserve, if for some reason they fell out of it. Typically, sufficient conditions for including co-workers in the personnel reserve are:

- excellent results of current activity;
- ability to learn new skills, quick learner;
- ability to learn by own experience;
- demonstration of ability to climb, at least, by two career stages after training.

Recruitment of personnel in enterprises which were examined, is carried out by admission of graduates of higher educational institutions, as well as by placing job advertisement in print media and internet. The company participates in various job fairs. In mass-media information on the work of staff has published, which maintaining a positive image of the company as a reliable employer. All these measures make it possible to keep the share of young people coming to the enterprise at a relatively high level. As a result, over the past few years, the company maintains a positive difference of up to 30 years between the level of accepted and dismissed employees. But the special significance in the JSC «Aktyubinsk Oil Equipment Plant» has long-term agreements on cooperation and targeted training of specialists with K.Satpayev Kazakh National Technical University and Kazakh-British Technical University. Directly under the leadership of the General Director of the company, programs are being implemented to improve the efficiency and quality of training specialists.

The enterprise conducts a targeted set of entrants (14 people per year) for training in Kazakh-British Technical University from their own resources. Students of target groups are involved to practical work, for these purpose special courses are provided to them by company employees. Special scholarships are granted to students of senior courses who have concluded a contract with the company. Annually, on the average, 50-60 young specialists graduating from universities are admitted. The company trains all categories of personnel in various areas of the use of information technologies, including computer design, calculations, and also within the framework of the information management system project.

In order to improve the efficiency of the process of selection and preparation of the reserve personnel service, the use of a modern methodology for evaluating the potential of managers and the reserve, the «Evaluation Center», has been expanded. Assessments of perspective specialists and managers are conducted. At the enterprise the task is solved: maintenance of 100 per cent of an estimation of the personnel directed on training of a personnel reserve (two groups on 15 persons annually). This training program of 250 hours includes managerial, economic and legal disciplines, as well as lectures and round tables with leaders and leading specialists on topical issues enterprises. The main personnel indicators of JSC «Aktyubinsk Oil Equipment Plant» are given in Table 1.

Table 1

**Main HR indicators of JSC «Aktyubinsk Oil Equipment Plant»**

Indicator	2014 y.	2015 y.	2016 y.
Average age, years	47	47	46,5
Share of employees with higher professional education, %	51	52	52
Post-graduate education,%	2	2	3

*Note.* Used source [4].

As a result of this work in 2016 in JSC «Aktyubinsk Oil Equipment Plant», the share of non-material assets increased more than twofold in comparison with the previous year. Expenses for working on research and development in 2016 amounted to 4 442 326 thousand tenge, that is equal to 92.7 per cent of the total cost. The share of sales of products in the gross income of the enterprise in 2016 was 90.7 per cent, in 2015, respectively, 81.7 per cent (in the analysis of 2015 was considered as basic).

It is possible to calculate the level of changes in the influence factors on the intellectual potential of JSC «Aktyubinsk Oil Equipment Plant». The calculation is given in Table 2.

Table 2

**Calculation of the change in the level of influence factors on the intellectual potential of JSC «Aktyubinsk Oil Equipment Plant»**

$I_1^{обп}$	$I_2^{обп}$	$I_3^{обп}$	$I_1^{HTP}$	$I_2^{HTP}$
1,015	1,5	1,5	1,024	1,067

Note. Used source [4].

Evaluation of the change in the level of intellectual potential was provided:

$$ИП = \sqrt{1,015 \times 1,5 \times 1,5 \times 1,024 \times 1,067} = 1,58.$$

As the performed calculation shows, for the analyzed period the level of the intellectual potential has changed and made up to the previous level of 1.58.

If we take another example - JSC «AZHS», the share of intellectual property in its assets is 0.00069 per cent or 320 thousand tenge. In 2016, while in 2015 was equal to 0.0005 per cent or 253 thousand tenge. Total costs for research and development works were not possible to identify, since they are written off as general economic expenses.

The share of employees with higher professional education amounted to 21.86 per cent in 2014, 23.53 per cent in 2015, and 24.85 per cent in 2016.

The share of young specialists in the general admission of young people to work was set in 2014 - 16.9 per cent, in 2015 - 16.7 per cent, in 2016 - 10.5 per cent.

Let's move to an estimation of indicators of intellectual potential of the second object - joint-stock company «AZHS». The average age of employees of JSC «AZHS» is about 40 years. The calculation by the basic method of the level of change of the influence factors on the intellectual potential of JSC «AZHS» is given in Table 3 (for the base period was adopted in 2014).

Table 3

**Calculation of the change in the level of factors affecting the intellectual potential of JSC «AZHS» by the basic method**

Year	$I_1^{обп}$	$I_2^{обп}$	$I_3^{обп}$	$I_1^{HTP}$	$I_2^{HTP}$
2015	1,076	1,011	1,01	1,032	1,003
2016	1,137	1,378	1,013	1,33	1,008

Note. Used source [5].

The amount of change in intellectual potential at the enterprise was in 2015. - 1,066, in 2016. - 1.459.

As the results of calculations show, in JSC «AZSHC» in 2015 and 2016. There was a reduction in the recruitment of young professionals (negative growth). The increase in other components compensated for this reduction, which affected the overall level of change in intellectual potential. As the comparative analysis shows over the years, the dynamics of increasing the intellectual potential are stable. However, factor analysis shows that the company needs to pay attention to increasing the intake of young professionals.

We will calculate these parameters by the chain method (Table 4).

Table 4

**Calculation of the level of influence factors on the intellectual potential of JSC «AZHS» by the chain method**

Year	$I_1^{обп}$	$I_2^{обп}$	$I_3^{обп}$	$I_1^{HTP}$	$I_2^{HTP}$
2015	1,076	1,011	1,01	1,032	1,003
2016	1,056	1,371	1,014	1,35	1,01

Note. Used source [5].

As can be seen in Table 4, the rate of change in intellectual potential in JSC «AZHS» is decreasing. In our opinion, the primary cause is in the fact of insufficient work of management in attracting young specialists.

The third object of the research is the use of intellectual potential in LLP «Aktyubinsk plant of metal structures», which produces and sells metal products and structures. In the company in 2016, 32 people worked, including 5 managers, 17 builders, and others engaged in servicing processes: accounting, sales, personnel management, etc. The profile higher education has 29 employees. The main employees are builders. The average age of the staff is 35 years, the builders - 29 years.

The share of intellectual property in the assets of LLP «Aktyubinsk plant of metal structures» in 2016 was 0.7 per cent, in 2015 1.5 per cent, at present 2.7 per cent. The total expenditure on research and development works for this period in relative terms to the gross income was 98.3 per cent in 2015, and in 1991 - 91.2 per cent. In 2017, the share of research and development expenditures in the firm's budget is planned at 95 per cent. The share of education costs in the company's budget for years was: 2015 - 0.01; 2016 - 0.011; 2017-0.011 (plan). The share of employees with higher professional education was set at 0.88 in 2015, 0.91 in 2016, and 0.94 at the present time. At the same time, the share of young specialists was 0.40 in 2015, 0.45 in 2016, and 0.46 at the present time.

We will calculate the change in the level of influence factors on the intellectual potential of LLP «Aktyubinsk plant of metal structures» (Table 5) (basic year is 2016).

Table 5

**Calculation of the level of influence factors on the intellectual potential of LLP «Aktyubinsk plant of metal structures»**

$I_1^{обп}$	$I_2^{обп}$	$I_3^{обп}$	$I_1^{HTP}$	$I_2^{HTP}$
1,034	1,125	1,1	1,0204	1,035

Note. Used source [6].

Based on the calculations made, an assessment of the change in the general level of intellectual potential was made, which amounted to 1,162.

The fourth object of research - LLP «Stern-IT» - develops programs for protection against copying of intellectual objects. At the company currently employs 51 employees, of which 33 programmers. The basic data on the enterprise of the company are given in Table 6 (for the base adopted in 2014).

Table 6

**The basic data of the activity of LLP «Stern-IT»**

Indicator	2014 y.	2015 y.	2016 y.
Sales, thousand tenge	91	100	98
Staff quantity, people	45	49	53
Incl.programmers, people	27	28	29
Share of specialists with higher education, per cent	91,5	91,84	79,25
Specific weight of young specialists,%	22	23	19
The share of research and development works, %	87,1	88,3	83,7
Specific weight of education expenses in the company's budget, per cent	0,2	0,21	0,19
The share of intellectual capital in the firm's assets, per cent	0,5	0,51	0,4

Note. Used source [7].

Based on the data given in Table 6, the analysis of the level of change in intellectual capital in LLP «Stern-IT» was performed using the basic method in Table 7 and the chain method in Table 8 (basic year 2014).

Table 7

**Calculation of the change in the level of influence factors on the intellectual potential of LLP «Stern-IT» by the basic method**

Year	$I_1^{обп}$	$I_2^{обп}$	$I_3^{обп}$	$I_1^{HTP}$	$I_2^{HTP}$
2014	1,0037	1,45	1,05	1,138	1,003
2015	1,134	1,136	1,05	1,039	1,2
2016	1,007	1,136	7,5	1,033	2

We will calculate the influence of the level of factors.

Table 8

**Calculation of the change in the level of influence factors on the intellectual potential of LLP «Stern-IT» by the chain method**

Year	$I_1^{обп}$	$I_2^{обп}$	$I_3^{обп}$	$I_1^{HTP}$	$I_2^{HTP}$
2014	1,0037	1,45	1,05	1,138	1,003
2015	0,863	0,826	0,905	0,948	0,785
2016	1,163	1,316	7,894	1,075	2,5

Based on the results of calculations, for the analyzed period the level of intellectual potential has changed, amounting to:

- with the base method: in 2015 - 1,321 in 2016 -1,299;
- with the chain method: in 2015g. - 1,321, in 2016 - 0,693.

As shown by the analysis of the activities of LLP «Stern-IT», there is a deterioration in the following indicators: the number of claims from customers has increased, the dissatisfaction of the founders has grown. As measures to increase the intellectual potential of the company, you can offer the following:

- introduction of a remuneration system based on competencies;
- introduction of a career planning system;
- stimulation of staff development.

Comparing the intellectual potential and the results of the activities of the enterprises of JSC «Aktjubinsk Oil Equipment Plant», JSC «AZHS», LLP «Aktjubinsk plant of metal structures» and LLP «Stern-IT», we can conclude that the intellectual potential depends on the market in which carry out their activities of the enterprise and on the types of activities and costs for the creation of intellectual capital.

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### **Ақтөбе облысы экономикасының нақты секторы кәсіпорындарында зияткерлік әлеуетті бағалау факторларына баға**

Ғылымды қажет ететін өндірісті басқарудың қазіргі кезеңдегі басты мақсаты кәсіпорын қызметінің тиімділігін және оның қарқынды дамуын қамтамасыз ету болғандықтан, өнеркәсіптік кәсіпорындардағы, экономика салаларындағы және жалпы экономикадағы инновациялық түрлендірудің сәтті болуы персоналға және оның дайындылығына байланысты. Осы жағдай зерттеу объектісі ретінде кәсіпорынның интеллектуалдық әлеуетін зерттеуді таңдауға негіздеме болды. Бұл мақалада кәсіпорындардың интеллектуалдық әлеуеті деңгейінің қалыптасуының теориялық және практикалық сұрақтары қарастырылды. Негізгі көңіл кәсіпорындардың тиімді қызмет атқару мақсатында адами ресурстардың өнімділігін жоғарлату жолдарын іздестіруге бөлінді. Зерттеу объектісі ретінде Ақтөбе облысының экономиканың нақты секторында қызмет атқаратын кейбір кәсіпорындары қарастырылды. Зерттеудің әдістемелік негіздемесін статистикалық талдау, индекстер, тізбелік қойылымдар, салыстыру әдістері қалады. Бағалаушы көрсеткіш ретінде кәсіпорынның зияткерлік әлеуетін пайдалану ұсынылды. Бұл көрсеткіш санды түрде ұжымның интеллектуалдық потенциалының қасиеттерін сипаттайды және оның қалыптасу, пайдалану және даму жағдайларында көрінісін бейнелейді. «Ақтөбе мұнай жабдықтаулары зауыты» АҚ, «АЗХС» АҚ, «Ақтөбе металлоконструкциялар зауыты» АҚ және «Stern-IT» ЖШС-ге кәсіпорындары қызметінің интеллектуалдық әлеуетті және қызметтерінің нәтижелері салыстырылған. «Stern-IT» ЖШС ең нашар көрсеткіштер тән екені анықталды. Компанияның интеллектуалдық потенциалын арттыру бойынша нақты шаралар ұсынылды, соның ішінде құзыреттілікке байланыстырып, еңбек ақы төлеу жүйесін енгізу, мансапты жоспарлау жүйесін ендіру, персонал біліктілігін арттыруды ынталандыру.

*Кілт сөздер:* әлеует, зияткерлік әлеует, мансап, еңбек ақысы, білім деңгейі, интеллектуалды капитал.

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### **Оценка факторов уровня интеллектуального потенциала на предприятиях реального сектора экономики Актюбинской области**

Поскольку главная цель управления современным наукоемким производством — обеспечение эффективности деятельности предприятия и его поступательное инновационное развитие, то во многом успех инновационных преобразований на промышленных предприятиях, в отраслях и экономике страны в целом зависит от персонала и уровня его подготовленности. В данной статье рассматриваются теоретические и практические вопросы формирования уровня интеллектуального потенциала предприятий. Акцент делается на поиске путей повышения производительности человеческих ресурсов с целью успешного функционирования предприятий. Объектом исследования выступили отдельные предприятия реального сектора экономики Актюбинской области. Методическую основу исследования составили методы статистического анализа, индексов, цепных подстановок, сравнения. В качестве оценочного критерия предлагается использовать интеллектуальный показатель предприятия. Данный показатель количественно выражает свойства интеллектуального потенциала коллектива и показывает степень его проявления в условиях формирования, использования и развития. Сопоставлен интеллектуальный потенциал и показаны результаты деятельности предприятий АО «Актюбинский завод нефтяного оборудования», АО «АЗХС», ТОО «Актюбинский завод металлоконструкции» и ТОО «Stern-IT». Установлено, что наихудшие показатели имеет ТОО «Stern-IT». Предложены конкретные меры по повышению интеллектуального потенциала компании, которые заключаются в следующем: введение системы оплаты труда по компетенциям; внедрение системы планирования карьеры; стимулирование повышения квалификации персонала.

*Ключевые слова:* потенциал, интеллектуальный потенциал, карьера, заработная плата, уровень образования, интеллектуальный капитал.

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