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7 METHODOLOGICAL SUPPORT OF DETERMINATION AND EVALUATION OF COMPETENCES OF EMPLOYEES BY THE METHOD «ASSESSMENT CENTER»

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ABSTRACT

In order to continue the study of sustainable development of an enterprise, conducted in Section 6, and to ensure the quality of education, conducted in Section 1, the mechanism of crisis management of an enterprise in the modern business environment is proposed. The modern developments of leading scientists and practitioners regarding the definition and assessment of competencies of employees of an enterprise have been studied. It has been established, that the methodological support of this process is imperfect and needs to be specified and modernized in accordance with modern market requirements and trends. The main stages of determining and assessing the competencies of employees have been identified and the content of actions on each of them has been revealed. An appropriate block diagram has been drawn up, which highlights the sequence of actions for determining and assessing the competencies of employees of an enterprise. It, unlike the existing ones, has a logical sequence of actions, is based on the principles of «Assessment center» according to a certain set of methods (interviews, «Brainstorming», «Business game», testing) and involves bringing the level of existing competencies to reference values. Methodological tools have been developed and its practical application has been carried out to determine key competencies, as well as the existing and necessary level of their values has been diagnosed.

KEYWORDS

Competence approach, employee competencies, key employee competencies, employee competency assessment, Assessment Center method.

7.1 DETERMINATION AND ASSESSMENT OF EMPLOYEE COMPETENCIES

Currently, socio-economic sectors of development in Ukraine are characterized by the implementation of transformation processes in them, caused by integration into the European space, digitalization, globalization of the economy and increased competition. These processes encourage changes in the management of enterprises, increasing the requirements for employees and, as a consequence, the need for highly competent professionals [1]. To meet this need, it is necessary to identify and assess the list of competencies of certain categories of workers, which today are the most widely used characteristics of both existing and necessary qualities of professionals in their selection, dismissal, internal transfer, evaluation, career advancement, promotion, training, etc.

At the moment, the vast majority of enterprises and organizations in any sector of the economy really use the competency-based approach to employee evaluation. At the same time, the process of assessing the competencies of specialists is of a general descriptive nature; there is no universally accepted list of competencies for each category of staff; there is no methodological support and tools for assessing the competencies of employees. Therefore, there is a need to develop such guidelines and effective tools for this process.

7.2 STATEMENT OF THE PROBLEM OF METHODOLOGICAL SUPPORT FOR DETERMINING AND ASSESSING THE COMPETENCIES OF EMPLOYEES BY THE METHOD OF «ASSESSMENT CENTER»

In the modern scientific and scientific-practical literature [2–17] a really important issue is to assess the level of competence of specialists. The works of leading foreign and Ukrainian scientists and researchers are devoted to this topic: M. Armstrong, L. Spencer, S. Uiddet, V. Petiukh, I. Voloboeva, V. Zaitsev, E. Kolesnikova, Ye. Zharyk, O. Poltavska and others.

The analysis of the relevant literature revealed that scientists did not agree on the definition and evaluation of employee competencies. There is no universal approach to its solution: the authors propose to determine the list of competencies of employees and evaluate them by different methods. However, in most cases it is not specified by which algorithm and in what way such an assessment is carried out; the chosen method of determining and assessing such competencies is not properly substantiated; the proposed methodological principles are quite general and require clarification of actions at each stage, etc.

Thus, the work of V. Petiukh and I. Voloboeva [3] proposed a quantitative multidimensional model for assessing competencies on the example of functional staff of a bank. This model involves the assessment of the competencies of the staff of primary, secondary, high and top levels of bank management using the methods of scoring and integrated indicators; staff of the strategic level of responsibility – applying the modified Alpha-Jensen coefficient. The authors [3] provide general theoretical aspects of such an assessment, but there is no methodological support for this process: it is not specified how to directly allocate a list of competencies inherent in specialists of a certain category (position); there are no mathematical calculations according to the proposed model, etc.

The scientific article by V. Zaitsev [4] contains scientific developments on the formation of a model of certification of industrial enterprises as a new technology for assessing the competencies of employees. It provides:

– determination of corporate requirements to the level of competencies of specialists separately by their categories on the basis of the selected list of key indicators, characterizing the efficiency of certification (growth of production volumes, increase of product quality, decrease of prime cost, increase of enterprise profit);

– establishment of the actual level of competence of employees;

– analysis of deviations and establishment of the reasons of occurrence of discrepancy.

Based on the obtained results, measures are developed to increase the level of competencies of company's specialists, as well as their implementation and monitoring.

In general, one should agree with this idea of assessing the competencies of employees. However, the proposed developments are purely theoretical in nature, there are no guidelines and examples of practical application of this model. It is not specified how the corporate requirements for jobs and competencies of employees are developed, and the scale and conditions for assessing their actual level are not given.

In the dissertation research Ye. Zharyk [5] provides a methodology for assessing the leadership competencies of managers, based on expert assessment of the proposed list of leadership competencies. The presented calculations contain an assessment of 10 leadership competencies of the heads of four machine-building enterprises on a scale from 1 to 5 points (1 point – no competence; 2 points – very rare; 3 points – rare; 4 points – frequent; 5 points – persistent, systematically, visually [5]). Based on its results, the relevant conclusions on the further development of each of these leadership competencies are formulated, and for the validity of the obtained expert assessments, their consistency is checked by calculating the standard deviation in accordance with the law of normal distribution.

The proposed developments require a graphical representation of the process of such assessment with a clear separation of each stage, as well as justification of the chosen method of assessment of competencies (expert). The dissertation does not indicate how exactly 10 units of certain leadership competencies were selected. In addition, the methodology is not universal, as there are questions about the possibility of its use to assess the competencies of other categories of staff.

The scientific article by E. Kolesnikova [6] developed a method for assessing the competence of steel furnace staff in the design of a computer simulator, which provides for the registration of compliance with all operations of the steelmaker regulations. The proposed method consists of two stages: the division of the project into stages and their evaluation by applying Markov chains with the calculation of the probability of transition by solving the inverse problem [6]. The main idea of work – the success of operations, performed by an employee, corresponds to the level of competence of the specialist.

This technique is complex, does not involve the separation of individual (key) competencies of a specialist and can be used to assess the competence of employees of those categories who perform the same type of regulated work (operations).

Imperfection and a rather low level of methodological support for determining and assessing the competencies of employees require its scientific improvement and modernization in accordance with modern requirements and trends.

Therefore, there is a scientific task to develop methodological support for determining and assessing the competencies of employees with the preparation of methodological tools for this process and its practical application in real conditions on the example of a particular enterprise.

7.3 THE RESEARCH OF METHODOLOGICAL SUPPORT FOR DETERMINING AND ASSESSING THE COMPETENCIES OF EMPLOYEES BY THE METHOD OF «ASSESSMENT CENTER»

In the previous study of the author on this issue [7] it has been substantiated, that the most appropriate method of determining and assessing the competencies of employees is the method «Assessment Center» – «comprehensive multicomponent technology for assessing professional competencies and personal qualities of employees and their potential» [8]. Applying its principles, the process of determining and assessing the competencies of employees is proposed, which contains three stages: preparatory, the stage of evaluation and the stage of processing the results (**Fig. 7.1**).

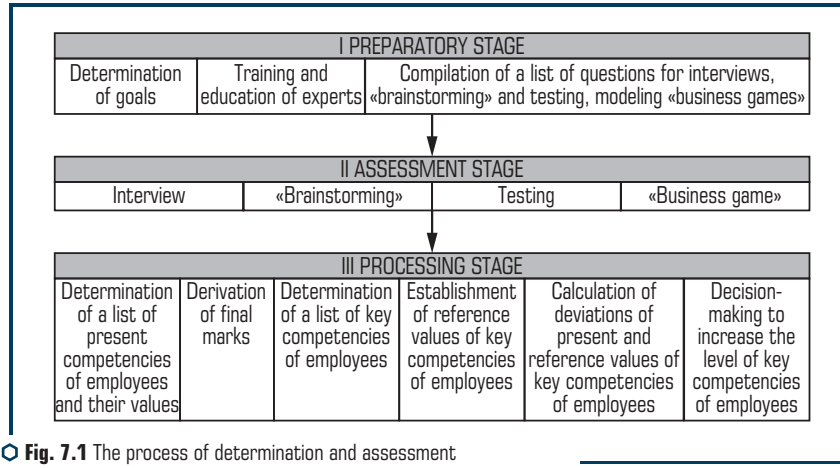

Fig. 7.1 The process of determination and assessment of the competencies of employees [7]

Preparatory stage I involves setting goals for the assessment of competencies; training and education of experts in order to acquire certain skills and abilities to work within the «Assessment center» and further staff work; forming a list of questions for research.

Assessment Stage II is implemented using a set of methods (interviews, brainstorming, business games and testing), which allows to obtain comprehensive complementary information on the results of the assessment to formulate a general conclusion. These methods are included in the technology «Assessment center», because they, compared with all other methods of staff evaluation, are characterized by a significant number of criteria for their selection (simplicity; insignificant material costs; general availability; systematization of the obtained results; comprehensive assessment; the ability to predict the results of employee's activity; assessment of personal qualities; assessment based on knowledge, experience, qualifications; motivation and others [7]).

Stage III Processing of results involves the definition of existing competencies (knowledge, talents, abilities and personal qualities of an employee, his/her professional skills, qualifications

and experience that the employee used in the work process); expert calculation of final estimates by appropriate methods; determining the list of key competencies of employees; setting their reference values; calculation of deviations of values of key available competences from reference; formulation of decisions on the level of development of competencies of employees of an enterprise.

The above process of determining and assessing the competencies of specialists has a general form, so it requires clarification of actions at each of its stages and the development of appropriate tools. The composition of the necessary actions and the sequence of its implementation is given in the form of a block diagram (**Fig. 7.2**).

Block 1 covers the setting of goals for determining and assessing the competencies of specialists. Objectives can be different: deciding on the selection of employees of a certain category, the formation and development of human resources, staff training planning, determining a set of basic competencies, assessing the level of competencies of employees individually and the team as a whole, and so on.

The determination of employee competencies is carried out cyclically by the *i*-th category. In block 2, this cycle begins and the first category of workers ($i=1$) is considered (block 3).

The staff of a road transport enterprise (RTE), as a rule, is classified into production workers (main and auxiliary) and office ones. In turn, the production staff includes drivers, repair and support staff; office workers – managers, specialists and other employees. Thus, the definition of competencies of RTE employees should be carried out in the following six categories: managers, specialists, other employees, drivers, repair and support staff.

The choice of the source of expert involvement to assess the competencies of employees of the *i*-th category (block 4) is based on the matrix of choice of the source of involvement of an expert (**Fig. 7.3**), which takes into account the objectives of determining the competencies of employees of the *i*-th category.

The choice of the source of expert involvement is carried out according to one of two possible options (block 5): an employee of an enterprise acts directly as an expert or he/she is involved from a third-party specialized organization.

In the first case, the company's management carries out a number of activities (trainings, seminars, webinars) for the training and education of employees, which will further evaluate (block 6).

In the second case, a search is made for a specialized company that provides the relevant services, and an appropriate contract is concluded (block 7). The involved experts are acquainted with all the features of the customer's company and prepare them for the «Assessment Center» for employees of the first category (block 8).

The next step in the sequence of determining and assessing the competencies of *i*-th category employees is to formulate a list of questions for interviews, brainstorming and testing (block 9). Each question that an employee needs to answer should provide for the possibility of identifying the relevant competence and assessing the strength of its manifestation in a particular employee (weak, middle, strong).

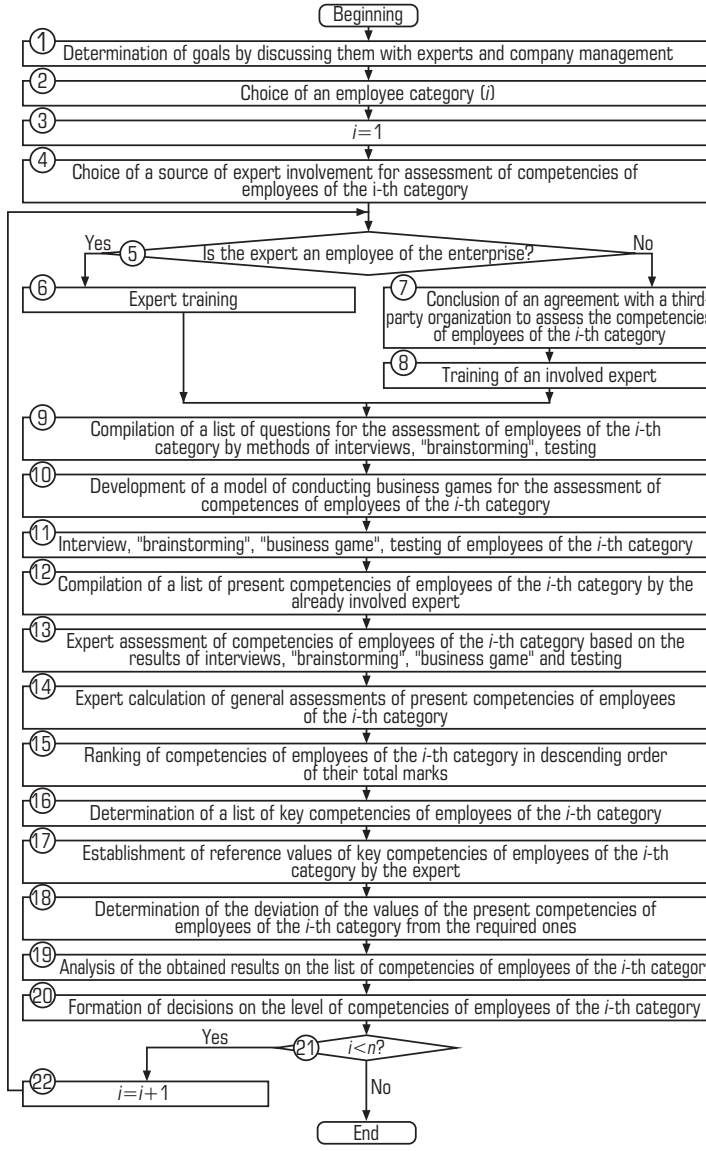

Fig. 7.2 The proposed block diagram of the determination and assessment of the competencies of employees of an enterprise

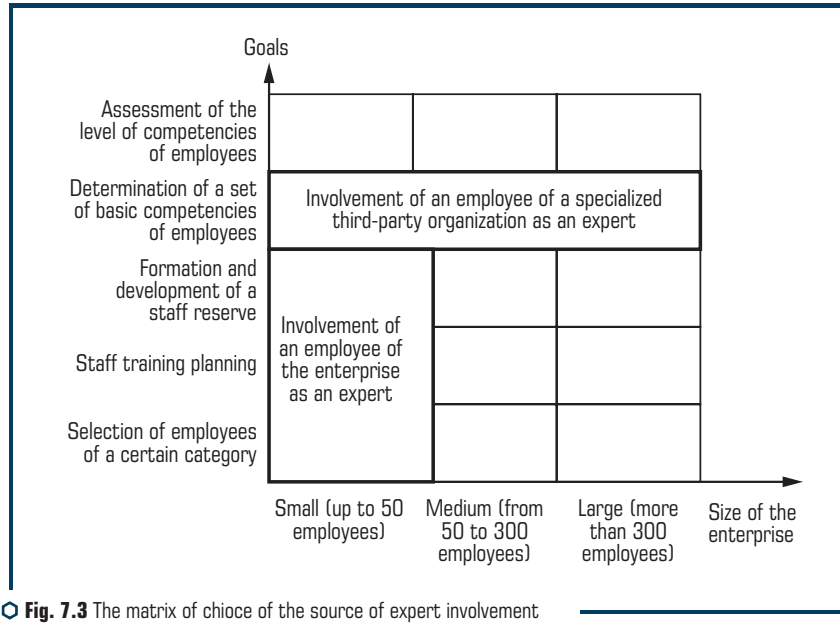

Fig. 7.3 The matrix of chioce of the source of expert involvement

Block 10 provides for the development of a model for conducting a «Business Game» to determine and assess the competencies of employees of the *i*-th category. The «Business Game» model or game scenario is a conditional reflection of a situation and an object. Within such a model, the content of a scenario is formulated (goal, description of tasks, directly description of the «Business Game»), the result of which is the separation of a number of competencies of each participant in the game with their inherent strength.

Block 11 of the block diagram for determining and assessing the competencies of employees of an enterprise outlines expert's interview, «Brainstorming», «Business Game» and testing of employees of the *i*-th category of an enterprise.

At the beginning of the interview, each employee of the *i*-th category is asked to tell about themselves and their own professional experience. After that, the interviewer (expert) asks a number of pre-defined questions and records the competences, selected by him/her as a result, as well as assesses the level of their manifestation in a particular respondent (employee of the *i*-th category).

During the «Brainstorming» employees of the *i*-th category express all their ideas and opinions on the proposed issues. The expert takes a direct part in the discussions and observes their progress. After the Brainstorming session, the participants discuss many of the ideas expressed and have the opportunity to put forward new ideas, as well as to supplement, modify and concretize those already expressed.

According to the pre-built scenario of the «Business Game», the expert acquaints employees of the *i*-th category with its topic, purpose, objectives, relevance of the study, as well as distributes roles among the participants. During the event, the expert can adjust the actions of the participants if they deviate from the main goal of the game.

Before testing, the expert instructs employees of the *i*-th category, then directly tests them on the basis of the developed list of test questions (block 9) and control the independence of the tasks, set by the participants.

In block 12 of the sequence of determining and assessing the competencies of employees of an enterprise is a list of available competencies of employees of the *i*-th category, identified during the interview, «Brainstorming», «Business Game» and testing.

Block 13 is intended for expert assessment of the competencies of employees of the *i*-th category based on the results of interviews, «Brainstorming», «Business Game» and testing, identified in block 12 of the block diagram by applying the matrix method. To do this, build a matrix for assessing the competencies of employees of the *i*-th category, the rows of which indicate a list of identified competencies of specialists, and the columns – the methods, used to assess employees of the i-th category (**Table 7.1**).

To build such a matrix, it is advisable to use the following scale for assessing the strength of the present competencies of employees of the *i*-th category (**Table 7.2**).

Table 7.1 The matrix for assessing the competencies of specialists

Present competencies	Methods of assessing specialists				Totally, points	Average mark, points	Rank
	Interview	«Brainstorming»	«Business game»	Testing			
1.							
2.							
…							

Table 7.2 The scale for assessing the strength of competencies manifestation [9]

Strength of competence manifestation	Symbol	Mark (points)
Weak	△	1
Middle	◯	3
Strong	◎	9

Block 14 of the sequence of determining and assessing the competencies of employees of the *i*-th category involves the calculation of the expert's overall marks of the present competencies of employees of the *i*-th category by a set of methods: interviews, «Brainstorming», «Business Game» and testing. The general marks are established by summation of points on

manifestation of the present competences in each method of competences estimation of workers of the *i*-th category. The average value of the manifestation strength of each present competence of specialists is also determined:

$$\bar{O}_j = \frac{\sum O_j}{n}, \quad (7.1)$$

where O_j – mark of the *j*-th present competence of employees of the *i*-th category, points; *n* – number of methods, used to determine and assess the competencies of employees of the *i*-th category within the «Assessment Center».

In block 15 of the block diagram, the identified competencies of employees of the *i*-th category are ranked in descending order of the values of their total overall marks. Based on the ranked number of present competencies of employees of the *i*-th category, a list of their key competencies is determined in block 16 of the sequence. For this purpose, a diagram is constructed, which shows the ranking of average marks of the present competencies of employees of the *i*-th category with their distribution by zones (groups). The whole range of competencies of repair workers should be divided into zones with low, middle and high importance (strength of manifestation) by the criterion of deviation of values from the average value (*M*) to 1/2 standard deviation (1/2σ) (**Fig. 7.4**) [10, 11]. According to such a strict criterion, the «middle» group includes about 38.2 % of competencies, the extreme groups – 30.9 %.

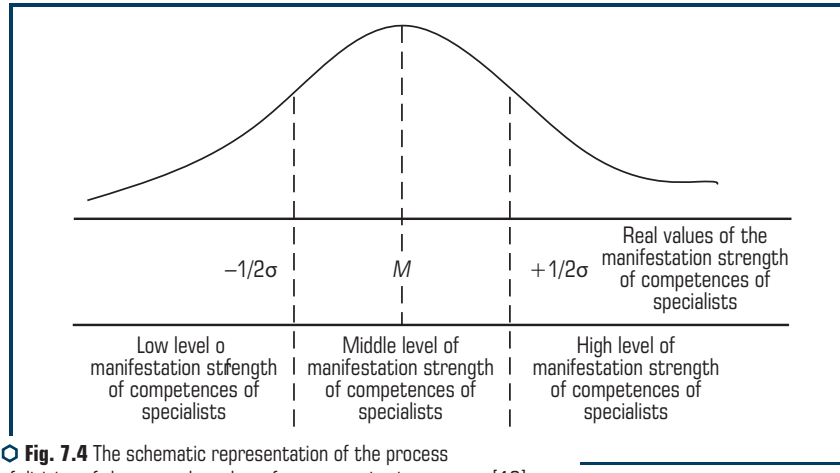

Fig. 7.4 The schematic representation of the process of division of the general number of competencies into groups [10]

The key competencies include those that fall into the group with a high level of manifestation (their importance degree).

Block 17 of the proposed block diagram covers the establishment by an expert of the reference values of the number of key competencies of employees of the *i*-th category, already formed in

previous block 16. The maximum reference value for each key competence of specialists is 9 points, because according to the applied scale of competence assessment (**Table 7.2**) the highest mark of the strength of a certain competence – strong – is estimated as 9 points.

The next step in the sequence of determining and assessing the competencies of employees of the *i*-th category (block 18) is to calculate the deviation of the present key competencies of employees of the *i*-th category from the reference values by calculating the absolute differences:

$$B_j = \overline{O}_j - O_j^E, \tag{7.2}$$

where $\overline{O}_j$ – average value of the *j*-th present key competence of employees of the *i*-th category according to the methods, points; O_j^E – reference value of the *j*-th key competence of employees of the *i*-th category, points.

Block 19 of the block diagram analyzes the obtained values of key competencies of employees of the *i*-th category and sets the type of calculated deviations. In the case when $B_j<0.5$ points – the deviation is considered acceptable; when $B_j>0.5$ points – inadmissible.

On the basis of information on the type of deviations in the values of key competencies of employees of the *i*-th category, decisions are made on the level of development of key competencies of specialists (block 20). For key competencies of employees, in the values of which an unacceptable type of deviation is set, it is advisable to develop actions and solutions that will increase their existing values.

Next block 21 is designed for the cyclic sequence of actions. It provides for the selection of all categories of employees ($i<n$), ie if $u<n$, then determine the competencies of the next *i*-th category of employees ($i=i+1$) (block 22); if not – complete the algorithm.

For an example of the application of the developed theoretical provisions and methodological support for determining and assessing the competencies of employees by the method of «Assessment center» consider PJSC «RTE-16365» (Kharkiv, Ukraine). Its main activity is cargo transportation; others – maintenance and repair of vehicles, retail trade in parts and accessories for vehicles, non-specialized wholesale trade and others.

To determine and assess the competencies of specialists of PJSC «ATP-16365», the necessary data were collected by interviewing and analyzing data on the work of the enterprise.

According to the proposed block diagram of determining and assessing the competencies of employees of the enterprise by the technology «Assessment center» (**Fig. 7.2**), its initial stage is to set goals. At PJSC «ATP-16365» the goals of the «Assessment Center» are to determine the set of key competencies and assess the level of competencies of each employee individually and the team as a whole. All calculations and computations were performed in the category of «repair workers».

PJSC «RTE-16365» refers to small enterprises (staff – 35 persons). According to the matrix of choice of the source of expert involvement (**Fig. 7.3**), an employee of the same enterprise – an inspector of the staff department was chosen as an expert. In order to prepare him for the assessment of the competencies of repair workers by the technology of «Assessment center», he was trained by attending relevant trainings and online webinars. Applying the

acquired knowledge and skills, the expert developed a list of questions for interviews (**Table 7.3**), «Brainstorming» (**Table 7.4**) and testing (**Fig. 7.5**) with each specialist (repair worker).

● **Table 7.3** The list of questions for interviews with repair workers using the «Assessment Center» technology

No.	Questions	Revealed competences
1	You see that the workflow can be significantly improved, but you understand that your idea may not impress. What are your actions?	initiative in the work process
2	Why do some professionals tend to follow accepted procedures and rules, while others often seek to make changes?	organization
3	Is it necessary to follow the technology of work when, by giving them up, you can achieve a quicker result?	focus on quality of work
4	The manager has assigned you a task, you do not have time to complete it before the end of the working day. Your actions?	responsibility
5	How many tasks did you have to solve in one day? Describe these tasks. How was your day planned?	ability to work in a multitasking environment
6	You come to the company. There is already a system in place, but you can see that it can be improved, although it takes a lot of effort and may not impress everyone. Your actions?	strive for innovation
7	What do you think are the advantages and disadvantages of having strict technological rules and procedures?	ability to follow technological rules and procedures
8	Why do some people strive to constantly develop, improve their level, while others prefer a stable sustainable activity that does not require special changes from a person?	focus on self-development
9	Name some basic rules for effective time management	ability to organize working hours
10	What is the most important thing in working in your specialty? How is the efficiency of work in your specialty assessed?	focus on result

● **Table 7.4** The possible answer options and the strength of their manifestation during the «Brainstorming» with repair workers

Possible answer	Manifestation strength	Revealed competences
Discussion topic: *«There was a serious car breakdown. This car was checked by 3 mechanics, but none could find the cause of the malfunction. Identify the cause of the car breakdown and suggest actions to eliminate it.»*		
It is necessary to connect the special equipment and to check up presence of deviations of indicators of the systems, which can influence the specified malfunction of the car (where there is a deviation – there is the reason of malfunction)	strong	determination, observation, logical thinking, the ability to quickly navigate the situation, mobility, experience in determining and troubleshooting a car, the ability to use auxiliary equipment, the ability to use special tools, the ability to apply new knowledge at work, the ability to compromise
To identify a list of all possible causes of the fault and check each one separately for damage	middle	
To replace all operating components of the system that may affect the cause of the failure	weak	

Test questions for testing repair workers

1. How to start to inspect a car?
a) from the car saloon;
b) from components and units of the car;
c) from the car body.

2. What methods are used when starting the car engine?
a) by hand;
b) by means of the electric starter;
c) both ways.

3. Where on the car the necessary pressure in tires can be indicated?
a) on the tire;
b) on the dashboard;
c) on the door rack or fuel tank hatch.

4. At what malfunction it is impossible to begin movement of the car?
a) faulty handbrake;
b) faulty brake lights;
c) punctured brake line.

5. Brass is an alloy:
a) bronze with tin;
b) tin with zinc;
c) copper with zinc.

6. What personal protective equipment is used when performing repair work?
a) safety helmet;
b) safety glasses, safety helmet;
c) gas mask, seat belt.

7. What a workplace should be equipped with, as well as places where is the possible impact on the person of harmful and (or) dangerous production factors?
a) means of individual and collective protection;
b) warning signs and inscriptions;
c) safety instructions.

8. What is pump maintenance?
a) replacement of defective parts and prefabricated units;
b) a set of operations to maintain a pump in working order and serviceability;
c) work performed to restore serviceability and complete or close to complete recovery of the pump life.

9. What detergent should be used to wash parts during disassembly and repair of equipment?
a) petrol;
b) kerosene;
c) diesel fuel, kerosene.

10. Is it allowed to operate equipment, mechanisms, tools in excess of operating parameters above the passport?
a) in exceptional cases;
b) is prohibited;
c) with the permission of the supervisory authorities.

Fig. 7.5 Test questions for testing repair workers

The scale of answers to the test questions for testing repair workers is given in **Table 7.5**.

The test results of repair workers of PJSC «RTE-16365» are contained in **Table 7.6**.

A «Business Game» was held with the repair workers of PJSC «ATP-16365» according to the situation: «A vacant position of chief mechanic has appeared in RTE. Several specialists are applying for this position. Setting tasks: it is necessary to evaluate the qualities of each of the candidates for the position and choose the best one».

To conduct the «business game», an expert from among the participants selected 4 people – candidates for the position of chief mechanic.

Table 7.5 The scale of answers to the test questions

Test No.	Answer option	Manifestation strength
1	a	weak
	b	strong
	c	middle
2	a	weak
	b	middle
	c	strong
3	a	weak
	b	middle
	c	strong
4	a	weak
	b	middle
	c	strong
5	a	weak
	b	middle
	c	strong
6	a	middle
	b	strong
	c	weak
7	a	weak
	b	strong
	c	middle
8	a	weak
	b	strong
	c	middle
9	a	weak
	b	middle
	c	strong
10	a	middle
	b	strong
	c	weak

● **Table 7.6** The test results of the repair workers of PJSC «RTE-16365»

No.	Name	Answers to question No.										The proportion of answers with a strong force of manifestation, %
		1	2	3	4	5	6	7	8	9	10	
1	G. Kulik	b	c	c	b	c	b	b	b	c	a	80.0
2	V. Bogomol	b	b	c	c	c	b	b	b	b	b	80.0
3	D. Omelchenko	b	c	b	c	b	a	b	b	a	b	60.0
4	M. Semko	b	c	c	c	c	c	a	b	c	b	80.0
5	V. Pavlenko	b	a	c	c	b	b	c	b	c	b	70.0
6	K. Litovchenko	b	b	c	c	c	a	b	b	c	a	70.0
7	O. Velichko	b	c	b	c	b	b	c	b	a	b	60.0
8	G. Sereda	b	c	b	c	b	b	b	b	b	a	60.0
9	L. Marchenko	c	c	c	c	c	b	b	c	a	b	70.0
10	P. Dovgan	c	b	c	c	c	a	b	b	c	b	70.0
11	O. Ivanenko	b	c	c	c	c	b	b	c	c	a	80.0
The average percentage of answers with a strong force of manifestation in the category of «repair workers», %												70.9

With the help of the «Business Game» in this scenario, competencies such as the ability to complete a case, stress resistance, purposefulness, attentiveness, persuasiveness, desire for career growth, responsibility, organization, ability to make decisions and ability to work with documentation were revealed, marks of which are presented in **Table 7.7**.

As a result of the actions carried out, the expert compiled a general list of present competencies of the repair workers of PJSC «RTE-16365», identified during interviews, «Brainstorming», «Business Game» and testing (**Table 7.8**) and evaluated them (**Table 7.9**).

● **Table 7.7** The marks of the competencies of the repair workers by the method of «Business Game»

Revealed competences of repair workers	Manifestation strength
Ability to complete a case	weak
Stress resistance	middle
Purposefulness	strong
Attentiveness	weak
Persuasiveness	strong
Desire for career growth,	middle
Responsibility	strong
Organization	weak
Ability to make decisions	middle
Ability to work with documentation	middle

Table 7.8 The present competencies of the repair workers of PJSC «RTE-16365»

No.	Present competences	Symbol
1	Initiative in the work process	K1
2	Organization	K2
3	Focus on the quality of work	K3
4	Responsibility	K4
5	Ability to work in a multitasking environment	K5
6	Strive for innovation	K6
7	Ability to follow technological rules and procedures	K7
8	Focus on self-development	K8
9	Ability to organize working hours	K9
10	Focus on the result	K10
11	Determination	K11
12	Observation	K12
13	Logical thinking	K13
14	Ability to quickly navigate a situation	K14
15	Mobility	K15
16	Experience in car troubleshooting	K16
17	Ability to use ancillary equipment	K17
18	Ability to use special tools	K18
19	Ability to apply new knowledge in work	K19
20	Ability to find a compromise	K20
21	Professionalism	K21
22	Qualification level	K22
23	Knowledge of the technology of car maintenance and repair	K23
24	Knowledge of safety rules	K24
25	Knowledge of the car structure	K25
26	Equipment repair experience	K26
27	Knowledge of the basic mechanical properties of processed materials	K27
28	Knowledge of instructions and regulations on labor protection	K28
29	Knowledge of design features of equipment	K29
30	Inclination to work with technology	K30
31	Ability to bring a case to the end	K31
32	Stress resistance	K32
33	Purposefulness	K33
34	Attentiveness	K34
35	Persuasiveness	K35
36	Strive for career growth	K36
37	Ability to make decisions	K37
38	Ability to work with documentation	K38

● **Table 7.9** The matrix of assessment of the competencies of the repair workers of PJSC «RTE-16365» based on the results of «Assessment Center»

Present competences	Assessment methods				Totally, points	Average mark, points	Rank
	IInter-view	«Brain-storming»	«Business game»	Testing			
K1	◯	◎	△	◯	14	3.5	
K2	◎	◎	◎	△	28	7	2–10
K3	◎	◯	◎	◯	24	6	
K4	◎	◎	◯	◯	24	6	
K5	◎	◎	◎	◯	30	7.5	1–4
K6	◯	◎	△	◯	16	4	
K7	◎	◎	◯	◎	30	7.5	1–4
K8	◎	△	△	◎	20	5	
K9	◎	△	△	◎	20	5	
K10	◯	◎	△	◯	16	4	
K11	△	◎	◎	◯	22	5.5	
K12	◯	◎	△	◯	14	3.5	
K13	◯	◎	△	◯	16	4	
K14	◎	◎	◎	△	28	7	2–10
K15	◯	◎	△	◯	14	3.5	
K16	◎	◎	◯	◎	30	7.5	1–4
K17	◎	△	△	◎	20	5	
K18	◎	◎	△	◎	28	7	2–10
K19	◎	△	△	◎	20	5	
K20	◯	◎	△	◯	14	3.5	
K21	◎	◯	◎	◯	24	6	
K22	◎	△	△	◎	20	5	
K23	◎	◎	△	◎	28	7	2–10
K24	◎	◯	◎	◯	24	6	
K25	◎	◯	◎	◎	30	7.5	1–4
K26	◎	△	△	◎	20	5	
K27	◎	◎	△	◎	27	7	2–10
K28	◯	◎	△	◯	16	4	
K29	◎	◎	◯	◯	24	6	
K30	◯	◯	◯	△	10	2.5	
K31	◯	◎	△	◯	14	3.5	
K32	◎	◎	◎	△	28	7	2–10
K33	△	◎	◎	◯	22	5.5	
K34	◯	◎	◎	△	22	5.5	
K35	◯	◎	△	◯	14	3.5	
K36	◎	△	◎	△	20	5	
K37	◯	◎	△	◯	16	4	
K38	◯	◯	◯	△	10	4	

The division of the existing competencies of the repair workers of PJSC «RTE-16365» based on the results of the «Assessment center» into groups is contained in **Fig. 7.5**. Thus, the average value of the manifestation strength in 38 competencies of specialists:

$$M=(3.5+7+6+6+7.5+4+7.5+5+5+4+5.5+3.5+4+7+3.5+7.5+5+$$
$$+7+5+3.5+6+5+7+6+7.5+5+7+4+6+2.5+3.5+7+5.5+5.5+3.5+$$
$$+5+4+4)/38=201/38=5.3 \text{ (points)}.$$

Standard deviation:

$$\sigma=\sqrt{\frac{\sum\left(x_i-M\right)^2}{n}}=$$
$$=\sqrt{\frac{\left(3.5-5.3\right)^2+\left(7-5.3\right)^2+\left(6-5.3\right)^2+\left(7.5-5.3\right)^2+...+\left(4-5.3\right)^2}{38}}=1.43 \text{ (con. un.)}.$$

1/2 standard deviation: $1/2\sigma=0.5\cdot1.43=0.71$ (points).

Limits $+1/2\sigma=5.3+0.7=6.0$ (points); $-1/2\sigma=5.3-0.7=4.6$ (points).

Then the extremes of the competence groups of the repair workers are as follows:

– with a low level of strength of their manifestation – the interval [1.0; 4.5];

– with the average level of strength of their manifestation – the interval [4.6; 6.0];

– with a high level of strength of their manifestation – the interval [6.1; 9.0];

Therefore, the key competencies of the repair workers of PJSC «RTE-16365» should include the following 10 units: K2, K5, K7, K14, K16, K18, K23, K25, K27, K32 (**Fig. 7.6**).

After the expert established the reference values of the key competencies of the repair workers of PJSC «RTE-16365», their deviations from the present values were calculated and the type of such deviations was identified (**Table 7.10**).

According to the results of calculations, 50 % (5 units) of the key competencies of the repair workers of PJSC «RTE-16365» have a tolerance ($B_j \leq 0.5$ points). However, it is necessary to increase the level of competencies of these specialists as: the ability to quickly navigate a situation (K14), experience in car troubleshooting (K16), the ability to use special tools (K18), knowledge of maintenance and repair (K23), knowledge of the car structure (K25).

To this aim, for the repair workers of PJSC «RTE-16365» it was decided to attend of advanced training and self-study courses by the employees of this category.

The process of determining and assessing the competencies of the employees on the basis of the modern assessment technology «Assessment Center» was formed and the content of the necessary actions at each of its stages: preparatory, assessment and processing of results was detailed.

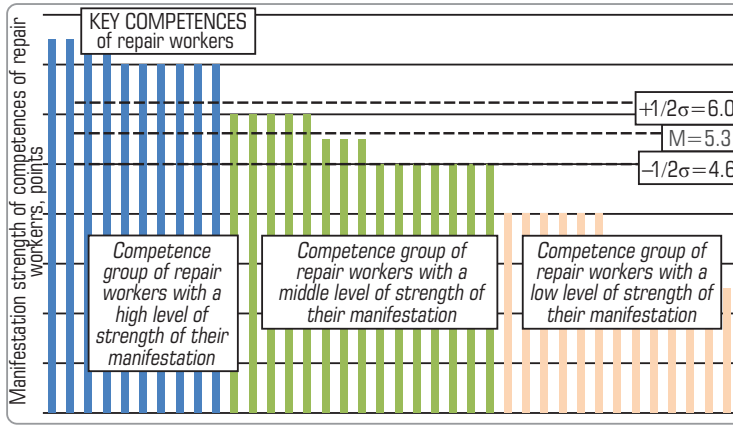

Fig. 7.6 The ranking of values and distribution of the competencies of the repair workers of PJSC «RTE-16365» by zones

Table 7.10 The deviation of present values of the key competencies of the repair workers of PJSC «RTE-16365» from reference ones

Key competences		Value, points			
Symbol	Content	average	reference	deviaton	
				Δ	type
K2	organization	7	7	–	admissible
K5	ability to work in a multitasking environment	7.5	7.5	–	admissible
K7	ability to follow technological rules and procedures	7.5	8.0	–0.5	admissible
K14	ability to quickly navigate a situation	7.0	8.5	–1.5	not admissible
K16	experience in car troubleshooting	7.5	8.5	–1.0	not admissible
K18	ability to use special tools	7.0	8.0	–1.0	not admissible
K23	knowledge of technology of car maintenance and repair	7.0	8.0	–1.0	not admissible
K25	knowledge of the car structure	7.5	8.5	–1.0	not admissible
K27	knowledge of the basic mechanical properties of processed materials	7.0	6.5	+0.5	admissible
K32	stress resistance	7.0	6.0	+1.0	admissible

To specify the actions to assess the competencies of the specialists, a block diagram of the determination and assessment of the competencies of the employees of the enterprise has been

built, which, unlike existing, has a logical sequence of actions, based on the principles of «Assessment center» technology for a set of methods (interview, «Brainstorming», «Business Game» and testing) and is based on bringing the level of existing competencies of the employees to their reference values. The inclusion of assessment methods, such as interviews, brainstorming, business games and testing in the Assessment Center makes it possible to obtain comprehensive and complementary information on the results of the assessment to formulate the overall conclusion.

The appropriate methodological tools for the implementation of such a process have been developed and its practical application to determine key competencies has been realized on the example of repair workers of the road transport enterprise PJSC «RTE-16365», as well as the existing and required level of their values has been diagnosed.

As mentioned in this section and previous sections of this work (Section 1, Section 3), ensuring the quality of education with a combination of innovation is an indisputable path to success and development of each individual industry and the state as a whole. Therefore, the problem of developing the innovative approach to the development of transport infrastructure in particular will be addressed in the next section of this study.

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