IT Team Building Process Management based on a Competency Approach

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Abstract

In the conditions of new geopolitical shifts in Ukraine, there is an urgent need to find new ways to increase the competitiveness of both individual industries and the economy as a whole. Competitiveness management within IT industry research and IT outsourcing in Ukraine is relevant, thus, at the present stage Ukraine remains one of the leaders in the development of the IT industry, in particular IT outsourcing. At the same time, the field of information technologies requires new approaches both from the point of view of public administration and from the point of view of providing new innovative services. The main problems of management in the IT field are as follows: the problem of communication within the team, the peculiarities of communication with the candidate at the selection stage, the management of a large amount of information, approaches to team motivation, gender and age. Modern management requires formation of new effective ways to solve these problems, since past experience cannot be applied, given the rapid development and changing conditions of the companies. Based on the analysis of the actual state of the IT market and forecasts of its dynamics, the primary SWOT-analysis of the IT market of Ukraine was made. The main problems of IT industry management are demonstrated and the options for solving existing problems are provided. The most important indicators for the manager of the IT department in the field of teamwork are identified, as well as measures to improve the recruitment process in modern Ukrainian IT companies are proposed. The theoretical and methodological basis of the study is the use of general scientific, interdisciplinary, economic-mathematical, statistical and special methods. The following methods were used to solve the tasks set in the article and to process primary materials: system approach, statistical groupings, graphical analysis, sample observation.

1. Introduction

In the conditions of new geopolitical shifts in Ukraine, there is an urgent need to find new ways to increase the competitiveness of both individual industries and the economy as a whole. Competitiveness management within IT industry research and IT outsourcing in Ukraine is relevant, thus, at the present stage Ukraine remains one of the leaders in the development of the IT industry, in particular IT outsourcing. At the same time, the field of information technologies requires new approaches both from

the point of view of public administration and from the point of view of providing new innovative services.

Problems of modern management and administration in IT companies were analyzed by such domestic and foreign specialists as Rudkivska O.V., Tulenkov M.V., Markina I.A., Gamayunov V.G., A. Marshall, K. Haxevor, B. Madina, Bi. Render, Lange O., David Meister, P. Drucker [1-4].

The Ukrainian information market has its own peculiarities.

Firstly, the formation of the Ukrainian market of information services is at an early stage and is characterized by a low level of structure, preceded by the specialization of services and the distribution of spheres of activity. The development of the information market traditionally goes from the center to the regions - most of the structures of the information business are concentrated in the capital.

Secondly, the state still plays a passive role in the Ukrainian information market. It practically does not regulate the information market - neither organizationally nor economically. Thus, it is not yet possible to achieve the stability of the national market under the condition of the priority position of the domestic producer on it. The weakness of the legal regulation of the information market imposes serious restrictions on its development.

Thirdly, the state acts on the market both as the main customer and as the main consumer. Most Ukrainian entrepreneurs know nothing about what the information market has to offer. The sector of domestic consumption of information products and services is insufficiently developed [5].

Taking into account the potential of Ukraine, in the near future we can expect the creation of a market of information products and services in the state, similar in importance and profitability to the relevant markets of European states.

Thus, in general, we can talk about fairly stable trends and prospects for the development of the Ukrainian information market, but the implementation of these trends will be determined by an active policy of state regulation [6, 7].

2. SWOT-Analysis of IT Market of Ukraine

Based on the analysis of the actual state of the IT market and forecasts of its dynamics, the primary SWOT-analysis of the IT market of Ukraine was made (Table 1) [8].

Based on the results of the initial SWOT-analysis, market trends and its forecast values, general recommendations for the development of IT sector in Ukraine have been developed:

- Increase of contacts with foreign partners and customers.
- Expanding the range of IT services.
- Development of strategy of innovative development at the enterprises.
- Focus on IT outsourcing.
- Attracting foreign investment.
- Risk management.

Thus, the factors contributing to the development of the IT sector of Ukraine are the high level of literacy and education of the population, the quality of teaching mathematics and science, the availability of science-intensive jobs, low tariffs for mobile communications and the Internet, the introduction of electronic systems, 3-G technology foreign investment, in particular in startups, the spread of IT outsourcing and the use of cloud technologies by an increasing number of economic entities.

Factors hindering the development of the IT sector are low availability of the latest technologies, low level of government procurement of goods and services in the IT sector, high tax rates, inefficient promotion of the IT sector in the international arena, low level of intellectual property protection, ineffective legislation.

Table 1
Primary SWOT-analysis of the IT market of Ukraine

Strengths	Weaknesses
- high quality IT talent - reputation of Ukrainian programmers - growth in the number of talented young people - certified specialists - unshakable desire for success - a large supply of relatively cheap ICT resources - result-oriented approach - convenient geographical location - rapid growth of the IT sector	high fragmentation of the IT market - low level of foreign investment - outflow of highly qualified personnel - unfavorable legislative field - low level of IT costs in the domestic market - temporary loss of Crimea and part of Donbass - high level of corruption - non-guaranteed rights of investors and property
Opportunities	Threats
- low level of staff turnover - market consolidation - potential connection to the European Union - transformation of the IT industry into high technology - development of IT outsourcing and partnerships	- deterioration of the political and economic situation in Ukraine - increasing the outflow of highly qualified personnel - economic recession - the emergence of competitors in potential markets - low development of innovative industries in Ukraine and low demand for IT services

The strengths of Ukraine's IT sector include the availability of highly qualified human capital, a significant number of IT companies, global R&D centers, powerful IT clusters and large international development centers, a fast-growing market for IT services outsourcing, low cost of services compared to the US and Europe, readiness of the state to cooperate with the field of information technologies. At the same time, the weaknesses of the domestic IT sector are the low level of infrastructure development and Internet penetration, structural inefficiency of the IT market (low aggregate share of software and IT services in the market).

Thus, there are prospects for the development of the IT sector in Ukraine, regardless of the unstable situation and risk environment. A model for forecasting the volume of the Ukrainian IT market, which depends on the factors of influence, was developed, using correlation-regression analysis and forecasting using a trend line. The forecast values of the IT market are calculated taking into account the general market trend and the forecast values f the four main factors influencing it: GDP, exports of services, average wages and foreign direct investment in Ukraine.

3. IT team building process management based on a competency approach

Increasing competition in the software market, as well as the rapid development of new technologies give customers the opportunity to make higher demands on the quality of software products, as well as demands to reduce budgets and development time. In order to achieve the set tasks in the conditions of limited resources of the company, software developers have brought to life a new area of project management methodology - project management in the field of software development.

Software projects imply a set of actions for the preparation, design, development, testing, implementation, operation and development of a software product or system, within the project management methodology. When managing such projects, the methods and principles used in the project management methodology are used: project life cycle, quality management, time, cost, resources, risks, etc. Software project management is a narrower area of project management methodology and has its own specifics due to a number of factors:

1. A special subject area. The subject area of the project is those products or services that must be made as a result of successful project implementation. The subject area of any software development project is a quality software product or system that can solve the company's business problems.

2. A special composition of executors and project participants. For any software is characterized by a special composition of persons involved in it.

3. Significant time and financial constraints. As a rule, time is often a critical resource for such projects. Otherwise, the customer risks getting an outdated product - the product of "yesterday". In most cases, most software development projects are subject to severe financial constraints. If some foreign companies can afford significant investments in software (up to several million dollars), then domestic companies can invest in such projects much more modest funds. According to domestic experts in the field of software development, the budget of a large project is USD 50-60 thousand per year, the average budget is USD 25-30 thousand per year, small one - up to USD12 dollars per a year. However, in practice, there are often cases when this type of project is allocated much more modest amounts - from a few hundred dollars.

4. Special requirements for the project manager. The manager shall, in addition to knowledge in the field of project management methodology, have comprehensive knowledge in the field of information technology: to understand the existing technologies of software development, know the design stages, understand design documentation, know methods of testing, implementation and development of software.

Software projects, despite their specificity, have many similarities with conventional projects. For example, they are characterized by the same features as other projects: the presence of purpose, uniqueness, changes in the state of the system, resource constraints. In addition, project management software development, as part of the project management methodology, implements concepts, tools and techniques specific to conventional projects [9].

However, the approach to creating a team of such projects should be special for a number of reasons listed above. It is important to remember that the basis of the team of such projects are programmers (or technicians) - people are quite specific, hence there are complexities within team building process.

The team in the IT company is formed at the stage of personnel selection, recruitment. Recruitment is, first of all, a team of work, and not only the manager, but also the team as a whole should be involved in this process. The ability to work in a team is included in the professional standards of all IT professions without exception.

5. Most software developers are rational introverts, phlegmatics. This means that programmers are calm people both externally and internally. They are persistent, but they need time to swing, to focus, to switch attention to another object. Internal rationality makes them restrained and closed, not distracted by external stimuli. But this does not mean that the programmer is not able to flash. Just to bring it to this state, you need to spend a lot of effort. This is the most balanced of all temperaments. Apparently, people with other temperaments in conditions of constant uncertainty and change, hard pressure of deadlines and customers, do not survive so well [10].

Within studying the personality and features of the "image of the world" of highly qualified programmers are characterized by perseverance, the desire to create their own world within the computer environment, as well as rejection of barriers and prohibitions that exist in the real world. The range of actions taken by programmers to restructure the existing reality is quite wide: from passive rejection of specific initiatives, processes and relationships or from deaf and fierce resistance to them to active intervention in the life processes of world order and life, to open struggle with specific (explicit or intentional) disadvantages—the struggle in which the professional skills and abilities of information technology professionals are used.

Hence, the prerequisites for the successful activity of the programmer are the following features: distance from other people, introversion, immersion in their own intellectual experiences, focus on self-improvement.

Programmers put the result first. For them, the main thing is that the task was performed in accordance with the requirements and on time, no matter where (in the office, at home) and when (at 6 am, afternoon or after two o'clock at night). It is also important not to restrict their working freedom (within reasonable limits), for example, to be flexible about the mandatory eight working hours. Software developers are creative people and may be exposed to a "creative crisis." In these moments it

is better not to talk about deadlines, but to be understanding, because the focus on the result will be fruitful.

According to the developers themselves, the main motivation for them is creative self-realization, everything else is secondary. On the one hand, programming does not always involve creativity, more often it is a normal technological process. But if the programmer is deprived of interesting tasks for a long time, he will start looking for a new job. Therefore, routine work - correcting design errors, finalizing programs for colleagues - should be divided equally among all team members who are directly involved in the stages of development, product testing.

Table 2 presents the main factors influencing the success of IT team building.

Table 2

Factors influencing the success of IT team building

Factors	Effective actions of team members
Availability of a project plan and clear requirements	1. Make a team work plan based on customer requirements. 2. Detailed description of the stages of work in special programs with the possibility of free access.
Clarity of goals and objectives of the team	1. Consider different ways to implement the project. 2. Identify the most effective approach, considering all the suggestions of team members. 3. Identify possible misunderstandings.
Motivation for each team member	1. Allocate space and opportunities for self-realization of employees. 2. Balance of routine tasks and creative approach. 3. Flexibility of the obligatory schedule.
The right approach to information exchange	1. Opportunity to freely express their point of view and ideas. 2. Study and reflect on the information obtained. 3. Discussion of further actions after completion of each stage.
Choosing effective team behavior	1. Collective responsibility for the results of work. 2. Learning and mutual learning even in the process of working on the project. 3. Clear division of roles in the team.

In the process of implementing software projects, many decisions are made based on technical features. But often the technical training of managers is too good. It is necessary not just to listen to the opinion of programmers, but also to publicly praise those who give sound advice. All IT professionals feel a great need for recognition. Another good motivator can be the opportunity for professional growth and training. In the field of IT, as in any other, it is important to be aware of all new developments, so training and retraining should be welcomed.

The requirement of "teamwork" for IT professionals belongs to the general group of competencies. For managers in IT companies, this competence is considered mandatory, as is the "ability to manage a team". First of all, we should consider the competence "teamwork", which is characterized by the indicators listed in Table 3 [11].

Table 3

Characteristics of competence indicators of "teamwork"

Competence indicator	Characteristic
1) adapt to a new team	understands the structure, climate and culture of the team
2) perform their work in the general rhythm	adapts to the rhythm of the team
3) build connections and relationships with people	maintains close friendly relations with all team members
4) clearly and logically express their views	expresses opinions clearly, logically and reasonably
5) to convince colleagues of the correctness of the decision, confirming their views with strong arguments	convinces most members of the group of the correctness of the decision, using strong arguments
6) admit your mistakes	admits his mistakes and corrects them
7) take into account the point of view of colleagues	gives another team member the opportunity to fully express their opinion and accepts it for further discussion
8) understand other people	understands other people's emotions and their content when considering the problem
9) restrain personal ambitions	keeps all his ambitions under control, and sometimes realizes his ambitions through the achievement of team goals
10) come to the aid of colleagues	tries to help colleagues solve the problem
11) manage your emotions	is able to control his emotions
12) to abstract from personal	objectively evaluates other team members, completely abstracting from personal likes / dislikes
13) avoid and prevent conflicts	tries not to create conflict situations
14) express confidence in the team	expresses positive expectations from the work of the team and trusts colleagues

In addition to the "teamwork" competency, it is equally important for the HR manager in the IT team to have the "team management" competency. The characteristics of the indicators of this competence are provided in Table 4 [12].

Table 4

Characteristics of competence indicators of "team management skill"

Competence indicator	Characteristic
1) to develop strategies for the group, adapted to its specifics	develops strategic goals, operational plans based on them
2) to form teams with the definition of the purposes of their functioning, methods of selection of team members, regulation of team activity, etc.	forms a team based on the goals of the team, the personal characteristics of each team member
3) organize joint activities of team members	distributes tasks, makes sure that it is understood, supports the initiative of team members
4) to form the team structure	forms a team depending on the position, the characteristics of its members and the characteristics of the situation
5) to intensify the work of team members	uses various methods of motivation and stimulation (intangible and tangible)

6) to develop and make team decisions	informs the rules of work in decision-making, monitors the implementation of the rules, participates in the discussion of the problem, activates the team in the decision-making process
7) to determine the methods of training group leaders in the organization	chooses methods of training group leaders in the organization depending on the characteristics of leaders and the specifics of groups with which they will have to work
8) to evaluate the results of the team	determines the degree of fulfillment of goals
9) to determine the effectiveness of teamwork	determines the effectiveness of the team based on the evaluation of results
10) to plan the activities of the team determines the goals and ways to achieve them	forms a team work plan based on a previously developed strategic development plan
11) to determine the role of team members	determines the role of the participant depending on the results of work in the team and the characteristics of its members
12) to determine the main points of tension and balance in the team	determines the points of tension in the team, the reasons for their occurrence, as well as possible ways to avoid points of tension
13) to formulate an unpleasant socio-psychological climate in the team	knows how to manage conflicts, in most cases tries to prevent conflict
14) to use different management styles in the team	not only knows different styles of team management, but also uses them depending on the characteristics of the team and the situation
15) to use levers that invite you to guide the team to work	identifies the levers with which you can guide the team in the work, and uses them
16) to use of specific forms and methods of personal work for formation of development of responsibility, sociability, initiative of participants of teams reads the literature, passes trainings	tries to apply some methods in practice
17) to determine the owner of the type of management manager	determines its own type of management and analyzes

The teamwork competency and the team management competency are interrelated and are integral parts of the same mechanism. This relationship can be traced by examining the competence data indicators (Table 5).

Table 5
Relationship between competency indicators "team management skill" and "team management ability"

Ability to work in a team (implemented in the process of teamwork)	Ability to manage a team (affect implementation)
to adapt to the new team	to form teams with the definition of the purposes of their functioning, methods of selection of team members, regulation of team activity, etc .; to form a team structure; use different management styles in the team
to perform their work in the general rhythm	use levers that allow you to guide the team in the work; organize joint activities of team members

to build connections and relationships with people	organize joint activities of team members
clearly and logically express their thoughts	to intensify the work of team members; determine the manager's own type of management
to convince colleagues of the correctness of the decision, confirming their views with strong arguments	effectiveness of teamwork to admit their mistakes to use specific forms and methods of personal work for the formation and development of responsibility, sociability, initiative of team members
to take into account the point of view of colleagues	develop and make team decisions to understand other people
to determine the role of team members	restrain personal ambitions
to form a favorable socio-psychological climate in the team	come to the aid of colleagues
to identify methods of training group leaders in the organization	manage your emotions
to form a favorable socio-psychological climate in the team	abstract from personal likes and dislikes
to evaluate the results of the team	avoid and prevent conflicts
to identify the main points of tension and balance in the team	express confidence in the team
to develop strategies for group activities adapted to its specifics	plan team activities

According to Table 5, the implementation of such indicators of competence "ability to manage a team" implies formation of teams with the definition of the objectives of their operation, methods of selection of team members, regulation of team activities, etc.; formation of a team structure; use of different management styles in the team greatly facilitates the adaptation of a new team member. To work in the general rhythm of the team helps the use of levers that allow you to guide the team in the work, and the correct organization of joint activities of each member of the IT team. Working together helps a team build connections and relationships with employees. The better the team leader is able to intensify the teamwork process, the more ideas can be voiced and discussed. It is important to take into account the point of view of IT professionals in forming a team decision. For a favourable socio-psychological climate in the team, first of all, it is important to restrain personal ambitions and be able to manage their emotions. Identifying the main factors of tension and balance in the team helps to avoid and prevent conflicts. Evaluation of team performance should be subject to abstraction from personal likes/dislikes. The results of the authors' research on the significance of indicators of competence "ability to work in a team" are provided in Table 6.

Table 6

The results of the research on the significance of indicators of competence "ability to work in a team"

№	Rank	Competence indicators%	Part, %	Total, %	Group
3	1	build connections and relationships with people	8.72	8.72	A
1	2	adapt in a new team	8.11	16.83	A
2	3	perform their work in the general rhythm of	8.00	24.83	A
7	4	take into account the point of view of colleagues	7.83	32.67	A
4	5	clearly and logically express their opinions	7.61	40.28	A
8	6	understand other people	7.00	47.28	A
14	7	express confidence in the team	6.92	54.19	A
11	8	manage your emotions	6.86	61.06	A
5	9	convince colleagues of the correctness of the decision, confirming their views with strong arguments	6.81	67.86	A
10	10	come to the aid of colleagues	6.69	74.56	B
6	11	admit your mistakes	6.64	81.19	B
13	12	avoid and prevent conflicts	6.36	87.56	B
12	13	abstract from personal likes / dislikes	6.28	93.83	C
9	14	restrain personal ambitions	6.17	100.00	C
Total			100.00		

To determine the indicators to be guided by, you should build a Pareto diagram (Figure 1). As shown in table 6 and figure 1, 9 indicators out of 14 belong to group A, they are distinguished from the general list. And that's why the team needs to focus on these indicators in the first place.
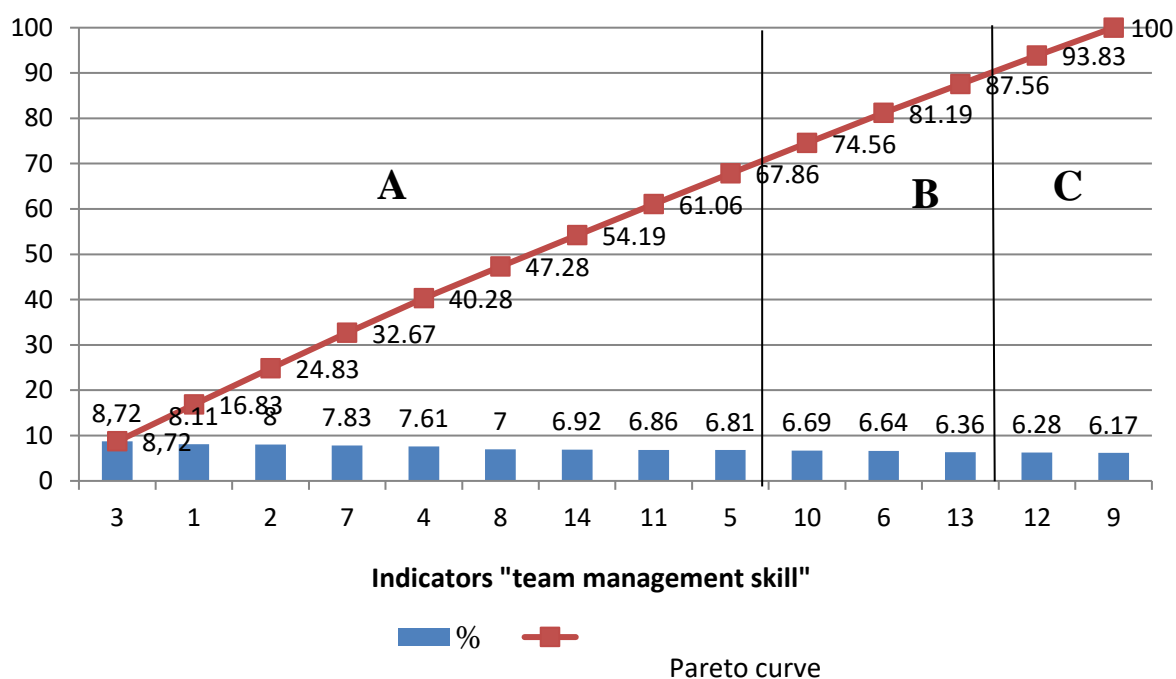

Figure 1: Pareto diagram for indicators of competence "ability to work in a team"

These indicators include: building relationships with colleagues, adapting to a new team, doing their job at a general pace, taking into account the views of team members, clear and logical expression of their ideas and opinions, understanding other people, demonstrating trust in the team, managing their emotions, convincing colleagues of the correctness of the decision with strong arguments. The study of the competence "ability to manage a team" revealed (Table 7) that the most important indicators of competence are the organization of joint activities of members of the IT team; formation of the team

with the definition of a clear purpose of their functioning, development of methods for selection of team members, regulation of team activities, etc.

Table 7

The results of the study of indicators of competence "ability to manage the team"

№	Rank	Competence indicators%	Part, %	Total, %	Group
3	1	to organize joint activities of team members	10,14	10,14	A
2	2	to form teams with the definition of the purposes of their functioning, methods of selection of team members, regulation of team activity, etc.	9,54	19,68	A
13	3	to form a favorable socio-psychological climate in the team	8,10	27,78	A
1	4	to develop strategies for group activities adapted to its specifics	7,92	35,70	A
6	5	to develop and make team decisions	7,34	43,04	A
10	6	to plan team activities	7,34	50,38	A
5	7	to intensify the work of team members	6,82	57,20	A
4	8	to form a team structure	6,80	64,00	A
11	9	to determine the role of team members	5,50	69,50	A
14	10	to use different management styles in the team	5,46	74,96	B
15	11	to use levers that allow you to guide the team in the work	4,58	79,54	B
8	12	to evaluate the results of the team	4,10	83,64	B
9	13	to determine the effectiveness of teamwork	3,96	87,60	B
12	14	to identify the main points of tension and balance in the team	3,64	91,24	C
16	15	to use specific forms and methods of personal work for the formation and development of responsibility, sociability, initiative of team members	3,26	94,50	C
7	16	to identify methods of training group leaders in the organization	2,94	97,44	C
17	17	to determine the manager's own type of management	2,56	100	C
Total			100		

To determine the main indicators of competence "ability to manage the team", to which HR managers or team leaders need to pay special attention, Pareto diagram is to be built (Figure 2).
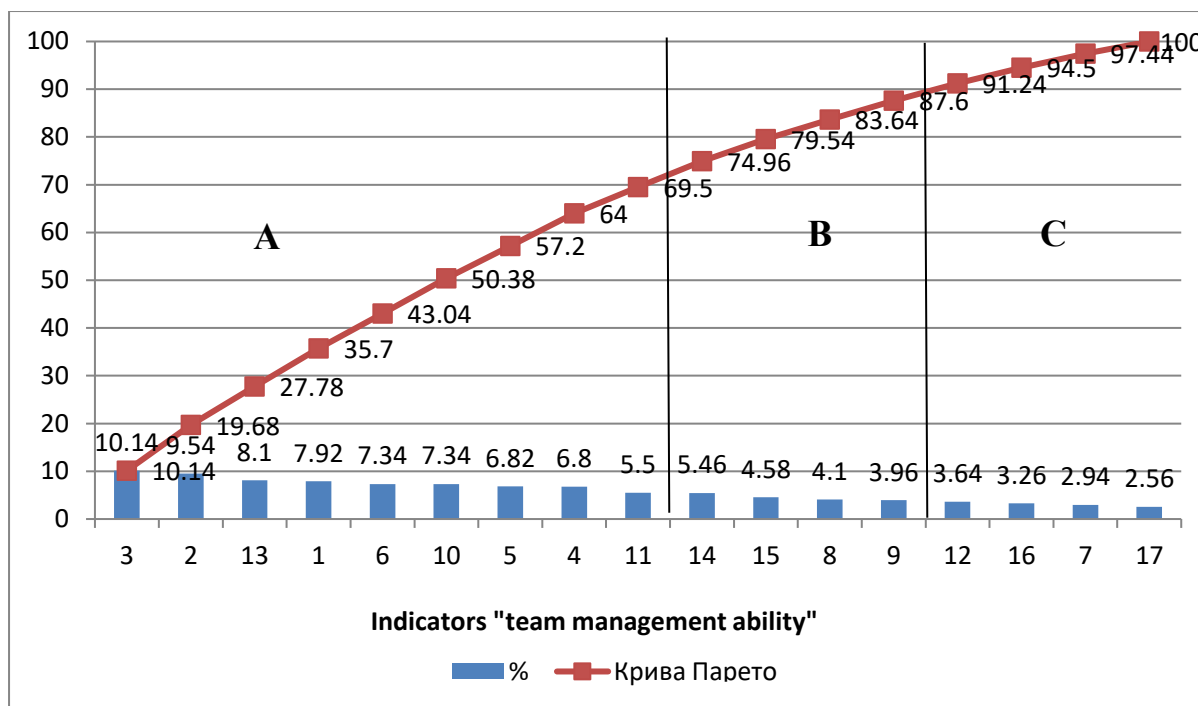
Figure 2: Pareto diagram for competency indicators abili Pareto curve n

As can be seen from this diagram, the most important indicators of competence that belong to group A are (nine indicators): the ability to organize joint activities of team members, the formation of a favorable socio-psychological climate in the team, development of group strategy adapted to its specifics, formation and adoption team decisions, planning team activities, defining the roles of team members. These indicators shall be relied on by the IT managers in the first place.

4. Conclusions and Prospects of Further Research

The process of team building is a task that requires high managerial competence. The competencies of "teamwork" and "ability to manage a team" are important among the skills of a recruitment manager. Its implementation requires not only the presence of properly selected, highly qualified IT professionals, but also people who want to work together as a team. Taking into account the features of both IT and IT specialists, the manager has a much better chance to create a truly effective team. And as practice shows, the project team is one of the key factors in the success of the project as a whole.

The formed variants of the decisions of the basic problems arising within IT company management are not final. Every modern manager can approach situations in terms of his own competencies and experience. But it is important to have a correct idea of the state of the modern labour market - to take into account age and gender, working conditions, features of the field - and not try to apply past mechanisms to the management of a completely new business structure.

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