

Psychology of creation

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A person's peculiarities of style of thinking in innovative process*

The results of theoretical problems of perception and innovative technologies introduction are presented. The results of empirical research of personal qualities and psychological readiness of people included in innovative processes are described. The presence of the expressed distinctions in development of inclination to risk and a rigidity level of people having a high level of psychological readiness for perception of innovations is shown.

The data of empirical researches of managers and employees of the building organizations with different attitude to innovative introductions are given. The special attention is paid to the research of these employees' style of thinking peculiarities. It is established that people, accepting innovations, have a high level of inclination to risk and a lower level of rigidity unlike people disposed to treat to innovative introductions skeptically or negatively. It is shown that successful managers, easily perceiving and introducing innovative technologies, are characterized by prevalence of initiative and practical style of thinking. In motivational sphere of these people the orientation on a problem, connected with the presence of aspiration in achievement of success, dominates. The authority motive, the need for achievements and the orientation on itself prevail among the managers with administrative style of thinking.

<u>Keywords:</u> innovations, innovative process, psychological readiness, style of thinking, a problem, risk, rigidity, motivation, criteria of success, an orientation of a person.

Nowadays practically in all spheres of life innovative processes connected with introduction of new technologies are enough intensively developed. In such conditions a person rather often gets in a situation of the uncertainty, concerning substantial, productive and personal, intellectual aspects of his professional work. This situation means a personal contradiction; the essence of this contradiction is, on the one hand, in that, that in society, in professional work there is an objective necessity for innovative process which, on the other hand, assumes the necessity of personal and intellectual changes. In this connection, the social problem of the innovations

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introduction gains psychological qualities, provoking to understand the psychological mechanisms of innovations acceptance, personal and intellectual resources of a human being which is ready to the transformation of oneself, one's activity and life.

Innovations, innovative technologies now draw an increasing attention. The introduction of innovations promotes development of different spheres of a person life activity. In O. S. Sovetova's (2000) opinion, just the innovations act as a form of operated development [22]. The central place in the innovative transformations system belongs to new technologies. The majority of authors define technological innovations as «a complex system by means of which an idea or an image turns to an object of commercial activity» [9, p. 20].

Foreign and native researchers have tried to construct a single theory of the innovative process which covers it (the process) in interrelation of all its stages: generation of idea, applied development, manufacture, sale, operation. It has been shown that efficiency of the innovative process is provided not so much with productivity of each stage, as with reliability of "joints", speed of conversion from any previous stage to the following. It is noticed that the success of one innovation prepares the ground for success of the following, and vice versa: «innovative fear» is more often a consequence of failures with the previous innovations. One of the most important conclusions for us is that the perception of the innovations is influenced by a level of psychological readiness of a person to acceptance of various changes [22].

It is clear, that the efficiency of the innovative changes depends on their acceptance by people getting in a zone of the innovative introduction. The generalized analysis of the innovations introduction allows to speak that for successful realization of the innovative project it is necessary to find out initially what problems of people the innovative technology can solve, to suggest them to take part in the realization of the project, to take into account their wishes, to make the information opened with a feedback between innovators and users of the future system. That is, to prepare the ground for the innovation introduction both above (managers) and below (last users).

In P. Drucker's opinion, in connection with the fact that the essence of innovative activity is the entry of dynamism into the "steady" economic order, the creation of uncertainty and risk of a higher level [9], innovations can lead to changes of traditional type of thinking and life style. What consequences of social innovations will be, it generally depends on psychological readiness of a person for their acceptance.

A. L. Zhuravlyov has suggested to distinguish various social – economic types of people according to their attitude to organizational-economic innovations depending on intensity of three psychological components display: psychological readiness for innovations (a motivational component); preparation for life activity in new conditions (knowledge, skills, experience, etc.); real activity (action, acts, activity) [4].

Various combinations of desires, knowledge and actions have allowed to A.L. Zhuravlyov to divide people into following social – psychological types:

1) «active reformers» (they want economic changes, they can work in new conditions and operate actively);



- 2) «passive reformers» (they want, they can, but don't operate);
- «passively-positively concerning innovations» (they generally want changes, but they can't and don't operate);
- 4) «overcoming themselves» (they can and they operate, but don't want changes);
- 5) «inefficient» (they want and operate, but can't);
- 6) «waiting» (they can, but don't want and don't operate);
- «blind executors» (there is no an expressed desire, they can't, but they operate in a direction of changes by means of others);
- 8) «passive opponents» (they don't want, they can't and don't operate);
- 9) «active opponents» (they don't want, they can't and they operate against changes) [4, p.10].

In N. A. Ilyina's (1985) opinion, a person's attitude to a new depends on affect of mechanisms of social perception and a human's personal qualities. The display intensity of each of three psychological components (motivational, cognitive and behavioral) influences the innovations perception owing to what people perceive the same changes in different ways [22]. To our mind, for efficiency of the innovative projects realization the timely distinguishing of participants of innovative situation dispositions and their change during introduction is necessary. From the point of view of psychological regularities, the situation is getting complicated because it is not one person, as a rule, but a group of participants who are engaged in the introduction of innovations. In this case there is a necessity of research of psychological regularities of separate participants' integration into one completed formation with the cumulative subject and the organization of joint activity characteristics. For this reason one of the primary goals in the innovative process is the problem of one "team" creation which will integrate people of various social-psychological types.

The problem of one "team" creation has been considered in applied psychological researches (A.L. Zhuravlyov, N.A. Ilyina, E.A. Iskanderov, J.D. Krasovskiy, A.N. Lebedev, A.I. Prigozhin, B.D. Sazonov, O.S. Sovetova, etc.) for a long time enough. The great materials concerning both social-psychological and personal peculiarities of the people making a "team" has been received. The important principles of a project team functioning are the following: the unity of a purpose, the professional and human solidarity, the confidence in necessity and utility of the activity out of dependence on results [9, 11]. It's known that the authoritative style of management in innovative activity conditions is impossible. The status of a member of a project group is defined by the value of his ideas, by his creative abilities, the flexibility of his thinking, by his readiness for risk and by other similar factors unlike the traditional divisions (seniority in official hierarchy, high income, education, knowledge and experience, etc.). Managers of a project have the similar situation: being under the lower status than the top management of the organization, he knows the certain situation better; he is able to put forward more constructive ideas and to apply more successful methods for the fastest realization of a project [9, p. 163].

E.V. Chernetsova (2001) also points out that in work of research groups «it is necessary to observe rational approaches to the solution of problems, to the estimation of



group members' behavior and to productivity of their work as a whole. On the quite rationale basis the formal operative system of purpose establishment, project planning and making decisions, which should integrate optimally creative individualities, informal methods and non-standard approaches, is created. Planning, administrative decisions and control create the basis inside of which there is a creative and role distribution of "team" participants [9].

For successful functioning of any social group the roles distribution is necessary: participants of a project team with purposeful roles select group problems and carry out them [15]. Functions of the given "team" members usually include the initiation of ideas, a new statement of problems, an information search, the study and forecasting, the co-ordination and generalization of ideas, considerations, opinions. The behavior directed on the maintenance and activization of a group life activity is expected from participants with supporting roles, they establish the criteria of work, estimate the decision, develop substantial and procedural actions, estimate the contribution of each group member, express the attitude, form the opinion of a group, execute the installations of a group, coordinate the opinions and emotions of group members [18].

Effective work of innovative group is promoted by an atmosphere of trust and participation, stimulating the workers to creativity. Positive interaction in a group is one of conditions of a project realization since in scientific collectives the individuals can have contradictory intentions. Interpersonal contacts in innovative groups can bring an additional uncertainty in the time of an innovation realization. It is important for a project manager to generate the positive group norms including pride for the organization, aspiration to collective work, the aiming at achievement of objects, high professionalism, etc. High rallied groups are characterized by a high level of dialogue, understanding and consent. Just here the micro social environment for successful creativity and realization of innovative alternatives is created [9].

Thus, during the innovative project realization the social status of a project group as a system is gradually forming, where there is a new role distribution, a group dynamics and a social interaction, where the norms of social adaptation operate, the certain functions and norms, concerning both internal and external environment, are carried out.

The innovative climate in a zone of introduction which is influenced, in O.S. Sovetova's opinion, by various factors, in particular, the scales of innovations introductions into the branches, the previous experience of a company and the attitude to innovations influences, affects a positive effect expected from innovative changes. The large innovation will hardly be successful if it is not supported both above and below since potential profits can't always be obvious to people [22, p. 38].

J.D. Krasovskiy, having analyzed both native and foreign practices, has shown that the control system of innovative communications is effective if it is capable not only to react to emergence of dangerous situations, but also to work for prospect in a selfadjusted mode. This innovative program allows to accumulate the bank of initiative offers with market needs outstripping for necessary initiatives would always be in a concept of organization management and

stock, i.e. the matter is in the marketing concept of organization management and search of internal resources of development. «But there it is necessary to overcome many psychological barriers. Any innovative program is realized contradictorily, as it is carried out by workers with a different level of preparation for innovations and a wide range reaction to reorganization: from initiators up to conservatives» [11, p. 295].

J.D. Krasovskiy emphasizes that in the innovative system the head is transformed from the administrator-functionary in to the leader: the peculiarities of management and leadership are intertwined. Efficiency of activity is mostly defined by what measure the heads are reoriented to the innovative style of management [11]. By means of a role approach J.D. Krasovskiy describes six behavioral types that take place in the innovative process:

- Innovators are initiators who offer and defend their own ideas and can often go on the conflict, struggling for their realization;
- Supporters of innovations are those who perceive a new very quickly when they're persuaded of its importance;
- Hesitated to innovations are employees who either don't understand clearly their (innovations) importance, or see more positives, than negatives. Sometimes it's difficult for them to estimate an innovation as they understand its sense badly or easily estimate it as a contradiction, trying to examine first of all that facts, that don't match the standard measures;
- Neutralists are those who're indifferent to new offers, under some conditions they can take a conforming position.
- Skeptically disposed are those employees which look, first of all, for negative consequences in innovations, but they can accept an innovation as something inevitable, under the majority's opinion pressure.
- Conservative to innovations are those who show the resistance to new. In this case traditionalism dominates in perception of innovations; they can perceive a new only when it becomes a tradition [11, p. 287].

O.S. Sovetova has the similar position; she suggests distinguishing the aim orientations of participants of the innovation that are expressed in their position to the innovation. On this ground she differentiates the participants on corresponding role groups - innovators, organizators, manufacturers, users; positions of the given groups to an innovation are defined as initiative, co-action, counteraction, inactivity [22, p. 64].

Perception of innovations, to our mind, is similar to the skill to reflect a new and to enter it in the world image. In this case the participants' joint activity has an significant influence on this process, motivating everyone. In A.K. Belousova's research (2002) it has been shown that in joint cogitative activity there is a role distribution in groups during the solution of problems. Accordingly, joint cogitative activity is possible in the form of role functions distribution between participants: generation, selection, sense transference, realization. There are corresponding role positions to these functions: the generator, the critic, the coordinator, the realizator [1].

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The given role positions of participants in joint cogitative activity coincide to positions of participants in innovative process. We suppose that innovative process, in its psychological sense, is based on joint cogitative activity since it assumes the perception of contradictions, the new (innovations), the development of the decision (innovative), the work in a team in which the advantages and disadvantages of a decision or a project are estimated, the efforts of each participant are coordinated, the realization and the embodiment of an innovative project into the life is carried out.

We suppose that this division of participants into positions is connected with a psychological readiness for innovations acceptance. The psychological readiness of a person for innovations acceptance depends on type of a person. So that innovative technologies might become a reality for a person, they should be entered in his world image, become a new formation in his consciousness. We connect the innovation acceptance with the functioning of a person's thinking, with his readiness to start thinking. It is possible to speak that the perception of an innovation is a cogitative process beginning with estimation of an innovation and finishing by decision making. Estimation of an innovation is important in its acceptance or rejection and this estimation first of all depends on judgement of an opportunity to use the innovation.

In B.V. Sazonov's (1980) opinion, an innovator has a key position in the innovative process. As a rule, the positions are grouped on two lines of opposition: on an opposition line of the «denying» and the «supporting» an innovation and on the basis of opposition of the «potential developers» and the «potential users». All other positions are less obligatory, the same member of the organization can take place a few positions simultaneously [21].

If we generalize characteristics of a manager-innovator existing in the psychological literature it is possible to distinguish the following peculiarities: he has a high internal motivation, sees sense and necessity of changes, can create and improve communicative processes in the organization, he is included in activity, the orientation to success dominates. From the point of view of intellectual processes development, this kind of a manager has a flexible thinking, a skill to analyze a situation and to make decisions adequate to it, a skill to reconstruct activity (both, his and his employees) according to objectively arising factors.

The analysis of personal qualities peculiar to a manager-innovator, according to various authors (J.D. Krasovskiy, O.S. Sovetova, A.B. Titov, E.V. Chernetsova, etc.), allows speaking about the presence of behavioral flexibility which depends on a level of inclination to risk and a level of rigidity. The inclination to risk and the rigidity are rather steady person's characteristics and influence on making decisions during activity.

On the foundations of the given theoretical thesis we have assumed that the managers, accepting innovations, have a more expressed level of development of inclination to risk and a low level of rigidity development. We've carried out a research the object of which was the attitude of potential managers (students of IMBL (Institute of Management, Business and Law), Rostov-on-Don – economists, lawyers, practical psychologists specialized in psychology of business) to smart-cards-technologies that are a demanded innovation in conditions of the Russian market [16]. There were 152 students in the research. To study the attitude to innovations we've worked out the questionnaire consisting of 2 blocks of questions. The first block is directed on revealing the examinees' idea of plastic cards and their use, the second block diagnosticates the examinees' attitude to possible application of a smart-cards-system in IMBL. On each question the points, describing the students' acceptance of an innovative technology, have been counted. On the basis of the respondents' answers three groups of students have been formed: with a high, average and low level of acceptance of innovations. To research a degree of readiness for risk and a level of rigidity we used Schubert's methods of diagnostics of a readiness degree for risk and a method of rigidity measurement [20]. The results are presented in Table 1.

Table 1

Level	Psychological readiness for innova- tions acceptance	Inclination to risk	Level of rigidness
High 5 %	26,75*	11,13*	27,13*
Average 59 %	17,62*	4,74*	28,70*
Low 36 %	10,68*	-3,40*	29,66*

Peculiarities of inclination to risk of students with a different level of innovations acceptance (average value)

*Distinctions are significant at a level of the statistical importance $p \le 0.05$ and $p \le 0.01$

The students, accepting innovations and seeing their expediency, have a high level of inclination to risk (11,13) and a low level of rigidity (27,13). In average group, the most numerous (59 %), the guarded or neutral perception of innovations, an average level of inclination to risk (4,74) and an increased level of rigidity are marked (28,70). And in the third group of students, rejecting the innovative introductions, we observe the presence of a low level of inclination to risk (-3,40) and a high level of rigidity (29,66). That is, we have got the results showing that the future students – managers, accepting the innovations, have a lower level of rigidity and a higher inclination to risk in comparison with the students rejecting innovations or perceiving them guardedly. Thus, it is possible to claim that supporters of innovations are characterized by flexibility and mobility of thinking connected with such qualities as a low rigidity and a high inclination to risk.

Innovations development and introduction are connected with innovators' active work. We suppose that innovators have much more expressed inclination to risk and low rigidity behind which there is flexibility and mobility of thinking. In that case it is possible to claim that innovators have a dominated initiative style of thinking in the profile of cogitative styles. This assumption has been made on the basis of the description of initiative cogitative style in A.K. Belousova's research. In A.K. Belousova's work four styles of thinking are distinguished: 1) initiative style with a domination of generation function; 2) critical style with a prevalence of selective function; 3) administrative style with a prevalence of sense transference function; 4) practical style with

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a domination of realization function [1, p. 303]. In the structure of individual thinking regulation there are all functions, thus a dominating function determines an orientation of thinking. In A. K. Belousova's opinion «initiative style of thinking is characterized by the directed search of contradictions, the discovering of problems and is displayed in ability to put forward various assumptions and hypotheses» [1, p. 298]. Initiation of thinking is observed. «It is a leading moment of any activity, «starting» undertakings. People, for whom function of generation has become a person's feature, are characterized by ease and variety of produced ideas, of qualities connected with flexibility of switching from one idea to another. The aspiration to find out problems motivates activity of such people. As a rule, «the generator» aspires to make a complete representation of a problem, to elaborate a strategy (plan) of the decision» [1, p. 303].

To determine the basic personal properties, making the motivational block of a person with initiative style of thinking, one of us has carried out a research among the employees of the building organization, introducing innovative technologies [2]. 50 persons were selected. Among them 27 persons are employees of a Road-building firm №5, a field of activity of the given organization is construction and reconstruction of roads and road objects, 23 persons are employees of «Basis» ltd., a field of activity of this organization is construction and reconstruction of dwelling and public buildings and constructions. We have assumed that among the employees of the organization having initiative style of thinking those motivational qualities which characterize a person's need for self-development and self-actualization have been developed, since it was shown in our previous researches (A. K. Belousova, 2002), that the generation of ideas is connected with the need for achievements, with domination of an orientation on a problem. According to the given assumption we have diagnosticated the specified motivational qualities. In the research we used: A. K. Belousova's questionnaire «Style of Thinking» [1], A. A. Rean's methods «Motivation of a Success and Fear of a Failure», V. Smekal and M. Kucher's methods «The Orientation of a Person», J. M. Orlova's methods «The Need for Achievement» and a methods «Motive of Authority» [6]. The results are presented in table 2. In our research there was only one person with critical style of thinking among employees. According to this fact the results on the given style of thinking are not presented in Table 2.

Table 2

of the building organization employees with unrefert style of thinking								
Style of	Motivation of success	Need for	Mo-	Orientation				
thinking	achievement and	achieve-	tive of	on	on	on a task		
	of failure avoiding	ment	authority	oneself	mutual			
					relations			
Initiative	14,00	12,57	14,57	30,86	25,57	33,86*		
Administrative	13,25	13,81*	15,44*	33,63*	31,06*	25,56		
Practical	14,52*	12,70	14,81	29,93	29,52	30,48*		

Peculiarities of motivational qualities development of the building organization employees with different style of thinking

*Distinctions are significant at a level of the statistical importance $p \le 0.05$ and $p \le 0.01$

The analysis of the results allows noticing the following. Domination of an orientation on a task (30,48) and prevalence of achievement of success motivation over avoiding of failure (14,52) are characteristics for employees with practical style of thinking. In other words, for representatives with practical style of thinking the solution of a problem is connected with aspiration of achievement of success. Interesting results concern administrative style of thinking among motivational qualities of which the motive of authority (15,44) prevails, then the need for achievements (13,81) and the orientation on oneself (33,63). Thus, the presence of authority, achievement and oneself presentation as the basic subjects of motivational influence are significant for representatives with the given style of thinking. For employees with initiative style of thinking such peculiarities in motivational sphere as prevalence of the orientation on a task (33,86) are characteristics. So, it is possible to tell that in the basis of initiative style of thinking there is a personal quality - the initiative, being the form of expression of a person's cognitive need, his need for actualization of himself through the solving of the tasks, this fact determines a high level of their innovative potential. Thus, we can speak that a task, a problem situation as a subject of cognitive need prevails among people with innovative style of thinking, i.e. this quality of motivational sphere dominates over other motivational qualities describing innovative style of thinking.

The further analysis of thinking and style of thinking peculiarities of a person in conditions of innovative process assumed the studying of managers' peculiarities. It is known that the level of innovative potential is connected with efficiency of innovative process managers' activity. On the foundation of the given position we have assumed that innovative managers are more successful in professional work. E. L. Molchanova's research (2005) has allowed revealing gualities of a successful and unsuccessful manager [17]. In the experiment there were 60 managers of Rostov-on-Don two building firms «Plastic» ltd. and «Dis» ltd. The following methods have been used: a method of expert judges and diagnostic methods: A. B. Orlov's methods «Need for Achievement»; N. F. Kalinin's «The Questionnaire of Person Self-actualization» [6]; A. K. Belousova's methods «Style of Thinking» [1]. Personal and business gualities providing success of activity have been determined by means of expert interrogation. On the basis of some researches analysis (G. S. Nikiforov, I. J. Satskiy, R. L. Krichevskiy, etc.), we have established criteria of a manager's successful activity: 1) he successfully solves tasks on a wide scale of intensity figures from monotonous up to high intensive level of his activity; 2) he is personally inclined to profession, is motivated to work in it, is satisfied by his position in the given sphere; 3) he reaches desirable results in his activity proceeding from the requirements shown to him; 4) in his activity he uses necessary ways and technologies, independent accumulation of new professional methods and technologies; 5) he opens up demanded norms, standards of a profession, he reaches a skill in it; 6) he aspires to individualize his work, and also consciously develops his individuality by means of profession. Personal competence; 7) he reaches a certain level of professional personal qualities, knowledge and skills. Professional independence and self-development; 8) at the same time he has and realizes the prospect, a zone of his

professional nearest development, does everything for its realization. He knows about criteria of a professional's personal development; 9) he is opened for constant professional training, accumulation of experience, change. He has professional thinking and professional training; 10) he is devoted to the profession, aspires to support his honor and dignity even in difficult situations; 11) he can approach creatively to the decision of arising problems and setting tasks; 12) he is ready to a qualitative and quantitative estimation of his work, can do it himself, is ready to the differentiated estimation of his work in points, categories, and he is ready to take part in professional trials, tests. He has a necessary style of reaction to changes of vital professional circumstances.

Among all variety of business qualities the profile of a successful manager's business qualities has included qualities which directly characterized a manager's behaviour in innovative conditions, mainly: the skills to solve tasks successfully and operatively in any conditions of activity, the getting of new knowledge and skills, the use of new non-standard methods and techniques in his activity. At the same time, a profile of an unsuccessful manager's business qualities didn't include the given characteristics. According to these two groups of successful and unsuccessful managers, rather interesting results, concerning their system of thinking style peculiarities of development, have been received (Table 3).

Table 3

Managers	Style of thinking				
	Initiative	Critical	Administrative	Practical style	
	style	style	style		
Managers with high successfulness	43,57*	35,10	35,70*	43,30	
Managers with low successfulness	37,20*	36,37	45,00*	44,60	

Peculiarities of successful and unsuccessful managers' style of thinking.

*Distinctions are significant at a level of the statistical importance $p \le 0.05$ and $p \le 0.01$

For managers with high successfulness a domination in the field of initiative style of thinking (43,57) and practical style (43,30) is characteristic, and also administrative style of thinking (35,70) and critical style (35,10) are not obviously expressed. Managers with low successfulness the prevalence of administrative thinking style (45,00) is observed in the profile of thinking style, practical style of thinking (44,60) is expressed a bit less, then initiative style (37,20) and critical (36,37). In other words, the analysis of successful and unsuccessful managers' style of thinking profile has shown the presence of distinctions in development of styles of thinking profile, for successful managers the leading styles of thinking are practical and initiative styles, and for unsuccessful managers practical and administrative styles of thinking dominate. In our opinion, expressiveness of each of the styles in both groups of managers is also interesting, the maximum divergences in figures are observed in initiative (successful managers – 43,57, unsuccessful – 37,20) and administrative (successful managers – 35,70, unsuccessful – 45,00) style of thinking, critical and practical styles of thinking are expressed in both groups practically equally. Thus, generalizing the received results, it is possible



to confirm that people having initiative style of thinking - innovators play the most important role in starting an innovative process, further «introducers», having a practical experience of an innovation adaptation, follow. And, the given two positions can coincide, that is these functions can be carried out by one person.

The analysis of the researches results has put some questions, demanding, in our opinion, the further development. These questions concern, first of all, the problems of selection of project team participants at different stages of an innovative project introduction. So, it is quite possible to admit that at each stage of innovative technologies introduction the role of domination is necessary to give to participants with corresponding style of thinking: at a stage of ideas generation – to participants with initiative style of thinking; at a stage of applied elaboration – with critical style of thinking; at a stage of selling – with administrative style of thinking; at a stage of manufacture – with practical style of thinking.

Thus, generalizing everything that was said above, it is possible to speak that representatives of all styles of thinking take part in innovative process. Efficiency of the innovative introduction depends on correct distribution of human resources considering the domination of cogitative functions at all stages of development and introductions of innovations. On the foundations of the researches we can confirm that people, easily perceiving innovations, have a low rigidity and a high inclination to risk. Successful managers, easily perceiving and introducing innovative technologies, are characterized by prevalence of initiative and practical style of thinking, though for other employees of the organizations, introducing innovative technologies, prevalence of practical and administrative style of thinking is characteristic. As a whole, for managers' features with different style of thinking we can distinguish the following motivational qualities: orientation on the task dominates with initiative style of thinking; motive of authority, need for achievements and orientation on oneself prevail with administrative style of thinking; orientation on the tasks and aspiration of success achievement dominate with practical style.

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