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DIGITAL TECHNOLOGIES
OF INTELLECTUAL COLLECTIVE ACTIVITY

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Abstract. Digitalization of the economy leads to an increase in the share intellectual activity and primarily collective activity in the enterprises. In the digital economy business success will depend on the effectiveness of collective intellectual activity organization. The work is devoted to the analysis of technologies of collective activity organization using digital communications. It is showing the differences of these technologies from crowdsourcing, which is the basis of the systems of ideas management. Digital technologies of intellectual collective activity include competence metrics, take into account differences in analytical and creative abilities of people, require of digital support of cooperation and creative motivation of participants.

Keywords: collective intelligence, digital communications, crowdsourcing.

INTRODUCTION

As organizations adopt digital technologies that reduce the share of routine operations, intellectual work becomes increasingly important in their activities. If earlier non-standard tasks that require new ideas were stayed only for the management of organizations, today such tasks are lowered to lower levels of management. For example, many large modern banks have already created entire departments engaged in digital transformation of business. Dozens or even hundreds of employees of these banks participate in various discussions related to business development, the introduction of new information technologies, the development of new products, etc. Moreover, with the introduction of knowledge management systems in the activities of enterprises and organizations, even ordinary business processes require employees to increasingly use creative and intellectual competencies.

Intellectual activity in the field of innovative development of modern organizations requires collective efforts. Finding unique solutions, and at an accelerated transformational processes rhythm, requires collaborations between staff members, either through projects or through research activities. However, despite the fact that creative and intellectual activity in a modern enterprise is often associated with the introduction of new, including digital technologies, directly in the organization of collective intellectual work, digital technologies are used very poorly. Today, various messengers, public and corporate social networks and chats, e-mail and group video and telecommunications are mainly used for the organization of collective intellectual activity.

In the literature is quite well researched and described [1] network projects (such as Wikipedia, Linux, etc.), in which large communities of specialists work. In the field of corporate activities, research is usually limited to the most widely used network tools of the "community of practice" [2]. However, there is no research on what digital technologies should be in General to support collective intellectual activity. Such technologies are called collective intelligence technologies [3], and they involve primarily an increase in the productivity of intellectual work in group work. This work is devoted to the description of collective intelligence technologies.

METHODS

To identify the main characteristics of digital technologies necessary for the effective organization of creative intellectual

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activity, a comparative study of group work using network messengers and chats was conducted. One group used the messenger just for communication of its participants, and the other group used it within the given algorithm of work and with the use of the competence model. The nature of group work (involvement of all participants, uniformity of work in time) was compared, which allowed to identify the role of the use of given processes in communications and competence metrics. This method was used in [4].

In addition to the study of work in groups, mathematical models of collaboration of experts were built both within groups and in the division of labor between the two experts. The mathematical model of the group of experts takes into account the competence metric and allows you to calculate the effective group IQ. Expert collaboration models allow to evaluate the effect of combining experts with creative and analytical skills, as well as the effect of the use of peer review in collective work.

RESULTS

A comparison of the work of two groups of experts who performed research work showed that experts who used a network messenger as usual communications among themselves, worked very unevenly over time. Communication between them arose spontaneously, as a rule, after initiation of discussion by one of the participants. In addition, the involvement of participants in the network communication was also very uneven, some experts did not participate in the discussions, and some – on the contrary, occupied most of the communication "ether". In the group of experts, the tasks between which were distributed according to their competencies, and the algorithm of joint work was clearly spelled out, communication in the network was much more uniform, since it was initiated not so much by the participants as by a given process. Similarly, the involvement of participants was also more uniform, there were no those who did not communicate with colleagues.

The calculation of the mathematical models of collaboration of experts showed that the productivity of group work can be increased significantly by taking into account the competence of experts. At the same time, each of the participants can show both outstanding performance indicators, if he has narrow unique competencies necessary for solving a group task, and smaller indicators, than he worked alone. Models of group work of experts showed the possibility of reducing the time of solving the problem several times with the right combination of an expert with creative abilities and an expert with analytical capabilities. At the same time, the time of using an expert with creative capabilities is many times lower than the time of using an analyst, which makes it possible to talk about the need for more analysts in group tasks. Evaluation of the effectiveness of the use of peer review in group intellectual tasks shows that this kind of collaboration can increase the quality of the problem, if the solving has a time limit.

DISCUSSION

The obtained results allow us to draw conclusions about the characteristics of digital technologies necessary for the effective organization of creative intellectual activity. First of all, for the organization of intellectual activity should be used competence metrics, which includes not only the subject knowledge of experts, but their propensity to creative or analytical work, the ability to work in a team, management skills, etc. A very important characteristic of collective intelligence technologies is the relationship between the stages of the problem solving process and the model of participants ' competences. In fact, this means that the technologies of collective intelligence are significantly different from crowdsourcing technologies, in which the processes of solving problems are not related to the competencies of the participants.

It is very important to combine experts with analytical and creative abilities in time. It is advisable to entrust the formulation of the problem and the search for ways to solve it to an expert who has creative abilities, and

it is better to entrust the work to an expert who has analytical skills. At the same time, it is very important in intellectual activity to use in the last stages of solving the problem of reviewing, which allows you to complete the work with rock and higher quality. Thus, the division of competencies is important not only from the point of view of the division of tasks in the expert group, but it is also important to build a phased solution of problems. Digital technologies of collective intelligence should allow the correct distribution of work in the group.

It should be noted that digital technologies of collective work do not mean digital communications. They should make it possible to properly organize the division between experts in the group and in the sequence of the decision, but the communication between experts can be carried out both using electronic means of communication (e-mail, messengers, network chats) and in personal communication. The main condition for the effectiveness of collective intellectual work is trust between the participants, which requires information transparency of all collaboration tools. In intellectual activity, creative motivation is much higher than in other activities, and increasing efficiency using digital instruments for teamwork increases motivation. Thus, the effectiveness of the use of digital technologies in collective intellectual work by increasing motivation will be even higher.

The paper describes the main General characteristics of digital technologies necessary for the effective organization of creative intellectual activity. Of course, further more detailed study of such characteristics, the study of existing examples of their implementation in the activities of organizations is required.

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