The Evaluation of Accessibility of the Medical Services on the Basis of Working Time Organization in the Digital Economy Society

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Abstract. In the article the authors estimate the accessibility of the quality of medical services on the basis of double questionnaires of the medical staff working for a range of clinics of the city of Moscow. On the grounds of the questionnaires it is revealed that under the condition of the digital technologies introduced in the clinics’ routine, the labour relations do evolve, and such evolution causes the necessity of adaptation of labour and civil laws to the changed social and economic relations in the field of medical services in favour of some more flexible forms of labour organization.

1. Introduction
In the modern conditions there do happen some drastic changes in the field of socioeconomic relations, these changes being related to the development of digital technologies. In the Russian Federation one of the priorities in the development of the economy is the development of the digital economy. At that, according to the authors, in the process of diffusion of the digital technologies in the economy, some changes in the correspondent legislation regulating different aspects of relations between the subjects of economic relation are vital. The digital transformation of the medical services in Russia constitutes one of the directions of the realization of the “Digital economy of the Russian Federation” program dated 28 July 2017, No1632. During the previous years there was formed a uniform state medical information system operating in 83 regions; there were amendments adopted to the Federal law No323-FZ “On the fundamentals of healthcare of the citizens in the Russian Federation”, regulating the relations arising from telemedicine application; there indeed is the integration of the electronic medical record into the functioning of the healthcare system; there are some other technological novelties.

However, as the diffusion of the digital technologies is taking place in the healthcare system, there also appear a number of problems arising from the need in formal and informal institutional adaptation of the subjects to the new technologies. Thus, the digital medicine does develop in the modern conditions, but the legislation regulating here different spheres of labour and economic relations, doesn’t evolve on time. In particular, there are legal gaps in the standards of labour relations for the medical staff, these standards being related to the remote medicine usage, also to virtual hospital rounds and shifts, to the use of mobile applications etc. (telemedicine). It is also possible that there might be a widely debated in the professional sphere effect of the so-called “over-information” of the medical
staff, based on the overwhelming volumes of incoming and processed information, which leads to stress and psychological fragility, and to the so-called “professional exhaustion” – i.e., to the loss of interest in the work performed. All this demands additional research in the field of functioning organization of the clinics in the Russian Federation, in order to ground and to introduce correspondent amendments to the labour and civil legislation on the principle of flexibility of institutional projects in the scope of the current economy, where the most up-to-date digital technologies are used.

2. Methodology of the research and hypotheses
Given the norms and rules of the institutional regulation for labour relations stated in the Labour and Civil codes of the Russian Federation, and also the results of questioning the medical staff the authors mark the following four basic models of time-management:

M 1 - the basic – a classic variant of employment for a member of staff. The employment results in conclusion of an employment contract, there is also an employment record. The working hours, the working timetable and the working duties are fixed in such a contract.

M 2 – the basic contractual – the employment results in conclusion of an employment contract, but no entry in an employment record is made. According to the laws, this could happen in case the employee starts another job on a part-time basis.

M 3 – contractual – the de-facto labour relations are nevertheless presented in the form of civil ones, i.e, as a service or refit contract. As an example, we could name a manager contract, with the legal nature of a service or a refit one. They employment can be for an exact period of time or for an indefinite one. Flexible working time might occur.

M 4 – hybrid – other employment schemes and time management. This group includes implied contracts – oral arrangements, remote work, service or refit contracts and other forms of outsourcing. There could be no strict regulation of working time; the main item is the on-time result of the work.

The following research hypotheses are made: 1. The introduction of digital technologies increases the accessibility of the medical services and requires also introduction of flexible methods of time-management of the medical staff; 2. The lack of medics and the increase in their individual workload (given the digital economy) require correspondent changes in the labour legislation.

3. The composition and the estimation of the research tools
The time management methods specified at the first stage of the research confirmed the possibility and need in the further investigations aimed at quantitative estimation of the effectiveness of the time management methods in particular medical structures given the conditions of digital technologies use. At this stage we use a set of two questionnaires including:

1. Professional questions for medic staff aimed at effectiveness of a specific time management method;

2. Questions on accessibility of medical services for the clinics’ patients.

The questions of the first questionnaire are organized into several modules according to their theme, whereas: module A – “working time”, module B – “estimation of effectiveness”, module C – “productivity”, module D – “accessibility”, module E – “quality”, module F – “other elements of management”, module G – “human resources management”. Subsidiary tool, or the second questionnaire, consists of two parts, whereas part A is “working motivation of the medical staff” and part B – “accessibility of the medical services in the framework of digital technologies”. Both questionnaires include questions requiring a reply conforming to the Likert scale, which allows the respondents to describe their relation towards each of the questions in a block as: “definitely agree”, “likely to agree”, “cannot state it exactly”, “likely to disagree”, “completely disagree”.

4. The discussion of the research results and formulation of conclusions
Upon processing the questionnaires the raw data is obtained, given the modernization of the research tools on the basis of a number of statistical methods and factor analysis, in the direction of getting more accurate figures for estimation of applied methods for time management in the chosen clinics.
and with the help of the program software STATISTICA. During the initial stage of the analysis the attention is focused on the general estimation, on the time management methods used in clinics according to the above stated modules (working time, estimation of effectiveness, productivity, accessibility, quality, other elements of management). The necessary data is grouped in Table 1 (the reply figures ranged from 1 to 5).

Table 1. The results of questionnaires processing.

| Integrated factor                          | Number of objects | Average figure | Median quartile value | Top quartile value | Average square deviation | Min    | Max    |
|-------------------------------------------|-------------------|----------------|-----------------------|--------------------|--------------------------|--------|--------|
| Working place comfort                     | 35                | 2.23           | 1.33                  | 1.67               | 3.33                     | 1.19   | 1.00   | 5.00   |
| Quality of a medical service              | 35                | 3.39           | 3.00                  | 3.67               | 4.33                     | 1.14   | 1.00   | 4.47   |
| Organization of labour                    | 35                | 3.07           | 2.00                  | 3.33               | 3.67                     | 1.10   | 1.33   | 5.00   |
| Selection of methods of labour            | 35                | 2.81           | 1.67                  | 2.67               | 4.00                     | 1.18   | 1.00   | 4.67   |
| Contract performance                      | 35                | 2.18           | 1.33                  | 2.00               | 2.67                     | 0.85   | 1.00   | 4.75   |
| Realization of goals                      | 35                | 3.16           | 2.75                  | 3.00               | 3.50                     | 0.79   | 1.75   | 5.00   |
| Doctor’s appointments                     | 35                | 3.47           | 2.50                  | 4.25               | 4.50                     | 1.41   | 1.00   | 4.75   |
| Level of hospital treatment               | 35                | 3.15           | 2.25                  | 3.50               | 3.75                     | 0.98   | 1.00   | 5.00   |
| Traditional appointments                  | 35                | 2.54           | 1.60                  | 2.00               | 3.20                     | 1.25   | 1.00   | 5.00   |
| Appointment with use of digital technologies | 35            | 2.01           | 1.33                  | 1.67               | 2.33                     | 1.13   | 1.00   | 5.00   |
| Quality of service                        | 35                | 2.52           | 1.75                  | 2.25               | 3.00                     | 1.00   | 1.00   | 5.00   |
| Medical effect                            | 35                | 1.53           | 1.00                  | 1.50               | 2.00                     | 0.50   | 1.00   | 3.00   |
| Other elements of management              | 35                | 2.63           | 1.60                  | 2.40               | 3.00                     | 1.27   | 1.00   | 5.00   |

Source: own elaboration.
The analysis of the data presented in Table one on the module “Working time” (integrated factor – working place comfort) shows that the average index of the replies is 2.23 with the median 1.67. This means that the respondents are highly likely to agree with that the “set” and applied in the clinic given working time methods based on the current provisions of the ministry of health and of the labour legislation do not create a high level of comfort at work and thus they should be amended in order to set better level of achieving the goals of a clinic’s functioning. In respect to the question of quality of a medical service the respondents believe that the existing time management methods are highly like not to affect the quality of services. The average figure for this integrated factor equals to 3.39, given the median of 3.67. At these indices approximately 25% of the respondents did not have their own opinion regarding the matter (the value of the low quartile did not exceed 3), and 75% do not notice any negative effect (the value of the top quartile is 4.33). It seems difficult for the respondents to estimate the factor of “organization of labour”. The average index here equals to 3.07 given the median 3.33, which means that the respondents used the clue “likely to agree” (the value of the low quartile is 2), and 75% of the responses submitted are “cannot state it exactly” and “likely to disagree” (the value of the top quartile is 3.67). It is hard to estimate the current organization of labour, as the latter has not undergone any significant changes throughout a significant period of time, and there are no alternative examples for comparison; moreover, the staff is not interested in organizational and administrative issues of a clinic functioning, as their main task is to treat the patients. The same difficulties the respondents faced when estimating the factor of selection of methods of labour. They are not able to define which methods are the best: the current traditional or the new ones, those brought by the digital economy – for instance, the telemedicine. In their turn, the facts of introduction of working schedules management in the framework of the telemedicine are of subjective character, as they are realized by the head staff without prior consultations with the experts and in most cases the ordinary staff that uses the telemedicine mode is not satisfied with the working conditions and the time management methods. This is supported by the following data: the average index of the replies here is 2.81, given the median of 2.67, at that about 25% of the respondents have given the clue of “definitely agree” or “likely to agree” (the value of the low quartile is 1.67), and 75% do not notice any negative effect (the value of the top quartile is 4).

The analysis of the data related to the module Estimation of effectiveness (integrated factor is contractual performance) reveals that the respondents are likely to agree with the existing time management method and they believe that the traditional methods allow to use the specialization of the staff effectively and to work normally in accordance with the current laws. Here we are to draw the attention to the following data: the average figure on the replies is 2.18, given the median of 2. The value of the low quartile is 1.33, or 25% gave the clue of “likely to agree”, where the value of the top quartile is 2.67, that is approximately 75% of them preferred to mark “cannot state it exactly”. It is somewhat more difficult to define the factor “realization of goals” for the respondents, it means that the correlation between the indices for the goals of functioning set by the public health authority and the factual importance of such goals in a particular clinic. The average index here is at the level of 3.16 at the median of 3. This means that, to our mind, the respondents in this case do not have a solid opinion too, as it is nearly impossible for the staff to estimate the correlation between the goals set forth by the heads of the health state bodies in the Russian Federation and the specific goals of a particular clinic functioning. Such estimation reminds that related to the factor of organization of labour. The values of the low and the top quartiles (2.75 and 3.50 accordingly) show that the head staff of the clinics do not pay enough attention to the participation of the ordinary staff in organizational and administrative activity, which however is beyond their everyday duties.

When estimating the Table 1 data related to the module Effectiveness, we have primarily investigated into the factor of “doctor’s appointments”, interpreted as the influence of the newly time management method being introduced on the continuity of the appointments, the time spent on an appointment and the medical procedures. In this case the respondents think that the existing traditional time management methods do not affect the appointments, in no way limiting them. They also do not agree with the common belief that the traditional system causes ungrounded refusals in doctor’s ap-
appointments or lengthens the waiting time before the appointment, and also that the use of, for example, telemedicine may substantially change the given situation, also improving the level of accessibility of the medical services. The following statistical data supports this idea: the average index of the replies here is 3.47, given the median of 4.25. This means that 25% of the respondents marked the clue of “cannot state it exactly” (the value of the low quartile is 2.50), whereas 75% of the respondents replied “likely to disagree” and “completely disagree” (the value of the top quartile is 4.50). Somewhat similar reaction of the respondents is caused also by the replies to the questions characterizing the factor of “level of hospital treatment”, understood as the correlation between the increase in demands of the ministry of health of the Russian Federation in the framework of use of the new forms for organization of working time and the indices of the hospital treatment, the number of patients received and the expenses on the healthcare. The respondents so not agree that the new methods of time management in the digital economy would decrease the indices of hospital treatment and the average time of waiting for hospital treatment. These theses are described with the following data from Table 1: the average meaning of the answers is at the level of 3.15, given the median of 3.50 and the corresponding quartiles – 3.15 and 3.75.

The analysis of data related to the module Accessibility (integrated factor is traditional appointments) reveals that upon estimation of this module the respondents showed mostly positive opinions, as the average figure here is at the 2.54 level, given the median of 2.00. This level might signify that 25% of the respondents agree with that the existing rules of working time organization allow to fully providing the accessibility of the medical staff for the people in order to get medical services; they are nearly all received during the working day, and their needs are completely satisfied. Also the respondents agreed that the infrastructure of the clinics is fully used, according to the current needs of the patients; at that minor clinics possess poorer infrastructure characteristics. It is supported by the following data: the value of the top quartile is at 3.20, which means that 75% of the respondents did not overcome 3.20 figures, that is the clue “likely to agree” was marked more often. As to the integrated factor of appointment with use of digital technologies (special mobile apps for primary diagnostics, computer administration in clinics, use of robots-medics and robots-surgeons – DaVinci, telemedicine etc.), the survey data show that at the moment of the survey the institutional ambient of the clinics was not completely ready to use the above mentioned technologies and adaptation there to of the special time management methods possessing the M4 model features. It is supported by the data of Table 1, whereas the average reply are of 2.63 level, given the median of 2.4, and nearly 25% of the respondents marked no more than 3 points there. Taken the particular interest of our research towards this very integrated factor, further, in order to broaden the research limits we would apply additional methods for research (the analysis of elasticity of an organizational project to the economy ambient) and a wider volume of information.

When estimating the data of Table 1 related to the module Quality (integrated factor is Quality of service) we assessed the influence of the time management method being introduced on the quality of the medical service, also the use of the most up-to-date medical technologies, the quality of the medical staff work and the extent of satisfaction of the patients. The respondents estimated the factor in question at the average level of 2.52, given the median of 2.25. The obtained figures characterize, according to the respondents, a considerably high level of quality of medical services and a wide accessibility of the medical technologies for all the patients. The other tool for this module is Medical effect. In this case the respondents are pretty much sure that the existing standard time management methods in the framework of modules M1 and M2 allow to deliver special medical services at the highest possible level together with high quality of maintenance. This is grounded by the average figure of 1.53, given the median of 1.50 and the values of the low and top quartiles at 1 and 2 accordingly.

The characteristics of the module Other elements implies the estimation of the correlation between the time management method being introduced and the possibilities of adaptation of a given clinic to the conditions of the economic ambient, planning, organization of working process, definition of goals and tasks of functioning of this clinic.
5. Conclusion
The research with the results represented in this article shows that upon processing the questionnaires distributed among the medical staff of 35 different clinics of the city of Moscow and upon survey of the patients it may be claimed that the hypotheses stated in the article are true.

The first hypothesis set forth, which was related to the increase in accessibility of the medical services for the patients in the conditions of development of the digital technologies is grounded by the research results. Moreover, the conclusion on the necessity of introduction of flexible time management methods into the clinic schedules also got its arguments for. The survey of the staff and the patients shows that in the process of delivering medical services to the population the traditional time management methods are the most favourable. However it could be stated that with the development of the new types of services implying the use of digital technologies (telemedicine, special mobile apps etc.) the use of flexible time management models – i.e. M3 and M4 becomes more and more relevant.

The second hypothesis is also confirmed – that implying the increase in workload of the medical staff as there are more and more digital technologies being introduced. The main tool for decreasing in the workload should be also the flexible methods of labour organization in clinics, functioning of the basis of model M4. The correspondent changes into the labour legislation the authors would suggest to introduce in the process of its improvement.

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