

# *Informatization of health care: stakeholders interaction*

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**Abstract** — This article focuses on the analysis of theoretical models allowed to explain the reasons of the chronic problems in the field of healthcare informatization. The authors assume that problems are steadily reproduced and are of a general nature. The most important of these ones relate to a lack of interoperability and institutional resistance against implementation of the healthcare information systems by healthcare providers. This article also indicates that implementation of the healthcare information systems can lead not to enhancing but to decreasing the effectiveness of medical care providers work. The authors use the reinforcement theory by K. Kraemer and J. King as an explaining scheme. This theory claims that the main impact of IT application has been to reinforce existing structures of authority and power in organizations and D. Collingridge's model under which there is a tendency in ambitious projects to highly centralized decision making, dominated by large organizations, which are able to exclude many legitimate stakeholders, particularly, end-users. The authors conclude that the problems facing healthcare informatization are a result of submission of this process to the interests of only one stakeholder as healthcare managers without healthcare providers and patients.

**Keywords** — *healthcare information systems, healthcare managers, healthcare providers, patients, stakeholders, dominance*

## I. INTRODUCTION

There are some predictions about a radical break with the current poor practices and rapid enhancing the effectiveness of the relevant systems with the implementation of digital technologies in all areas of society. Such expectations are also placed on healthcare informatization. It is expected that the implementation of information technologies provides enhancing the quality of services while cutting costs, which is of particular importance under a constant increase in the proportion of high-technology medicine.

However, in practice, healthcare informatization is one of the difficult areas of informatization. According to materials on this topic, there is mounting evidence that the implementation of healthcare information systems has resulted in unforeseen costs, unfulfilled promises and disillusionment. Experts dealing with medical informatization from the US, UK, Germany and other developed countries note the unsatisfactory situation with healthcare informatization.

## II. PROBLEM STATEMENT

The whole complex of problems which are steadily reproduced in the process of healthcare informatization the last quarter-century can be identified.

Creation of the unified digital system is not being achieved while the implementation of medical information systems at the level of national healthcare systems. There is a problem of interoperability in the medical field, including two variants such as the lack of interoperability and the lack of progress in interoperability. This stymies efforts of information governance and information/data sharing between organizations and reduces opportunities of using artificial intelligence systems to support doctors' decision-making.

The National Program for Information Technology (NPfIT) of UK National Health Service often acts as a traditional case related to a failure to create a Single Digital Circuit in health care. This program was recognized as the largest civil IT program worldwide at an estimated technical cost of £6.2 billion over a 10-year period (2002 – 2012). The NPfIT's challenge had been to establish a shared health IT infrastructure to embody common functionality for a range of applications including patient care records, appointment booking, prescriptions and a data communications spine to permit record transfer throughout England.

The NPfIT was officially dismantled in 2011, one year before an end date, after a history marked by delays, stakeholder opposition and implementation issues. In doing so, 2019 NHS IT Leadership Survey showed that issue of interoperability remains firmly on the agenda of senior IT leaders across the health service. It was identified as the number one concern by 78% of NHS IT leaders who took part in the survey (84% in 2018) [1].

A failure of NHS ambitious scheme aimed to transform the NHS in England by implementing a centralized digitized health care record for its patients had not prevented realization attempts of similar schemes in other countries, despite repeated warnings that the top-down approach for IT adoption and diffusion is likely to engender feelings of resentment and frustration among healthcare workers, rather than a willingness to adopt and adapt to these changes [2,3].

The problem of organized resistance of medical care providers to the implementation of information technologies is steadily reproduced not only at the level of national healthcare systems but at the level of individual health facilities. For example, in 2007, A. Battacherji and N. Nikmet expressed surprise at healthcare information technologies (HIT) such as

computerized physician order entry (CPOE) systems, electronic medical records (EMR), and electronic prescriptions which are widely expected to reduce medical error rates, improve healthcare delivery quality, and increase staff productivity, are often strongly resisted by the same professionals who are expected to benefit from its use [4].

In 10 years, in the 2016 systematic review dealing with the main barriers to medical informatization, the authors had to note that promises to reduce medical errors, provide more effective methods of communicating and sharing information among clinicians, lower national health care costs, better manage patient medical records, and improve coordination of care and health care quality with information technologies have caused reticence [5]. In the US, even with the incentives offered by the Federal Government, one out of four hospitals in 2014 had not obtained a basic EHR system [6], the remainder have significant problems with their informational systems.

K. Kruse with the co-authors indicated the set of factors that impede meaningful use in effective manner of informational technologies in health care. In their opinion, the most important of these ones is resistance to changing work habits, including high initial cost of medical informational systems and a lack of technical support on the basis of a systematic survey [5].

The reasons of such resistance will become clear, considering that implementation of medical informational systems leads not to enhancing effectiveness of medical care providers work, in accordance with the results of empirical research. A. Gawande indicates that in the US physicians spent about two hours doing computer work for every hour spent face to face with a patient—whatever the brand of medical software in his consolidated article entitled “Why Doctors Hate Their Computers” [7]. The consequence is professional burnout as a combination of three distinct feelings: emotional exhaustion, depersonalization (a cynical, instrumental attitude toward others), and a sense of personal ineffectiveness. In so doing, one of the strongest predictors of burnout was how much time an individual spent tied up doing computer documentation and feeling screen-bound.

The transition from traditional forms of interaction between doctors and patients to telemedicine just exacerbates the situation, especially given the insignificant effectiveness of telemedicine systems. Notably, the main users of such the systems are not citizens of remote or hard-to-reach territories who have difficult problems with health but residents (or rather female residents) of large cities who use e-healthcare system to treat routine and resurgence diseases (for details see the systematic survey [8]), which is completely contrary to the official ideology of telemedicine, as stated in World Healthcare Organization (“the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies...” [9]).

All the listed problems occur in the Russian Health Care Sector. We recall that 32 billion rubles from the federal budget and about 10 billion rubles from regional budgets were allocated to create The Unified State Health Information System (EHISS) in 2011-2012. And 28 billion rubles were spent to support EHISS by regions in 2013-2018. However,

the result is described as a “program zoo’ in which there is not mentioned unity. The realization of the project “Creation of a unified digital health care circuit based on a unified state health information system” in which it is planned to provide the rapid transition to centralized regional cloud systems and a waiver of locally established healthcare information systems is planned for 2019-2024 within the National project “Healthcare”. Analytics note that this project includes not only implementation of any healthcare information systems at the municipal level or state informational systems at the regional one to the discretion of customers, healthcare administration or developers but also implementation and development of systems which meet the normative requirements [10].

According to the passport of the federal project, federal budget expenditure on project realization will exceed 113 billion rubles, and 88 billion rubles were allocated by regions [11].

So far, review of the main trends of medical informational systems development in Russia in 2018 showed that, despite the rapid increase of medical informational systems, staging the main processes of personified account electronically and creation of the basic infrastructure, there are shortcomings of medical informatization “such as a lack of making-decision process based on data, a lack of information on patient exchange, conflict between the paper and electronic workflows and consumer dissatisfaction with respect to a service level mainly in State healthcare institutions” [12]. In spite of carefully chosen formulation (two types of workflows are in conflict without medical personnel who are obliged to fill in the form; it is not mentioned about their satisfaction of usability of healthcare systems), it is obvious that organized resistance of informational technologies implementation is described.

Thus, healthcare informatization is an extremely problematic process and such problems are steadily reproduced and are of a general nature.

### III. HEALTHCARE INFORMATIZATION AND REINFORCEMENT THEORY

The analysis of these problems related to healthcare informatization can be provided from different theoretical points of view. We consider this process as a process of realization of megaprojects by the state and proceed on the basis that problems are connected not only with healthcare specificity (though we try to take into account this aspect) but also with megaprojects features.

Ch. Sauer and L. Willcocks [13] analyzed the mentioned case NPfIT according to that way. In their opinion, the realization of any megaprojects leads to effects of scale which increase the probability of problems, particularly at points of interdependence such as organizational boundaries and interfaces. They created the table which showed the links between megaprojects characteristics and organized problems posed by them (see table 1) [13, p. 197].

TABLE I. TYPICAL EFFECTS

Characteristic	Typical effects
1. Very long-time frame	External volatility more likely, turnover of key personnel unavoidable
2. Scale of resource required	No single organization can supply the resource and capabilities required
3. Impossibility of planning accurately	Changes to budget, schedule and scope
4. Unpredictability of how the program process will evolve	Relationships ebb and flow. Some parties to the program will lose commitment
5. Vast number of stakeholders/users	Meaningfully engaging and communicating with all stakeholders/users is impossible
6. Normal project uncertainty on a massive scale	All the normal project delivery problems are to be expected but because of scale and complexity their potential impact is massive
7. Accumulation of problems	Encourages the naysayers and promotes the tendency to criticize thereby damaging reputation

In our opinion, the central factor which identifies the other problems is vast number of stakeholders/users involved in the healthcare informatization process. The main actors of informatization have not only different interests but also different values, beliefs and ideas. Healthcare informatization is an extremely complex and politically and socially contentious process that engenders a range of interpretations across different institutional groups. Moreover, these groups have the uneven power and can affect the informatization influence on each other. Ch. Sauer and L. Willcocks' scheme does not take into account the latter aspect.

It is necessary to consider at least two regularities implemented for situations of the unequal participation of stakeholders in the analysis of megaprojects and other major projects.

Firstly, at the beginning of the 1980s, on the basis of system informatization of municipal management (project URBIS (Urban Information System) implemented in 1975 [14]) K. Kraemer and J. King showed that information technology had never been an instrument of administrative reform (which they defined as efforts to bring about dramatic change or transformation in government such as a more responsive administrative structure, greater rationality and efficiency, or better service delivery to citizens); rather it had been used to reinforce existing administrative and political arrangements [15]. Numerous studies provided by the authors lead to the conclusion that the main impact of IT application has been to reinforce existing structures of authority and power in organizations. Basically, the main customer is always successful because computerization in city manager governments reinforces the power and control of the professional manager; in strong mayor governments it reinforces the elected mayor; in commission governments it reinforces the power of individual commissioners» [15]. This approach is called as «reinforcement theory».

If reinforcement theory and healthcare informatization are combined, it becomes clear that this theory reinforces the power and control of healthcare managers, despite that stakeholders constantly mention patient-centered care and patients' empowerment.

For example, 44% of the funds is planned to spend on the implementation and development of the state informational systems of members of the Russian Federation within the project «Creation of a unified digital health care circuit based on a unified state health information system (EHISS)». The second largest funding area is the implementation and development of medical informational systems (41%). 12% will be spent on medical organizations automatization [10]. Allocation of costs clearly shows allocation of priorities.

On the basis of the English-language discourse analysis, S.A. Kreindler reports that engaged with the concept of patient-centered care and/or the question of how to achieve it. She makes a conclusion that this seemingly benign concept can easily become a weapon on an intergroup battlefield. Moreover, S.A. Kreindler discovers that healthcare managers are able to appropriate the identity of patients to gain ground in an intergroup battle with healthcare providers and as a group make themselves invisible in such documents. The recommended approach is clearly managerial, yet managers are never recognized as a group with its own interests. That implies that the organization (meaning managers) naturally embodies patient-centered values [16].

In our view, this interesting monitoring can be fully applied to documents of state strategy planning connected to realization of the project «Creation of a unified digital health care circuit based on a unified state health information system (EHISS)». A part of the interview with the Deputy Minister of Health of Russia in which appropriation of the patients' identity is clearly expressed: «Since the Act (Federal Law No. 242-FZ of July 29, 2017 «On Amendments to Certain Legislative Acts of the Russian Federation in using informational technologies in healthcare»), the new subsystem of EHISS was implemented as a registry of electronic medical documents. This database stores each person information on what electronic documents related to him/her were created, their type and where they are stored (a medical organization). It is this subsystem which will provide a citizen with an opportunity to gain access to his/her document through the unified portal for State and municipal services. Moreover, a citizen will be able to share this document with a doctor» [17]. Actually, healthcare administration will be primarily gained access to this base («Medical organizations have already organized digital information. It is already possible to work with it. Business processes of regional healthcare are also automatized. The centralized systems are created in every entities of the Russian Federation»).

Thus, the pattern which was identified by K. Kraemer and J. King shows that organized resistance which provides healthcare information systems implementation is a consequence of actors' unequal status in the project realization but not a result of healthcare providers' inability to assess the benefits of informational technologies and to change work habits.

#### IV. HEALTHCARE INFORMATIZATION AND COLLINGRIDGE DILEMMA

The second pattern comes into effect in the situation of healthcare administration domination in the process healthcare information systems implementation. This is so-called the Collingridge dilemma connected with a danger to make wrong and costly decision which, however, is subsequently not

possible to be corrected. D. Collingridge demonstrated the example of the American space program which shows that this danger increases dramatically in case of inflexible technology implementation. Of course, the definition of information technology as inflexible seems strange but D. Collingridge is of the view that inflexibility is indicated by four physical properties of the technology: long lead time, large unit size, capital intensity and the need for supporting infrastructure [18]. These characteristics can be classified as the British NPfIT and domestic EHISS, especially considering that the development of an inflexible technology involves highly centralized decision making, dominated by large organizations which are able to exclude many legitimate stakeholders, particularly, end-users. In this situation challenge from the experts is unlikely because they will regard the project as a technical challenge through which to advance their own professional standing [ibid.]. Negative effects of the system implementation cannot be predicted from the outset, and after substantial funds have been already allocated, it is impossible to amend. That is why the chosen area is developed ignoring the effectiveness problem.

The situation is compounded by the fact that inflexibility is combined with cultural significance with regard to informational technologies. Informational technologies serve as the main symbol of the scientific and technical progress, therefore, serious attempts to attain increased efficiency in order to deliver better services (patient-oriented healthcare) may be combined with a desire to create a myth of modernized healthcare system without meaningful institutional changes. It can raise so-called “dangerous enthusiasms” ([19]) and IT-disaster as a result. R. Gauld and Sh. Goldfinch describe the situation when stakeholders feed off and mutually reinforce the tendency of wrong decision-making in their work based on New Zealand materials. They highlight four groups of stakeholders, each of which has its own type of “dangerous enthusiasm”, that is faith in absolute advantages of informational technologies. First of all, it is “technological infatuation” characterized public officials and managers (belief that IT can radically transform their sphere of activity). Then it is “technophilia”, which is typical for developers who perpetuates the myth that better technology, and more of it, are the remedies for practical problems. Next is the enthusiasm, feigned or genuine, that sales representatives develop for their company products. And the last is “managerial faddism” as a tendency for experts and consultants to eagerly embrace the newest management fad. The authors define them as pathologies the “Four Enthusiasms of IT-Failure». Conference materials on healthcare informatization and scientific journals encourage making a presumption of one of the four pathologies existence.

Among stakeholders there are not end-users, for example, health care providers that will work with the new systems, staff-at-large of IT companies who will work with bugs, glitches and legacy systems, patients whose life e-healthcare projects are aimed to make easy.

Thus, there are not actors who can call into question dangerous enthusiasms. The strengthening tendency of the power and control of healthcare managers characterized healthcare informatization increase the risk of wrong decision-making and reducing the barriers of dangerous enthusiasm in

condition of expensive and inflexible systems creation. That is why there are chronic problems mentioned at the beginning of our article.

## V. CONCLUSION

Our analysis showed that the chronic problems facing healthcare informatization are the result of submission of this process to the interests of only one stakeholder as healthcare managers without healthcare providers and patients. In Russia, the situation is exacerbated by a lack of effective corporate organizations combining health workers and patients, though valuable experience of defend their interests is gradually gained by these actors at the same time.

Dominance of managers is largely a consequence of neo-liberal doctrine of new public management actively implemented in the global healthcare since the late 1990s. It is thanks to new public management “invisibility effect” analyzed by S.A. Kreindler and situation described by E. Bartis and N. Mitev when the dominant stakeholder claims project success become possible, though the key users do not use the system as intended and the project goals are not achieved [20]. However, connection considering of new public management, new paternalism and healthcare reforms requires writing another article.

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