

# On Big Data, Management Systems and Corporate Culture

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## ABSTRACT

The paper explores the problems associated with new technological solutions that have emerged in the era of digitalization. First of all, this applies to Big Data technology. Technology diffusion statistics and development forecasts are presented. The authors identify two factors that negatively affect the spread of Big Data: the openness of information and the institution of higher education. A solution is proposed for leveling the negative impact of these factors, that is a change in the essential characteristics of the control system necessary for the advanced development of both managed and managing subsystems of an organization. For this, on the basis of the observations carried out, the modern essential characteristics of management systems have been analyzed and the conclusion has been made about their inconsistency with innovative technical and technological solutions. The authors see the solution to the problem in a change in corporate culture, which should become the foundation of the managerial decision-making system. As a result of studying the content of educational programs of higher educational institutions located in the constituent entities of the Russian Federation, the authors observe its interdisciplinarity, project activities, and the study of IT technologies, but there is also a considerable group of universities where departments and institutes try to maintain the status quo in any way, using for achieving this goal all available means. According to the authors, knowledge of the management methodology and the availability of analytical competencies are a catalyst for the generation of a leader striving to implement the model of the alignment of interests, for which it is necessary to build an appropriate corporate culture, the values of which will change the essential characteristics of the management system existing in an organization; the role of the institution of higher education in this process is dominant. The implementation of the authors' solution to the problem will make it possible to level the risks associated with the implementation of Big Data and aimed at creating processes of organizations' digital slavery.

**Keywords:** *Big Data, higher education, corporate culture, management system*

## 1. INTRODUCTION

In the 18th century, the English scientist Thomas Simpson, exploring the advantages and possibilities of making astronomical observations, emphasized the special importance of using numbers in this process. More than two centuries passed before the scientific community began to use Big Data in research systematically and consistently, and business structures and federal governments found the practical application of it.

Among the countries in the total volume of the Big Data market, the USA is the leader (53%), followed by Japan, China, Great Britain, and

Germany with a share of about 5% each, all other countries make up 28.5% [1]. The sectoral distribution begins with the banking sector, continues with non-cyclical production and specialized services, then rounding out the top five leading industries, cyclical production, and government administrations. In the Russian market, Big Data technology is most widely used in Sberbank, Gazprom, Tinkoff Bank, and Yandex.

In 2009, the editor of the British scientific journal "Nature" published an article in which he outlined the growth prospects of this technology [2]. Today, the Big Data market is 44 zettabytes, and by 2025 it may grow to 440 zettabytes, i.e. tenfold. One

zettabyte is 1,024 exabytes; one exabyte is 1 billion gigabytes. Any other technology is unlikely to be able to accommodate such an amount of information. Big Data, for example, is used not only in demography and ecology but also in such a narrow area as assessing the benefits of environmental programs to improve the living conditions for indigenous peoples [3] or estimating the prevalence of severe asthma [4]. The use of Big Data reformats marketing analytics and multiplies the marketing capabilities of market actors [5], strengthens positions in the international market [6], transforms the tourism industry [7], increases the flow of information about the behavior of individuals [8], etc.

The Irish scientist Rob Kitchin is engaged in the Programmable City project, analyzing the results for the society and economy from the creation of smart cities [9] where the openness of information plays a special role because without this condition, Big Data cannot be collected. First of all, information openness is required from government bodies as regulators of economic processes. According to the World Justice Project [10], in 2015 Russia was ranked 67<sup>th</sup> between Honduras and Thailand in the government openness index. In recent years, the situation has changed for the better: the Russian government has approved a list of open data sets, numbering about two hundred items recommended for disclosure, but even then, this has not allowed the country to enter even the top thirty of the rating, since, on some components, the backlog has not been eliminated. The level of access of citizens and organizations to information on the activities of state bodies remains low, including the mechanisms for exercising the right of citizens to receive such information; and the level of their access to the information on civic participation and mechanisms for the citizens to exercise their rights remains even lower.

The second factor in the advancement of Big Data technology is the institution of higher education. Very few educational programs can be found in Russia that incorporate, reflect, or are based on the study of such a topical sphere of knowledge and its implementation.

The events taking place indicate the transition of the existing reality from the SPOD (Steady, Predictable, Ordinary, Definite) world to the VUCA (Volatility, Uncertainty, Complexity, Ambiguity) world, i.e. functioning and development are becoming less and less stable, predictable, simple, and definite, and more and more unstable, uncertain,

complex, and ambiguous. In such a dynamically changing environment, Big Data seems to be a necessary and even a rescue tool for self-organizing and self-stabilizing systems, therefore, research in the field of its application in this area is very relevant. Questions as the following arise: what should a manager be like, what competencies of the manager are dominant, what are the requirements for the personnel? How to neutralize the negative impact of factors – the closeness of information and stability of educational programs – that are by no means conducive to the widespread adoption of Big Data technology? Hundreds of thousands of scientific papers talk about the advantages, disadvantages, processes of implementation and use of Big Data, but what should the head of an organization or a manager of a project, where processes are built on Big Data, be like, is either not mentioned, or a set of standard characteristics is given. At the same time, there is euphoria from the spread of digitalization, but it has a lot of risks that are very dangerous for any individual.

## **2. MATERIALS AND METHODS**

The world is changeable, and in the 21st century, this phrase is understandable more than ever, especially in the last two years passing under the mantle of the COVID-19 pandemic, and mail is already delivered by drones, robots are answering phone calls, and human translators are being replaced by an online translator. New technologies put forward new requirements for all workers – retraining or unemployment. Generation Alpha is replacing Generation Z, and for them, Big Data in a gadget, like a book in a library forty years ago, is becoming an integral part of their life. The era of comfort is leaving; the employee, and the manager, first of all, must constantly force themselves to keep going, even running.

Therefore, the research tasks include finding answers to the questions posed in the introduction, and the result of the search is to be the achievement of the goal consisting of the formation of proposals for changing the essential characteristics of management systems necessary for the advanced development of both managed and managing subsystems.

In order to accomplish the assigned tasks, formal-logical and general scientific research methods, including strategies of intuitive search and observation which were carried out for two years in organizations of cyclical production and the service sector, have been used. The authors, in agreement

with the heads of the objects of observation, decided on the anonymity of both legal entities and individuals. The number of objects fluctuated over two years from seven to eleven; all the objects are geographically located in the Novgorod region (Russia). Initially, self-observation was involved, i.e. priority was given to personal qualities and their views on the ongoing technological innovations and their impact on the organization's management processes, then it was transformed into objective observation. The authors have made an attempt to get away from classical observations (laboratory and field), and use the technique of natural experiments, simulating randomized control trials, as a toolkit [11, 12].

### 3. RESULTS

Observations of management systems, including the processes of making managerial decisions, the implementation of the leadership function, and the adequacy of the new technological conditions of corporate culture, have revealed the unconditional priority of the order-execution model over the model of the alignment of interests. The order-execution model has existed since the Horde-Byzantine era and is unable to correlate with either new IT technologies, or modern values, or project teams; it causes considerable concern that it is already like the genetic code of the nation. At the same time, business entities that have nothing to do with the budget basket, and who have retained themselves in such a difficult environment for more than five years, are trying to follow the path of the alignment of interests.

Secondly, communications are not as straightforward as the order-execution model requires: ascending-descending or descending-ascending so slow down the passage of signals and distort their content that employees almost unconsciously build integrated communications in organizational, economic, and interpersonal interaction; such a discrepancy in the model leads to a conflict of the third type. A struggle begins not for a resource, but the rightness: "I said so" and "Okey"; as a result, there is a confrontation, right up to dismissal. Of whom? Obviously, not of the leader. But, interestingly, psychologists argue that this type of conflict destroys, first of all, the personality of the leader. If we consider the types of communication networks used in the organization, then this is the usual link (direct and reverse), sometimes you can find a star or ring type, more often a bypass network, but you cannot find a complete network.

Thirdly, it has been noted that both subordinates and managers lack IT competencies, with the exception of computer engineers and programmers, but, unfortunately, a considerable number of the latter should be classified as "dummies". There is hardly any place for Big Data in such a conglomerate.

Fourth, doctors still run hospitals, artists run theaters, and professors run universities. Managers are not favored in Russia; apparently, for the reason that they do not exist, but there are administrators who know well the nature of the managed unit, but do not accept the laws and management methodology, and therefore manage according to their subjective opinion (will): as the Chairman of the Upper House of the Russian Parliament V.I. Matvienko once figuratively noted, "as they please".

Fifth, low wages and the impossibility of career growth are the talk of the town, but the first lines of reasons for dissatisfaction with work are occupied by a low level of respect for the individual and a low level of respect for personal circumstances, uncomfortable working conditions, and a lack of corporate culture.

Sixth, leaders blame subordinates or environmental factors for all troubles, not even admitting their own mismanagement to themselves. You cannot change the external environment, it is difficult to change the internal one, and the implemented model does not contribute to this. The leader concludes that it is necessary to change subordinates: in an organization with a small number of employees, this is possible, but the result will not radically change if the leader themselves does not change; in a large organization, this is nonsense.

Seventh, the ambiguity: information is distorted, remains hidden, timeliness is violated, the picture of what is happening is misrepresented, disinformation is spreading, and there are more and more improper decisions.

Eighth, among the top and middle managers, being on trend is a significant ability, i.e. the ability to stay in a state of VOGUE for a long time, or more correctly "to be in vogue". Import substitution is on trend – people are talking about it, teamwork is in trend, and at all meetings, you hear "we are a team", etc.

Peter Drucker once said, "Culture eats strategy at breakfast". If there is no corporate culture, if values do not change and contradict technical and

technological innovations, then the most wonderful strategy is to join the majority.

Therefore, values should become a priority in the formation of corporate culture, and the culture should be the foundation of the managerial decision-making system, and all this is impossible without changing the characteristics of the leader, and the stronger the connection between the formal and the informal in one person, the more developed the organization will become. When the personnel perceives the manager not only as a boss by position but also as an informal leader, then a team is built, otherwise, there is just a group headed by the boss that remains. The chain continues as follows: the team understands and accepts the need for innovations dictated by time, and the team implements Big Data technology. And this happens because there can be no closed or hidden information in the team, which is an indispensable condition for this technology.

The second factor, which has been indicated at the beginning of the consideration of the Big Data problematics, is education. Having studied the content of educational programs of higher educational institutions located in the constituent entities of the Russian Federation, we can conclude that many have switched to interdisciplinarity, project activities, and study of IT technologies within the framework of an educational program of any orientation, with the exception, perhaps, of humanitarian ones. But there is also a considerable group of universities, where departments and institutes are trying to maintain the status quo in any way, using all available means to achieve this goal. As a result, everyone – alma mater, students, professors – loses. Such a recession develops into a depression, into professional burnout, there is a shortage even for budget places, the system can function on the created groundwork for a short period, and then destruction occurs, leading the system to a certain bifurcation point.

The era of the digital economy dictates its own rules not only to business and government regulators but, above all, to universities. Without the creation of data centers, digital programs (using machine learning technologies, artificial intelligence), new learning management systems, new models of educational institutions, neither university science nor the educational process can meet the requirements of the practice.

Business processes require an IT infrastructure, therefore, for example, a graduate of the economic direction needs to possess tools for designing data

structures in databases and building queries to them, the skills of data analysis and preparation of reviews or reports, building business models, and methods for assessing their impact on enterprise architecture.

They need to model functions and processes, and for this, they need to understand the architecture of the enterprise, the process of data governance in the organization, Data Mining, and machine learning, software prototypes for solving applied problems, stages, and methods of design thinking. For example, most foreign universities training future masters in project management necessarily implement a master's degree program in business analytics, because in the globalizing world, the importance of not only methodological knowledge but also analytical skills is increasing a priori. Big Data technology serves as a means of ensuring the transition from typical analytics (classical, bureaucratic), looking for an answer to the question "Why did this happen", through predictive analytics ("What is going to happen?") to prescriptive analytics ("What should I do?"). The master's degree programs on Project Management and Business Analytics continue the undergraduate studies focused on Business Administration, Business Technology, and Business Management.

Other examples are Tourism and Marketing. The tourism industry, after the end of the COVID-19 pandemic, will make up for its 60% drop and become an even more popular industry and will require new specialists, but by no means tourism managers. We believe that these will be designers of augmented reality of territories, developers of intelligent travel systems, directors of individual tours, developers of tour navigators, brand managers of territories, and concierges of robotics [13].

Analytics of large tourist flows will be objective when using Big Data. Considering that 65% of trade is carried out through marketplaces, it is not marketers that are required, but Internet marketers who use Big Data to analyze activities taking place on e-commerce platforms and online e-commerce stores.

Thus, knowledge of management methodology and the presence of analytical competencies are a catalyst for the generation of a leader striving to implement the model of the alignment of interests, which again is to require building an appropriate corporate culture, the values of which are to change the essential characteristics of the existing management system in the organization, and the role of the institution of higher education is dominant in this process.

#### 4. DISCUSSION

Corporate culture is not only the main factor in designing an effective management system that ensures competitiveness, but also the main factor in leveling the risks of the digitization system, where Big Data is one of the elements, but extremely dangerous, although very useful. The majority of society has Digital literacy, the Alpha generation is proficient in Digital fluency, demonstrating the ability to quickly find information using algorithmic search strategies that no one has ever taught them, but they have the ability because their lives have begun in the era of digital. But only building a society that can be called Digital citizenship will allow minimizing and, better, completely avoiding the risks that potentially lead to digital slavery.

Firstly, on the darknet on the forums of hackers, you can buy various kinds of information – official, commercial, and personal. There is no guarantee that all data from the organization's information field arrays will be on this dark web.

Second, has the leakage of data from the organization's information field been “leaked” or is there something bad with security? The question is not just who is to blame, but what to do, and for this, it is necessary to determine the source of the problem.

Thirdly, deepfake technology based on machine learning and neural networks is known today; using it, you can change a person's face: sometimes we hear on the news that someone, who looks like someone, has done something which this someone could not even imagine. With an insufficiently protected information field of an organization, it will not be difficult to penetrate it and replace data. False data is false targets.

Fourthly, in such systems, there are always errors, failures, hangs, and it takes time and logical comprehension of the situation to eliminate them.

Fifthly, Western technologies are constantly being imposed on us, which leads to unpredictable consequences both in the form of shutdowns and in the form of downloading data, and leads to the degradation of our creative capabilities.

The identified risks can turn an organization into a digital slave. Avoiding this requires a corporate culture that is consistent with Big Data and analytics. And this is already an extremely controversial issue, since how many people, that many values, how many organizations, that many corporate cultures. The way out is seen in the

creation of teal organizations, open organizations characterized by integrity, self-management, self-organization, and self-improvement [14].

#### 5. CONCLUSION

Thus, in order to change the essential characteristics of management systems necessary for the advanced development of both managed and managing subsystems, it is necessary to reformat at least, but better to build a new corporate culture, the fundamental values of which are to be creative thinking, integrated communications, faith in oneself and others, risk tolerance, open mind, curiosity and empathy, simplification and decisiveness, i.e. everything that makes a person free, overcoming their fears and weaknesses, a person-creator. With such a corporate culture, there will be a team, not just a group or department. The question of the negativity of information closeness when using Big Data will lose its relevance. However, corporate culture will not be able to form in such a set of values without the transformation of the institution of higher education. Therefore, organizations that admire the possibilities of digitalization and strive to implement them should think carefully about the compatibility of this technology, and any other, with their corporate culture, otherwise the process of innovation will end in a process of maximizing risks.

#### AUTHORS' CONTRIBUTIONS

The authors made an equal contribution to the study: collection and analysis of material; definition of goals and objectives, research methods; formulation and scientific substantiation of conclusions, registration of key research results in the form of an article.

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