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GAME PRINCIPLE AS A FACTOR IN GENERATING MANAGERIAL INITIATIVES

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Abstract

One of the key features of modern management is the need to work and make decisions in an extremely complex environment. This complexity is generated, on the one hand, by the modern technosphere, which is built on the basis of high technologies, complex machines and artificial intelligence, and, on the other hand, by the information environment and hyper communications system, which are extremely saturated. In these conditions, decision-making is associated with the practical impossibility of taking into account all significant factors that influence the possible choice of the image of the desired result. In such an extremely dense informationally saturated environment, managers and leaders often experience a decrease in searching motivation, which results in a narrowing of the choice space and a decrease in the quantity and quality of managerial initiatives. Meanwhile, the classical tools related to management theory and practical management have a fairly extensive arsenal of tools and methods that stimulate search activity and significantly expand the space of potential browsing opportunities. This type of stimulating managerial initiative means both the classic apparatus of game theory and numerous techniques, the unifying and system-forming principle of which is the game principle. A special variety of modelling techniques are business games of various forms and types that can be used in managerial practice as a means for generating managerial initiatives and can effectively solve a wide range of managerial tasks, as well as tasks related to professional training and personal development.

Keywords: Business games, game models, game principle, game theory, management theory, statistical models.

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1. Introduction

Considering the history of the use of games as special practices that simulate real or conditional situations that arise in human activities, it should be noted that this phenomenon has its roots in the deep past of mankind. When talking about the interest science has in this phenomenon, then attempts to build the first game theories date back to the 17th century and are noted in the works of B. Pascal, in particular, in his scientific correspondence with M. Mersenne and P. Fermat. In a formal mathematical interpretation, the scientific concept describing the game was created by American scientists Neumann and Morgenstern (1970). They considered this concept a special mathematical discipline that uses the apparatus of probability theory and is intended to describe the competitive interactions of companies and other economic entities in a market economy (Von Neumann & Morgenstern, 1970). In the future, the scope of application of game theory was significantly expanded, and the mathematical apparatus used by it began to be considered an integral part of the theory and methodology of operations research.

Another direction of the scientific development of the game concepts in relation to management and decision-making issues was the theory of statistical decisions, the mathematical apparatus of which, however, is largely similar to the apparatus of game theory. One of the basic techniques of this theory is the so-called Monte Carlo method, or the statistical test method, which is based on modeling random variables and random processes and the subsequent construction of forecast estimates used for decision making. In contrast to a competitive game in which each participant seeks to prevail over competitor and turn their mistakes to their own advantage, in statistical games one of the parties acts as a whole, the environment that is neutral in relation to the tester, is described in the model as a set of real or potential circumstances. In most cases, this method is used in the absence or incompleteness of information on the parameters of the functioning of the environment, due to which there is a risk of making an erroneous decision. Actually, the goal of such a game is to develop such a selection strategy with respect to the alternatives resulting from the game that minimizes risks as potential undesirable consequences from making erroneous decisions (Byrne, 2018).

The third area of gaming practice is business and professional development-oriented games of various forms and types that have long established themselves as an effective means of solving a wide class of managerial tasks, as well as tasks related to education and development. The interest in the widespread adoption and use of game methods and practices is largely related to the conditions of the competitive environment in which the achievements of individuals, small and large teams, institutions, organizations, enterprises and firms directly depend on the real knowledge and professional competencies, without regard to previously established ideas and attitudes that the already acquired education alone can provide a set of social guarantees arising from basic professional training.

Business games are closely related to educational technologies that orient enterprises, organizations and firms towards the active use of all their information and knowledge resources. However, the leading link in any business game is, of course, the person themself, while the game is only a way to most fully reveal a person's active and intellectual potential. In this regard, one can note such a managerial model paradigm that appeared in the 1990s, which is based on the principle of continuous staff training and which is called LO/MBL in the scientific literature – Learning Organization/Management by Learning (Popov, 1999). The key of this model is the confidence of its

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adherents that in the modern global economic system, only those organizations and enterprises that know how to achieve interest, motivation and the ability to interact with employees at all levels, and also constantly develop the employees' ability to successfully self-study.

2. Problem Statement

Methodological tools based on the game principle in managerial decision-making tasks can stimulate the search activity of managers and significantly expand the space of visible opportunities that usually remain hidden in a modern informationally saturated environment. A correctly applied game methodology for analyzing situations and making decisions can increase managerial activity and act as a factor of generating managerial initiatives.

3. Research Questions

The following can be named as the main research questions formulated in the paper and acting as research tasks.

3.1. How does modern management respond to the information and communication overloads that accompany the management process, and how does this affect the management quality?

3.2. What management gaming tools can be used as a means of stimulating search activity and acting as a generator of managerial initiatives?

4. Purpose of the Study

The purpose of the study is to show the capabilities of gaming methods and gaming technologies in terms of developing initiatives and search activity of management of enterprises and organizations in the process of their activities.

5. Research Methods

The study is based on the following methods: structural and historical analogies, systemic, situational, qualitative and comparative analysis.

6. Findings

The modern economic environment is oversaturated with information and information flows. Information explosion that occurred at the turn of 1960-1970. Lem (2002) continues today at even more amazing speeds. The main signs accompanying this phenomenon are, on the one hand, an avalanche-like increase in new information and new knowledge, on the other hand, the equally high rates of their obsolescence and devaluation. Another side of this process is the continuously accelerating pace of production of changes, a potentially increasing number of new products. This maxim became the motto of

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business life: QFN: Quicker - Faster - Now (Molden, 2000). It is no exaggeration to say that the modern economy is an economy of change, and these changes are becoming continuous and dense.

In the managerial body, sensory overloads are manifested in the growth of depressive states, which leads to a decrease in motivation and, in the end, to a decrease in the quality of decisions. Situations requiring resolution often contain too many variables and are too complex for a manager to be satisfied with at least one of the alternatives they view. It is in such situations that a game approach to solving problems can help. The basic idea of this approach is as follows: if the problem cannot be solved in actual reality, then the solution can be found in the gaming, virtual reality.

One of the methodological lines of this approach is the modeling of situations based on the application of the apparatus of game theory. The goal of the game model is to find an optimal solution in a conflict (Kelly, 2018). Conflict is a situation of collision, that is, an interaction in which the parties involved, called players, pursue opposing or at least diverging interests.

A formal description of a conflict involves the definition of players (players can be understood as individuals or teams), and the definition of their game status, i.e. who and in what role is involved in the game (conflict). Also important is the description of the context in which the game situation unfolds. In addition, it is important to know who is interested in the conflict arising, having a certain continuation and the desired end. Since opponents tend to hide their actions in a conflict, a situation of informational opacity (uncertainty) arises, therefore this methodology can also be considered a theory of finding solutions in conditions of uncertainty.

The rules or game agreements adopted by the players, as a rule, remain unchanged during the game, however, it happens that these rules can change even within the same session of acting out a situation (in some cases this manifests itself as “treachery”, i.e. a deliberate violation of the rules by one of the parties). Thus, the general definition of the game can be represented as a set consisting of a set of rules, sets of possible strategies for each of the players and the so-called payment matrix, which determines the size of payments received (real or virtual money, points, bonuses, preferences, etc.).

When studying the competitive interactions of several firms (which in the game can be represented by teams), one should take into account the actions of all players (teams) at the same time. If there are several teams, then they can form coalitions. The basis for creating a coalition is the players' recognition of the mutually beneficial actions agreed upon and the subsequent conclusion of a cooperative agreement. The most important characteristics of a cooperative agreement are its sustainability and effectiveness. The agreement will be stable if a player who violated the terms of the agreement in case of malicious violation of the rules (deception, fraud, etc.) is guaranteed to suffer damage significantly exceeding player's illegal gain. The effectiveness of the agreement implies the inability to improve this agreement for all participants at the same time, in other words, improving the position of one of the participants is a deterioration of the other's position.

One of the goals of conducting game sessions according to the scheme described above is to find a game strategy that could provide the greatest gain in the least favorable conditions. If we talk about the possibility of predicting the outcome of the game, it is believed that a greater combinational variety of game strategies of one of the participants in the game, compared to the other, increases the chances of the first to win. This is fully consistent with the law of cybernetics, formulated by Ashby (2017), in

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accordance with which, as a rule, the system with the greater, in comparison to the competitor, variety of strategies wins.

The methodological base of game theory is directly adjacent to the theory of statistical decisions, which can be considered yet another game concept, which allows, figuratively speaking, to conduct "rehearsals of the future". The modeling technique underlying this method can significantly increase the prognostic efficiency of using all the information available to a researcher. A brief algorithm for constructing a statistical model is as follows:

- the situation (case) is determined, which is subject to analysis by the method of statistical modeling;
- the main relationships or causal relationships that characterize the structure of the studied situation, considered as a system, are identified;
- a mathematical model of the situation is built, taking into account the identified dependencies in a formula form;
- the dynamics of the development of the situation is simulated using a computer, and the results are evaluated for the degree of coincidence with data on similar situations;
- the model is adjusted to clarify the nature of the identified relationships and patterns and is further used as a generator of images of a possible future.

The strength of this gaming technique is the ability to repeatedly "play" the same situation, which allows one to get a range of possible results based on varying the available source data, conditions, circumstances and other inputs. Analysis of the results and their comparison to the initial data allows one to determine the patterns of development of the situation, to understand its nature better and, ultimately, to use this knowledge to achieve practical goals (Akoff & Emery, 1974).

As an example of the application of this method, we can cite the task of determining the most promising types of activities of an energy service company for a 3-5 year perspective. Among the types of activities, the following were considered: energy inspection and energy certification (energy audit), energy consulting, including the development and implementation of energy-saving programs and expertises, energy-efficient lighting, the development of an energy-saving project based on technical specifications from the customer, the full or partial execution of the project work on conservation of energy by the forces of its divisions, energy management (performing managerial functions in the interests of the customer with the aim of increasing the energy efficiency), energy project financing (full or partial), metrological support of the energy conservation project, information support of energy saving and energy efficiency. Statistics based on a survey of specialists, experts of this market was used as the model's information base. Based on expert evaluations, statistical tests were carried out, according to the results of which energy-efficient lighting, as well as the development of energy-saving programs and expert examinations, were recognized as the most specialized types of activities for this prospect (Kotter, 2014).

A special kind of modeling techniques is business games, which can be played with or without the support of computer programs. For example, role-playing games are designed to practice behavioral skills

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in conditions close to reality. This type of games can be used, for example, to develop communication skills with clients, as a tool in preparation for important negotiations and business meetings.

The base of a business game is:

- participants themselves, endowed with a certain role, for example, the role of a leader, manager, marketer, buyer, seller, consultant, expert expert, while the role may have some personal characteristics that give the game a special flavor and create a sense of reality;
- rules of the game, the purpose of which is to set the permissible actions and the actions that cannot be performed during the game; at the same time, for some types of games, which are based on the so-called heuristic principle, the initial conditions can only contain the wording of the general mood for the game, since the main purpose of such a game is to identify the behavioral characteristics of the participants;
- necessary funds and resources: premises, equipment and other types of information, material, organizational, etc. resources for the effective preparation and functioning of the game.

The most important types of business games include the following:

- role-playing games are the most widely known class of games aimed at developing skills in business behavior and communication;
- heuristic games are focused, on the one hand, on finding solutions in conditions of incomplete information, on the other hand, in such games the task is also to identify the most valuable personal characteristics of participants in managerial practice; in this type of games, the role of initiative, the presence of leadership qualities, creativity, constructiveness and determination are especially important;
- games focused on group problem solving, which involves a collective search for the information necessary to solve a problem; with this method of interaction, game participants are much more motivated due to the factor of joint search activity; the problem of the comparative effectiveness of individual and group decisions was studied by the American psychologist Myers (2007); in groups, two collective decision strategies are applied; within the framework of the “individual group” strategy, each member of the group first considers the decision, then a collective discussion takes place and then the decision is made; the individual-group strategy involves an initial joint discussion of the problem, and then each participant individually thinks about their own version of the proposal; at the last stage, the group finally chooses the best option;
- cooperative games are aimed at finding coordinated solutions on the principle of compromise, the main characteristics of which are stability and efficiency;
- games simulating a conflict situation, the concept of which is based on the idea of purposefully using the conflict mechanism to solve a problem; the task of the leader of such a game is to accumulate the energy of conflict and direct it to solving an urgent problem;

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- mobilization games are games that simulate the solution of urgent tasks in extreme conditions; the most important condition for success here is the ability to identify the most important current problems and to find a way to focus all available resources on them;
- organizational and activity games, or development-oriented games; the ability of participants to think strategically is especially important here; the goal of such a game is to determine the development directions taking into account the already existing experience and a clear vision of possible contours of the future.

Summarizes the types and basic characteristics of business games described above that can be used in managerial practice as a means of generating managerial initiatives (Table 01).

Table 01. Types of business games used in management practice

Role-playing games	**Games of a heuristic model**	**Group decision-oriented games**	**Cooperative games**
Focused on the development of certain behavioral skills in conditions that simulate a real situation.	Minimum information needed to solve the problem. No list of possible alternatives, no instructions.The goal is to find a way to overcome the inertia of thinking. It is much harder to see a problem than to find a solution	The game aims to activate the processes of collective thinking. The strategies used are: "individual – group" and "group – individual"	Focused on the search for compromise solutions. The goal is to identify sustainable and effective compromises that could become the basis of a cooperative agreement
Games that simulate a conflict situation:	**Mobilization games:**	**Organizational and activity games:**	**Computer business games:**
Based on the purposeful use of the conflict mechanism to solve a problem. Successful application in practice is largely determined by the qualities of the person taking charge of the conflict management.	Focused on resolving problem situations arising in extreme conditions. The main task is to identify the most important current needs and how to concentrate all the main resources on them	Organization-oriented games. The participants' ability of systemic integrated planning is important, as well as the ability to think in terms of the future	Held in the system "Man – computer". Game development and results are determined by the capabilities of a computer program

An important advantage of gaming technologies is that in the course of game interaction, the connection between the experience of an active search for a solution, professional training, and personal development is most effectively revealed (Vygotsky, 2005); In the game in the most natural way, the potential of the human personality is revealed and its activity is updated, there is an increase in managerial motivation and search activity, which creates the prerequisites for the manifestation of managerial initiatives.

7. Conclusion

Game as a social phenomenon, which, on the one hand, is one of the most ancient forms of study, on the other hand, which has already gained recognition and scientific status of a special methodological concept in our time, has a number of interesting opportunities that are important for professional

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management, management and marketing. Games are a part of the social nature of a man; they are ontological and organically integrated into all types of human activity.

Game modeling, based on the mathematical apparatus of game theory, can be used as a tool to solve a wide class of important and complex, interesting problems related to management issues. The technology of the game allows one to search for optimal solutions in the conditions of game confrontation between the parties pursuing opposite or substantially different goals.

The quality of game decisions largely depends not only on the exact specification of the game parameters, but also on the correct determination of the context of the situation in which the game conflict is born and proceeds. An important place in the analysis of the results of game modeling is given to the interpretation of game parameters, which, ultimately, should determine the meaning and direction of current actions.

Statistical models of situations and processes are based on the mathematical apparatus of the theory of statistical decisions, which is largely similar to the apparatus of game theory, but does not imply the existence of a game conflict and the associated conscious counteraction. When constructing and using models, special attention should be paid to an in-depth understanding of the laws inherent in the modeled system. The model must be evaluated by its ability to reproduce the characteristics of the behavior of the system - stability, fluctuations, growth, average period of fluctuations, the general relationship of variables that change over time, and the tendency to increase or weaken disturbances caused by the external causes. A good model of a real system, situation, process should express their essence, show how structural or operational changes lead to an improvement or deterioration of their behavior. Using the model as an example, one can observe such variables that cannot be accounted for in a real system. Factors that are elusive in reality and the assumptions of the researcher about them become tangible and can be observed in the model. In the end, this kind of model should serve as a guide in terms of solving the problem of improving management efficiency.

Many problems, particularly the problems of long-term development that enterprises and organizations face, can be resolved through the judicious application of the principle of imitation, game principle and game learning. The indisputable advantages of models based on the principles of continuous, organically integrated into the management system of the organization of training and self-training are confirmed by the experience of enterprises of various profiles and fields of activity. In particular, some energy service companies are expanding their business and communication strategies to the level of integrated network interaction and include broad cooperation with private, government, and public institutions in other regions (Keller & Price, 2014).

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