

## OUR HERITAGE

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### Amosov and social processes' modelling

#### *Abstract*

*Mykola Amosov is one of the most known Ukrainian scientists. He has occupied the second place (after Jaroslav the Wise) in the TV project Great Ukrainians as a result of election of tens of thousands of people. Most people know him as the outstanding surgeon-cardiologist, some people know about his work in cybernetics but few people know about his works in the field of sociology. The paper is dedicated to the role of Amosov in the development of modeling of social processes in Ukraine.*

**Keywords:** *humanistic orientations, modeling of social processes, system analysis (Forrester), heuristic /imitation modeling*

We don't usually think about what led to the development of a particular trend in science. And when we begin to think, we understand that a lot depends on purposeful activity of very few people, sometimes one or two people, and if they leave, then the trend does not take place, it will not survive.

I wasn't a colleague of Amosov's, but from time to time, I have met him, within thirty years, with regard to various issues related to sociological modeling. Actually, I was under the impression that Nikolay Mikhailovich was interested in sociology almost more than medicine, but he practiced medicine much more out of a sense of responsibility to patients, for whom his work was a matter of life and death. Yes, and Amosov's interest to sociology was connected, probably, with his humanistic orientations. In one of his books (I think it was "Thoughts

and heart”), he described how he had met his former patient, who had had recovered, but had continued to be unhappy because of family issues. An ill society is able to generate millions of unhappy people (can it be estimated, for example, how many insolvable family issues generated lack of housing; no wonder Bulgakov’s Woland said that the housing problem had spoiled muscovites). I think Amosov was doing sociology to change society, to reduce the number of accidents, increase its overall happiness (the indicator of “integral happiness”, which was used in his models).

In 1962, Amosov headed Institute of Cybernetics Department of Biocybernetics of AS Ukrainian SSR, which had several trends of scientific development; one of them was modeling of social processes. Dmitry Galenko headed the modeling team. The Department organized a seminar on sociology, to which came even people from other institutions. I was at school at the time, I was interested in psychology, social psychology and sociology of identity, but in 1965, I entered the Faculty of Mechanics and Mathematics of T. Shevchenko Kiev State University. In University, if I am not mistaken, in 1968 at Alexander Yatsenko’s, our philosophy teacher, suggestion several students, led by Yuri Belov, formed a group study of mathematical methods in sociology. And somewhere around that time I began to attend seminars of the Department of Biocybernetics.

Those seminars were unique phenomena. I should say that sociology in the Soviet Union was doing its first steps. In 1968 was formally established and only in 1969 started to work the first sociology Department in the Institute of Philosophy of the USSR’s Academy of Sciences, the first “Sociological studies” was issued only in 1974, the sub-faculty of sociology at KSU was established only in 1979, and the faculty of sociology and psychology merely in 1991.

Amosov’s seminars were conducted in conditions of total absence of sociological education and almost complete lack of sociological literature, therefore, the seminars carried out not only the functions of scientific communication, but education as well. I remember that at one of the seminars, for example, the works of Durkheim were discussed (some of the participants read the works in English or Polish and made a report on this subject).

The lack of sociological education and the generally negative or at least suspicious attitude of the authorities to sociology had positive moments — into sociology came economists, mathematicians, physicists, and representatives of different sciences that considered sociology a science that helps find ways to change society. It was a romantic period of sociology’s formation. Moreover, the strong presence of representatives of the “exact” sciences has led to the interest in the application of mathematical methods and modelling in sociology.

In 1969, the international school-seminar “Mathematical methods in sociology” was held in Novosibirsk (Akademgorodok), which lasted two weeks (see: [Социология и математика, 1970]). Besides N. Amosov, other outstanding scientists, for instance, T. Zaslavskaya, A. Aganbegyan participated in the school’s work. I cannot imagine that some international congress would have lasted more than a week now, while then it was two weeks with only one discussed trend in sociology. I had my internship in the Department of Methodology and Techniques of Sociological Research of Institute of Philosophy of USSR’s Academy of Sciences and with the head of the department, V. Chernovolenko, also flew to

Novosibirsk. The memory is arranged in a strange way, often instead of serious things all sorts of nonsense is remembered. I don't remember the report of Nicholay Mikhailovich, maybe because I was familiar with his ideas and also read his works even later, so it's hard to remember exactly what he said in his report then. I only momorized that in the hotel's cafe where we lived, there were pastries, which I couldn't resist. And I really wanted for Amosov to enjoy himself:

- Nicholay Mikhailovich, why won't you take the pastries, they are incredibly delicious.
- “You don't understand – I rarely allow myself to have white bread, and for me this bun is much more delicious than pastry for you.

Amos was not only interested in modeling in sociology, but sociology in general, including the sociology of personality, he willingly participated in purely sociological conferences (see, for example, photos of members of the sociology of personality unit at the conference in Vilnius in 1988).



N. Amosov is talking with Y. Yakovenko and V. Khmelko.  
Vilnius, the conference on the sociology of personality, 1988

One of Amosov's most important contributions to the development of social processes modeling, from my point of view, is the idea of changes in data collection methodology. I don't know whether this idea was original and if Amosov was familiar with the work of Jay Forrester, which were released at about the same time, I think, Amosov had his own terminology and no references to Forrester, so these works were parallel (see: [Amosov 1969, 1994; Forrester, 1978]). In any case, it is important that the modelling radically changes the methodology of sociological research. Forrester and Amosov's experiments with models had shown that some of the input factors of the model practically does not affect the output one's, and some, conversely, the affect them profoundly. Therefore, Amosov pro-

posed a new approach, that one should not waste time and other valuable resources for gathering all information, because part of it will be unnecessary — one has to start not with gathering information, but with building models based on existing data or hypotheses and expert assessments in cases where such data is absent (Amosov called it “heuristic modeling”). Then, along with the model, experiments are conducted, the most sensitive, the most important indicators are highlighted, and efforts focus exactly on their measurement.

Indeed, sociologists start with the theory, from which hypotheses about the relationship of several factors are derived. Then the conceptualization of these concepts (their exact definition) is conducted, this is followed by their operationalization (that is, it is described how these concepts will be measured). And then, a sociological study is conducted (for example, population survey), which shows if the hypothesis gets confirmed or not. However, the system as a whole is not studied this way. That’s why Amosov once said that all medical books should be put in a one big pile and burned, because these books explore the connections between separate factors, while the person needs to be studied as a whole system (to the same extent it applies to the study of society).

The ideology of modeling reality by Amosov is different: first opportunities need to be created for holistic models based on already existing data. While the same aspects on which data is absent, experts estimate the missing parameters. Then computational experiments are conducted in different variations as well as identifying which inputs affect the outputs more, or, in other words, to which variables the system is most sensitive. Further sociological research will be aimed at measurement of these key factors and connections.

The last step is verification of the model, the results of the study are inserted into the model and it is examined how such model works, how it conforms to the available information, whether it correctly predicts these or other output factors. If not, we have to remake it until it will be impossible to fully use it for management. Therefore, the model is a framework that guides the data collection, as well as it is a dynamic theory. Theory still needs to be, as philosophers say, objectified, and this model is already a ready tool for making management decisions. It is important in this social modelling that this form of the theory is dynamic.

Interestingly, Amosov’s approach was very similar to Forrester’s systematic analysis and that what now is most often referred to as imitative modeling. From my point of view — it is one of the most promising trends to be used in sociology, because the creation of imitative models allows the use of the concepts, which are close to the sociology’s object domain. In sociology there are almost no functional regularities, they are mostly stochastic. Furthermore, sociologists in the present system of education have mathematical training, which is significantly weaker than that what physicists or natural scientists have, so imitative modelling creates conditions that are more propitious for mathematicians and sociologists to cooperate.

Here I have to say a few words about myself and about the development of this trend in Ukraine, to make it clear why we crossed paths with Amosov. I began working in the Department of Applied Sociology of Institute of Philosophy of USSR’s Academy of Sciences in 1970, first as engineer, then as a junior researcher, in 197. I defended my Ph. D. thesis, in 1986 — doctoral thesis, but it was

not related to modeling. Although, I was always interested in this line of research and I tried to look for people with whom I could cooperate. By the way, my first student was a former employee of Amosov's Department in the Institute of Cybernetics, Y. Yakovenko (now he is a doctor of Sociological Sciences, Professor of the Faculty of Sociology at Taras Shevchenko National University of Kiev), who participated in the development of models together with Dmitry Galenko (see: [Galenko, 1973]). In spite of this, creation this business at the Institute of Philosophy just couldn't be done. The subject of the modelling became especially important to the work of the semisecret group that my friends created in the early 1980s (besides me it included Valeriy Khmelko, Leonid Finkel and Roman Lenchowskiy). The main task of the group was the attempt to create a society model, to conduct experiments on it, to find the vulnerable points where a relatively small impact results in – according to theory of catastrophes – disproportionately big changes in this system. The goals were being discussed for a very long time (it is not possible to create a model of a whole society. So, it was necessary to select what exact part of it to model), we agreed that we are interested in the society model, output parameters of which will be humanistic values, the degree of prevalence of *humanity*, that is, mutual aid, kindness, sensitivity, compassion among people in the society. Finally, in 1987 I was able to create a section of computer modeling of social processes, but failed to hire members for this group. In 1991, the new management of the Institute closed the section, so I had to leave. My friend, the famous Ukrainian sociologist, Valeriy Khmelko, had the same issues and I along with him, with the consent of the Board of the Sociological Association of Ukraine have established our own centre, which later was reorganized into Kyiv's International Institute of Sociology. In the first Charter of our company the main objective was the creation of a computer model of Ukrainian society; we hoped that we would be able to invest money coming from private research Institute associated with the various public opinion polls into this trend. Unfortunately, it succeeded only in the first two years of existence of the company, then the competition forced us to increase the volume of work and invest more money and time in company's development and the amount of money left to create the model was very small, and this idea was never implemented. To sustain this trend I started giving a course on the modeling of social processes at the National University of "Kyiv-Mohyla Academy" and had been giving it for ten years, but our own research on society modeling almost stopped. In other Ukraine's universities, such courses are not given, no one is involved, as far as I know, in modeling in sociology, and since the early 1990s, this trend ceased to develop in Ukraine (although its development had kept pace with global trends before).

From the aforementioned, it is clear that the survival of this trend very much depended on Amosov's efforts in the development of sociology modelling in general and society modelling as a whole. Of course, from time to time there were attempts to cooperate with Nikolai Mikhailovich. I must say that such first attempts were unsuccessful, Valeriy Khmelko and I tried to offer new version of Amosov's model to Amosov, which as it seemed to us was logical, to what Amosov said, "You know, guys, I'm too old to implement other people's ideas". Now, when I am about the same age as Amosov was then, I understand his answer better.

The most interesting option of cooperation was the project of creation of the interdepartmental centre of the Academy of Sciences and the Institute History of the Party under the Central Committee of the Communist Party of Ukraine, this project was supported by the Deputy Director of the Institute V. Mazur. If I'm not mistaken, it was in the mid 1980s. It was assumed that society models will be secret and developed by this centre to prepare projections only for the top leadership of the country. Forecasting of social processes that support decision making, it was supposed to be implemented in two ways — on the basis of their mathematical modeling and on the basis of expert evaluations collected by special methods of sociological surveys and processed by statistical analysis of small samples, developed by academician V. Glushkov and his colleagues. It was assumed that we, together with V. Khmelko will work in this center, V. Mazur will be the Director, N. Amosov — something like a supervisor, and I — don't remember who, but N. Amosov said that I'd get administrative functions, as he has no time to deal with this nonsense. Despite this not very attractive role, I was really hoping to establish this centre — the prospect of doing modeling alongside Amosov was very tempting. Unfortunately, it did not work out; the project was stopped at the highest level. By the way, V. Mazur, who wrote several books praising the Communist Party, struck me with what he once said: "Volodya, you want to model a society, not modeling the Party, but this is impossible — the Party has permeated all spheres of society like a cancer. You can model the Party only with us, join the Party, and we will hire you to our Institute".

After the early death of Dmitry Galenko in the mid-1970s, the course of society modeling in Amosov's Department became less noticeable (again I saw it only from the side and I apologize in advance to the staff of the division, if I'm wrong), while Amosov continued to be interested in sociology and was planning to breathe new life into that area. However, after one of the trips abroad (I think it was France), he returned to find that the French had used resources more efficiently and had organized the process in such a way that allowed to make a lot more operations than Amosov's clinic could. As a result, he didn't only allot more of his time to the development of society modeling, but conversely — focused on surgery. The problem was that the Academy of Sciences funded sociological studies very poorly, which were necessary for estimation of the parameters of society models. By the way, this situation persisted to this very moment, the Institute of Sociology of NAS of Ukraine does not receive funding neither for Ukrainian part of the European social study (ESS), nor for the annual International studies (ISSP) — the main international projects, on which data a large part of the scientific findings in Europe is carried out, and this underfunding minimizes the involvement of Ukraine in international cooperation in the sociology field. Amosov was trying to obtain the necessary information by placing questionnaires in the press, for example, in the "Literaturnaya Gazeta" (publishers were willing to meet him half-way), but the gathered data was not representative. We also passed the data to Amosov, which did not require large resources for it to be obtain. After creating our own company, we were able to help Nikolai Mikhailovich more, gathering for him some information with the help of our omnibus researches (for example, at his request, we measured the correlation between the remuneration paid to the respondent and his work efforts), but we couldn't con-

duct a full study without funding. In general, practicing sociology as an empirical science on a voluntary basis is almost impossible; it requires a lot of resources.

To conclude what I said earlier, I have to admit that modeling of social processes ceased to grow since the 1990s and it's rather "smoldering" at this point than exists. The establishment of the Institute of Cybernetics and Amosov's works and his colleagues were the impetus for development in this direction, it has emerged in parallel with Western works and till 90s didn't fall behind them. Meanwhile, for empirical sociology, from my point of view, this is an important and the most promising line of research, its development would allow this science a real basis for making management decisions. While all social experiments are not conducted on models of social systems, but on the unique "live" social systems, on people. I want to pay tribute to Nikolai Mikhailovich Amosov, who 50 years ago understood this well and was moving in this direction. One can only regret that his life resources were not enough to make this movement irreversible in our country. I think only Amosov with his intelligence, vitality and independent status would be able to create a stable research unit devoted to society modeling (neither my colleagues nor I were able to do so).

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