Human and the foodnet market: on the formation of the agricultural producer ethos (psychological and pedagogical aspect)

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Abstract. The existing directions of studying the ethos of an agricultural producer in the context of the introduction of digital technologies in the context of pedagogy and psychology are outlined. The relevance of the scientific study of the agricultural producer ethos in the sixth technological wave is considered. A psychological and pedagogical model of the agricultural producer ethos has been developed, which includes personal interests; ethics in the use of digital technologies; relationships with society; value orientations; agricultural producer personality; responsibility and relationships with other persons. The experts presented the ethical principles that agricultural producers should follow, considering the trend of development of digital technologies in agriculture. Priorities for the development of ethical principles in the use of Foodnet technologies were identified.

1. Introduction

Our time is the time of the prologue of the sixth technological wave. Its contours are just beginning to take shape, characterized by the development and application of high-tech, or, as they now say, "high technologies" \cite{5}. The priority is bio- and nanotechnology, genetic engineering, membrane and quantum technologies, photonics, micromechanics, thermonuclear energy - the synthesis of their achievements should lead to the creation of, for example, a quantum computer, artificial intelligence and ultimately provide access to a fundamentally new level in the management systems of the state, society, economy \cite{5}. One of the striking features of the coming wave is the acceleration of the life cycle of technologies, which leads to the need for specialists to form competencies for managing these processes, determining their direction, and meaning.

The beginning of the sixth technological wave is associated with the achievement of the singularity point by humanity, leading to the uncontrollability and irreversibility of the processes that determine radical changes for all mankind (Figure 1).
Figure 1. Timeline of technology development.

Such processes, first, may include environmental problems, income differentiation and the growth of the world population. Their totality defines one of the most promising, in-demand and, consequently, competitive markets - the market of pure products.

In the conditions of the upcoming sixth technological wave, forecasting the future for the state is forecasting its place in the high-tech markets. A key guideline for predicting the future of Russia is the National Technology Initiative (NTI), a public-private partnership program aimed at creating competitive products and services, which should provide Russia with a leading position in the high-tech markets [5]. NTI includes such production markets as Energynet - energy market; Safenet - personal security; Healthnet - personal health and medicine system; Finnet - distributed finance and currency systems; Neuronet - distributed components of the psyche and consciousness created artificially, etc. It is possible to secure leading positions in these markets only if there are both "high technologies" and the human factor.

Scientists and engineers can work on projects together with environmentalists, sociologists, ethicists who in practice deal with issues of social benefits and threats. Ethicists and sociologists should take an active part in research and development to be able to understand and evaluate all the possibilities and consequences of a technological breakthrough and, if necessary, offer alternative options. Science can be especially useful in modeling the future. Ethics in the field of science is an integral part of scientific thinking. Creating technologies for the benefit of society and moving away from the current consumer model of technological development requires system management, which is strategically focused on improving human life, and not on preserving the power and position of the elite. Nevertheless, it should be borne in mind that innovations pose a threat to the current social hierarchy, because they redistribute power: people with low social status can soar up and vice versa [8].

Competition is not so much a contest of products. Competition is a contest of agricultural producers. We suggest paying attention to the agricultural producer - a person whose actions depend on the accuracy of the execution of the most thorough instructions.

It should be noted that the competition of the future is the competition between the maturing generation Z and the previous generations. The speed of technology development and the rapid adaptation of modern children and adolescents to them will lead to an increase in the differences between previous and subsequent generations. Modern children and adolescents will have
hypertrophied characteristics that cause anxiety among parents of students today: isolation and opposition of virtual and traditional values, clip thinking, priority of the virtual world, unwillingness to build a long-term career, lack of authority, desire to receive quick rewards [7].

When considering the human factor in agricultural production, it matters not only what the agricultural producer knows, can and what skills he has, but also his motivation, values, and worldview. This is especially important in the context of the development of a new technology market called Foodnet. This is a personalized food market, based on advanced technologies for food production and marketing. Its difference from the existing one is that it presents the end user with products of better quality and for less money. The Foodnet includes the following segments: organic and precision farming, alternative sources of raw materials, modern breeding, and personalized nutrition. In this market, it is necessary to consider not only the consumer's needs for high-quality personalized food, but also the manufacturer's willingness to follow ethical standards in food production.

The set of provisions defining the behavior of an agricultural producer in the Foodnet market is the agricultural producer ethos. The concept of ethos (Greek ethos – custom, disposition, character) came from ancient Greek philosophy, it was used for the general characterization of a set of stable traits of individual character [2]. In sociology, the concept of ethos is used to denote rules and patterns of everyday behavior, "practical wisdom", the way of life and lifestyle of a community of people, for example, "professional ethos". The ethos formation is a process of education, it should be carried out in the education system. But is it being implemented and what is required for its implementation? We will pay attention to the questions – how the work on the formation of the agricultural producer ethos is carried out, starting with the general education system and what needs to be done so that this work would allow to form a worldview that ensures victory in the competition on the world Foodnet markets.

There are several research papers devoted to the role of man in production. Thus, back in the XVII century, the English thinker V. Petty, who stood at the origins of classical political economy, put forward the idea of the paramount value of the labor skills of the population in the national wealth of the country [9]. This idea was further developed by the Scottish economist and philosopher A. Smith, who concluded that the wealth of each nation depends on two main conditions: art, skill, ingenuity with which labor is applied and on the ratio of the number of people employed and unoccupied with useful work. He "included" knowledge and qualifications in the fixed capital of society, along with machines and land, and also formulated an idea of the productive nature of costs in the development of the ability of the population to work [11]. K. Marx drew attention to the fact that labor, as an expedient human activity to change objects and forces of the surrounding nature for the purpose of creation of tangible and intangible benefits – is, first of all, the process of labor consumption [6]. O.S. Gorbunova, V.I. Nabokov, V.V. Kalitskaya studied the role of man in agriculture [1].

Among the foreign authors developing the concept of ethos, including the ethos of science, the following names can be distinguished: B. Barber, R. Boguslav, I. Mitroff, M. Mulkey, K. Popper, N. Storer, S. Fuller, J. Ziman, P. Shtompka. Russian scientists also made a significant contribution to the development of the ethos of science: G.S. Batygin, N.N. Vitchenko, N.V. Demina, L.P. Kiyashchenko, M.G. Lazar, E.Z. Mirskaya, V.N. Porus et al. [2,3,4].

But, despite the numerous, multidimensional studies of the human factor in various fields of production, the question remains open about how to form the personality of a modern agricultural producer focused on the tasks of NTI? How to form ethical norms and values of the future agricultural producer, so that they correspond to the current trends of society? The formation of the personality of the future agricultural producer begins with school and continues in agricultural universities and colleges. At the same time, it should be recognized that purposeful work in this area is not carried out in educational organizations. The school as a social institution prepares students to take the Unified State Exam in subjects that students mainly focus on when choosing a future profession. In such conditions, there is an increasing need to actualize the role of educational work – as a complex process covering all substrutures of personality.
We proceed from the assumption that the formation of the ethos of an agricultural producer is a purposeful and continuous process, covering the areas of general, vocational, and additional education, focused on the development trends of modern society.

2. Materials and Methods
The purpose of the study is to substantiate the purpose, content, and stages of the formation of the agricultural producer ethos qualimetrically. Agricultural producers are producers of agricultural products. Within the framework of this article, the results of work on the formation of a draft model of the agricultural producer ethos are presented. By the agricultural producer ethos, we mean the lifestyle of a given professional group, the orientation of its culture, the hierarchy of values adopted in it.

The process of formation of a model of the agricultural producer ethos is a process of heuristic modeling. For its implementation, it is important to select experts as specialists who can provide information in conditions of uncertainty and work with them.

To solve this problem, the following research methods were used: theoretical (analysis of psychological and pedagogical, methodological literature and dissertation research on the studied problem, content analysis, comparison, synthesis of essential characteristics of concepts, generalization of practical experience); empirical (pedagogical observation, questioning, expert assessment).

3. Results and Discussion
We propose to create three expert groups, each of which is competent in "answering its own question". The group of experts "Agricultural Producers" — how does the proposed ethos correspond to the essence of agricultural labor? The group of experts "Teachers" — is it possible to implement the process of familiarization with the ethos and accepting it as a guide to activity in the education system? What should be the content, methods, means, forms used by participants in educational relations? The group of experts "Marketers" — how is the ethos related to the promotion of goods on the market, with competition? The task of expert groups at the described stage of research is to conduct an examination of the draft model of the agricultural producer ethos according to the algorithm of the method of group expert assessments (GEA), which will provide a qualimetric justification of the ethos model being formed.

The first stage of the expertise is the development of the object of expertise - the draft model of the agricultural producer ethos. The first stage of its development was the formation of a working group (WG), which was assigned with administrative, organizational, methodological, and technical functions. The areas of responsibility of each participant of the working group, key control points and targets of the expertise results were identified.

At the second stage, the WG identified a set of candidates for experts. It included 138 potential experts. Of these, agricultural workers – 54 people, teachers of general education organizations and teachers of universities and colleges - 44 people, marketers - 40 people.

At the third stage, the WG formed a bank of potential experts, including 98 people. Of these, agricultural workers – 34 people, teachers of general education organizations and teachers of universities and colleges - 37 people, marketers - 27 people.

At the fourth stage, the WG carried out an analysis of models to select the basis for building a project model of the agricultural producer ethos. The theories of the ethos of B. Barber, R. Boguslav, and I. Mitroff, M. Malkey, K. Popper, N. Storer, S. Fuller, J. Ziman, P. Shtompka, G.S. Batygin, N.N. Vitchenko, N.V. Demina, L.P. Kiyashchenko, M.G. Lazara, E.Z. Mirskaya, V.N. Porus were considered [2,3,4]. Experts have developed a model of the agricultural producer ethos, which includes the following areas (Figure 2):
At the fifth stage, the experts were presented with a model of the agricultural producer ethos and asked to formulate principles that determine the behavior of agricultural producer for each of the fields of activity.

The quantitative results of the expertise are presented in Table 1.

**Table 1.** The quantitative results of the expertise.

| Areas of activity/number of principles | Group of experts "Agricultural Producers" | Group of experts "Teachers" | Group of experts "Marketers" |
|----------------------------------------|-------------------------------------------|-----------------------------|------------------------------|
| Personal interests                     | 5                                         | 3                           | 1                            |
| Ethics in the use of digital technologies | 4                                         | 1                           | 2                            |
| Relationship with society              | 2                                         | 6                           | 4                            |
| Value orientations                     | 1                                         | 2                           | 3                            |
| Personality of agricultural producer   | 3                                         | 2                           | 1                            |
| Responsibility                         | 5                                         | 4                           | 6                            |
Relationship with other persons

|   | 2   | 4   | 5   |
|---|-----|-----|-----|

During a group interview with experts, a list of ethical principles was compiled that agricultural producers should follow, considering the trend of development of digital technologies in agriculture.

1. The principle of professional competence.
2. The principle of not harming human health when using low-quality raw materials in the manufacture of agricultural products and violation of processing technology.
3. When working with big data in agriculture, the analysis of user data using algorithms and probabilistic models is omitted, provided that the necessary legal grounds are available. When processing data, intentional discrimination of citizens based on race, nationality, language, political views, religious or philosophical beliefs, information about intimate life is not allowed.
4. Falsification of data obtained by an agricultural producer for the purposes of analytics, as well as falsification of data analytics results, is unacceptable.
5. Agricultural producers should make every possible effort to ensure that when processing data for analytical purposes, no harm or damage is caused to users whose data has been used in analytical products.
6. If publicly available information posted in the form of open data is used for analytics for commercial purposes, then agricultural producers consider it a good practice to check the possibility of using such data. The mere fact that some data is open does not mean that their use is unlimited.
7. Agricultural producers carry out automated data processing that generates legal consequences for a citizen based on a written consent of a citizen, equivalent to which is the consent in electronic form, certified by an electronic signature or other identifiers permitted by applicable law or, if this does not contradict applicable law, by agreement of the parties.

The obtained empirical data were subjected to mathematical processing using the statistical program SPSS. Based on empirical data on the methods used in the study, a correlation analysis (Pearson's criterion) was carried out based on the results of a quantitative expertise of the model of the agricultural producer ethos.

The following significant correlations were revealed.

As can be seen in Figure 3, value orientations influence ethics in the use of digital technologies ($r = 0.42; p \leq 0.05$). Thus, a high level of value orientations contributes to the ethical use of digital technologies.
As can be seen in Figure 4, the level of responsibility directly affects relationships with other people (r = 0.40; p≤0.05). Accordingly, the higher the level of responsibility, the better the relationship with other people develops.

4. Conclusions
The Foodnet is the NTI market - therefore, the requirements for the NTI graduate should be focused on it. The NTI graduate training program includes both basic, forming "rigid" and "flexible" competencies, and variable program, considering the specifics of the NTI market. For NTI graduates focused on the Foodnet market, this is the agricultural producer ethos, which includes the lifestyle of this professional group, the orientation of its culture, the hierarchy of values adopted in it. For its formation, it is necessary to create a system of measures that allow developing an understanding that breaking the rules may provide a tactical victory over a competitor (a lot of cheap and bad products will be produced), but in the end it is a strategic defeat, since the agricultural producer will lose confidence.

To do this, it is possible to conduct situational games, workshops, training in communication skills in virtual reality; work with psychological barriers in the process of using the latest technical means; training in safe behavior skills in the future technological environment.

References
[1] Gorbunova O S, Nabokov V I, Kalitskaya V V and Perminova I M 2017 Modern trends in the formation of human capital of agricultural organizations of the Sverdlovsk region AON 2 URL: https://cyberleninka.ru/article/n/sovremennye-tendentsii-formirovaniya-chelovecheskogo-kapitala-selskohozyaystvennyh-organizatsiy-sverdlovskoy-oblasti (access date: 06/24/2021).
[2] Zolkin A L 2019 Ethos of culture and civilizational security Socio-humanitarian review 2 33-37
[3] Kicherova M N 2013 Ethos of science in the information society Bulletin of Eurasian Science 4 (17) URL: https://cyberleninka.ru/article/n/etos-nauki-v-informatsionnom-obschestve (access date: 06/24/2021)
[4] Klishina S A 2017 The ethos of the new science Bulletin of the Russian Chemical Technology University named after D.I. Mendeleev: Humanitarian and socio-economic studies 1 104-119
[5] Koshevenko S V 2019 Formation of NTI markets as a factor of strategic development of Russia In the collection: Digital space: economy, management, society. Collection of scientific articles of the I All-Russian Scientific Conference Smolensk State University 107-110
[6] Marx K. 2010 Capital Vol. 1. (K.Marx and F.Engels) Col. Vol. 23
[7] Miroshnichenko A A and Merzlyakova D R 2019 National Technological Initiative: about the risks of the quality of education Bulletin of the Udmurt University Ser. Philosophy Psychology Pedagogy 29(3) 336-344
[8] National Report on Innovations in Russia 2015 (edited by E.B. Kuznetsov) Moscow: RVC. 144 p. Access http://www.rusventure.ru/ru/programm/analytics/docs/NROI_RVC.pdf (checked 22.04.2016)
[9] Petty U 2012 *Economic and statistical works* (Kiev, Publishing house "Book on demand")

[10] Sagina O A and Maricheva T V 2019 Personalized nutrition and prospects for its development for the Foodnet In the collection: *Greater Eurasia: Development, Security, Cooperation Yearbook* 447-449.

[11] Smith A 2016 *The study on the nature and causes of the wealth of Nations* (Moscow, Eksmo)

[12] Brighton C 2013 *Socio-cultural values in the development of intercultural communication competence* (New York: Peter Lang) 217

[13] Khan M A, Ismail F B, Hussain A and Alghazali B 2020 The Interplay of Leadership Styles, Innovative Work Behavior, Organizational Culture, and Organizational Citizenship Behavior *SAGE Open* 10(1) 126-137

[14] Baranov A A, Vytovtova N I and Naumova T A 2014 *International scientific-practical conference «Innovations in science, technology and the integration of knowledge»* (London: SCIEURO) 126-136

[15] Merzlyakova D R, Miroshnichenko A A, Baranov A A, Morozov V I and Samigullina G Z 2021 Foodnet Market: role of rural schools *IOP Conference Series: Earth and Environmental Science* 699 (1)