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DIGITALIZATION OF AGRICULTURE IN THE REPUBLIC OF UZBEKISTAN

Abstract: *In article questions of development of digital economy in agrarian sector of the Republic of Uzbekistan are considered. Technologies of "clever" agriculture: «the Internet of things» (Internet of Things - IoT) - interaction and information interchange system between various devices and cars which allows to automate managerial processes and control by means of various «clever devices» and considerably to lower participation in them the person. Scopes of technology IoT in agriculture this exact agriculture; "clever" farms";" clever hothouses»; management of raw materials; storage of agricultural production; management of agricultural transport; «Big data» and others. Exact agriculture is an application of "clever" devices in management of efficiency of crops taking into account changes in inhabitancy of plants, and also more an earth effective utilization. Thus there is an optimization of operational expenses and productivity increase on the average on 15-20 % at the expense of reduction of volumes of used seeds, agrochemicals, fertilizers and water which are applied strictly« on requirement». Exact agriculture provides also parallel driving of agricultural machinery by means of the GPS-navigation, excluding double processing or expression of plants in the field, and also the differentiated crops and entering of chemicals. "Clever" hothouses allow to spend more effectively fertilizers, chemicals, water, and also to optimize the quantity of the personnel necessary for care by cultures, and to lower the losses arising because of the human factor.*

Key words: *digitalization, clever devices, big data, clever hothouses, a farm, digital technology, IT technology.*

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Introduction

Thanking digitalization of efficiency of agriculture in the EU countries and the North America develops high rates. In the Republic of Uzbekistan the great attention recently is given to development of digital agriculture from the state, caused by necessity to provide the given branch by modern technologies, to pass to digital technology. The companies develop cooperation in questions of increase of management efficiency chains of deliveries; transformations of client experience for the purpose of increase in presence of finished goods of the company in trade channels; constructions of the effective integrated processes in meat - and a bird processing, cultivation of agricultures; forming of system of development of the personnel and motivation of employees. Now in the Republic of Uzbekistan operate more than 67800 farms. Their activity is regulated by the Republic of

Uzbekistan. Law «About a farm» and the Decree of the President «About measures on the further perfection of the organization of activity and farming development in Uzbekistan». In the country it is created over 17.5 thousand farms and more than 250 thousand new workplaces. The greatest quantity of farms is formed in the Tashkent, Dzhizak, Namangan, Samarkand, Kashkadaria, Fergana, Andizhan areas and Republic of Karakalpakstan. Dizitalization of branch economy, including agriculture consulting and data processing assumes the active investment policy regarding IT technologies. In it the sense the big role for development of agricultural the Republic of Uzbekistan promotes the Decree of the President of the Republic of Uzbekistan № UP-5853 from October, 23rd, 2019, «About the statement of strategy of development of agriculture of Republic of Uzbekistan on 2020 – 2030 years»

Research methods: At a writing of article we had been used methods of the analysis and synthesis of materials on agro-business development in the Republic of Uzbekistan.

Discussion: By 2020 year it is provided to finish volumes of output of grain grains of cultures to 8.5 million tons with growth on 16.4 %, to increase potato volume of output by 35 %, other vegetables - on 30 %, fruits and grapes on 21.5 %, meat on 26.2 %, milk - on 47.3 %, eggs on 74.5 %, fishes in 2.5 times. Thus volumes of export of these kinds of the foodstuffs considerably will increase.

By estimations of the World Bank, reduction of the areas of a clap and wheat in the Republic of Uzbekistan, for example, to 50 % of areas under crops, will lead to increase in gross output of agriculture at 51 %, employment in agriculture the economy of water on 11 % will grow on 16 %, and. In 2018 year cost of export of agro food production of the Republic of Uzbekistan, including a cotton fiber has made only $1.3mln.; $330 on hectare of arable lands. For comparison, for the same period Vietnam exported agricultural products for the sum $40 billion Export gain of this country equaled $6100 on each hectare of an arable land. Economic reforms and the measures undertaken by the government under the introduction into the World Trade Organization (WTO) will help to the Republic of Uzbekistan to increase export of the agricultural goods, in particular, fruit-and-vegetable production, in большее number of the states of the world. Now more than 60 % of fruit-and-vegetable productions are made small dehkans household by economy and personal plots.

However their participation in the chains of creation of production with the additional cost focused for export of foods, while remains low. Integration of the above-named manufacturers into these chains by means of government programs on stimulation of cooperation and cooperation of agricultural co-operatives with agro business and exporters would promote development of production potentialities and increase of profitability of business of small farmers and owners of personal plots. The clever agriculture, considerably raises productivity of agricultural crops and efficiency of animal industries, reduces costs and production cost price. Dynamical development of this sector in the world represents a serious call to agricultural sector of the Republic of Uzbekistan which, despite a favorable environment, still does not possess sufficient competitiveness in manufacture and sale of production. And this call is serious enough for national economy as in the Republic of Uzbekistan half of population of the Republic of Uzbekistan lives in countryside, more than 1/4 parts of able-bodied population are occupied in agriculture which makes almost half of gross national product. Technologies of clever" agriculture": «the Internet of things» (Internet of Things - IoT) - interaction and information interchange system between various devices and cars which allows to automate managerial processes and control by means of various «clever devices» and considerably to lower participation in them the person. Scopes of technology IoT in agriculture is an exact agriculture; "clever farms"; "clever hothouses"; management of raw materials; storage of agricultural production; management of agricultural transport; «Big data» and others. Exact agriculture is an application «lever devices» in management of efficiency of crops taking into account changes in inhabitancy of plants, and also more an earth effective utilization. Thus there is an optimization of operational expenses and productivity increase on the average on 15-20% at the expense of reduction of volumes of used seeds, agrochemicals, fertilizers and water which are applied strictly «on requirement». Exact agriculture provides also parallel driving of agricultural machinery by means of the GPS-navigation, excluding double processing or expression of plants in the field, and also the differentiated crops and entering of chemicals.« Clever »hothouses allow to spend more effectively fertilizers, chemicals, water, and also to optimize the quantity of the personnel necessary for care by cultures, and to lower the losses arising because of the human factor. By estimates of experts in spite of the fact that the world market «clever hothouses» does not exceed 3 % from total of hothouse constructions, their quantity annually grows on 9%. «Clever hothouses» allow operating all process of watering and microclimate regulation. Besides, realization of monitoring of productivity and quality of work of all systems that presumes to raise a crop gain on 20-40 %, and with improvement of quality of a made product and reduction of costs is possible. The wide circulation is received by projects on creation in short terms of a network of mini farms near to big cities for delivery« to the day »fresh and natural vegetative food, for example, greens. Following purposes are thus reached: the big crop from smaller territory is reaped and manual skills are replaced with a robotics. It is supposed that for a year

from such farm the area of 0.4 hectares it is possible to collect the same quantity of a crop, as from 12 hectares of a classical farm in the open air. Thus the earth on a mini farm can be replaced on hydroponics.

«Clever farms» allow raising productivity of pets and quality of production, and also to lower costs. According to scientists, the animal industries based on traditional ways, in a today's kind a little effectively as under grazing cattle there is one third of earths of a planet, thus animals in the course of growth eat the most part of grown up grain. Application of the automated systems fattening, milking and monitoring of health of animals, according to experts, allows raising milk yield on 30-40 % and it is more rational to use available forage reserve. Besides, there are technological decisions for increase of efficiency of veterinary service which allow conducting the individual veterinary account, a uniform database of animals, and the account of owners of animals. For example, on the basis of the chip «the electronic passport» animal is created, the information in the course of reading supports a database in the software in an actual condition, than and constant and reliable veterinary control is provided. "Clever storehouses" for vegetables and fruit allow carrying out monitoring of a condition of production at storage by means of specially set algorithms in a mode of real time (temperature mode of storehouses, humidity level, the maintenance of carbonic gas) that helps to make correct decisions. At infringement of conditions the system corrects a situation and notifies on changes of the owner of a warehouse. The created technological decisions for processing and agricultural products storage, automation of these processes allows to reduce expenses for the personnel and to improve storage conditions of the collected crop. Risk factors represent everything that can negatively be reflected in profit. In plant growing, and animal industries it is a lot of risks: what will be weather; whether there will be an invasion of a locust; what illnesses can be dangerous to animals in a future season; whether there is enough qualification of workers, it is necessary to understand absolutely accurately, it is connected with what risks also what there will be a price of each such risk. Landowners need to know, how many they will lose, if fears come true, it is necessary, it is necessary to analyze all factors which influence productivity and a market situation, and also separately to consider the operational risks, including the human factor. For example, it is possible to sow braver from the point of view of productivity culture. For the profitableness analysis as a whole on the enterprise it is necessary of monitoring of volume of realization of production, its structure, the cost price and level of small -realization prices. Therefore online systems connect practically to everything that is on a farm. Also it is possible to give an example the analysis of the data with drones. The data drones allows providing inventory of farmland, monitoring of technics, a condition of crops and fields under steam, and also support and control of agro technical actions.

Digital technologies help drivers with mode of one window to choose approaching it both on an arrangement, and at the price the order and гарантированно to receive payment during the shortest time. Not all landowners have mastered Skype and to introduce digital technologies, it is necessary huge forces and resources to allocate on training and an advantage and necessity explanation.

One of the major directions of digital transformation is adjustment of automatic data exchange between car and office systems. In this segment company John Deere in partnership with the Russian company TSPS has let out decision AGDI (AgData Integrator), carrying out automatic data exchange between technics John Deere and office system on base 1C in a bilateral format. The system allows not only supervising technical characteristics of work of the car, but also carries out functions of the Agrarian dispatcher with the realized functionality of work under instructions. In spite of the fact that the given decision was developed as a part of digital ecosystem John Deere, it allows carrying out integration of technics of different manufacturers into one system, and also gives the chance uses of the various cartographical data. The unique example of such decision is platform Agri router which structure includes such brands, as AGCO, Amazone, Grimme, Horsch, Krone, Kuhn, Lemken, Pöttinger, Rauch, Same Deutz-Fahridrugie. The platform is developed in cooperation with company DKE Data and allows carrying out data exchange between cars and software of different manufacturers. The given decision adapts under technics of each manufacturer. For example, since 2017 year all self-propelled combines GRIMME, and since 2019 year also potato harvest combines EVO 280 and EVO 290 are delivered in a serial complete set with the telemetering device which transfers the given cars and co-ordinates GPS to a client portal and connects them to platform Agro router. Thus the user can set itself the data and GPS which will be transferred to different appendices of type Farm Management Information System (FMIS). Leading manufacturers of agricultural machinery offer digital decisions not only for the clients, but also for dealers that helps to deduce work of service services on new level. In this direction company CLAAS has developed unique system CLAAS Remote Service which provides to dealers possibility of remote service support of the clients. By means of system the dealer can remotely define a cause of defect of the car and, depending on character of malfunction, or prompt by phone to the machine operator as it can be eliminated, or if detail replacement is required, beforehand to take it with itself at departure to the client. Besides the dealer can beforehand co-ordinate time of carrying out of maintenance service of cars to avoid their stop during

intensive field works. System CLAAS Remote Service c is included 2018 year into standard equipment of combines LEXION, tractors XERION, and also some models of combines TUCANO and JAGUAR and tractors AXION of 900th series.

The known fact that depends on service and maintenance service level timeliness and quality of work in the field, therefore world manufacturers apply the advanced technologies to optimize service and to raise its quality. We will consider foreign experience of digitalization in foreign countries: at the USA the first place in the world on level of efficiency of agriculture in which it is occupied only about 2 % of labor of the country. In agriculture of the USA the set of the innovative decisions allowing farmers to make of more production with smaller expenses is used. For example, application of genetically modified seeds and direct crops reduces expenses of farmers on use of cars, fuel and pesticides. In the USA the average level of penetration of technologies of exact agriculture, according to Service of economic researches (USDA) the Ministries of Agro culture is estimated in 30-50 %. Thus in large-scale enterprises level of use of technologies twice above, than in small, and in active agricultural areas reaches 60-80 %. Poll spent among the American farmers has shown that the computer with high-speed access to the Internet and the analysis of soil tests is applied by 98 %; productivity cards, monitors of productivity and navigating GPS-systems - about 80 %; technologies of the differentiated application of fertilizers (chemicals) and ordering cards - more than 60 %; satellite pictures and the analysis of a vegetative index of plants - no more than 30 % of respondents. Thus in agriculture the basic technologies of exact agriculture, including soil and productivity mapping, «auto pilot» technicians and an individualization of norms of entering of everything that the earth, from seeds to pesticides "asks" are widely used. Each of these technologies renders the economic benefit. By estimations of the farmers who are growing up corn, productivity mapping allows them to save to $62 on each hectare, and tractors with the autopilot and GPS save to $37.5 on hectare. By estimations of the American experts, each dollar enclosed in the USA in export of agricultural products and foodstuff, creates in home market of $1.27 more, each export $1 million supports 8 thousand workplaces in home market, and as a whole the agriculture of the USA participates in formation to 8.6 % of gross national product of the country. In the Netherlands in agriculture «digital technologies», including application of exact agriculture and robots at various stages of agricultural works, and also «the Internet of things» are widely applied, helping to operate various processes. Thus in agriculture of the Netherlands only 2 % of the occupied population of the country work. In the Netherlands the small area of ground grounds is the basic restrictive factor. For this reason the most part of farms represents small firms and family business. Despite it, they are capable to compete and even to surpass large transnational corporations in sphere of sales of fruit-and-vegetable production and seeds. In many farms the practice based on high technologies and management is introduced, allowing to raise their productivity and to be resource-saving.

The Netherlands is the world leader on introduction of innovative technologies in agriculture and animal industries. The Dutch farmers since 2000 year managed to refuse almost completely application of pesticides, and since 2009 year to reduce use of antibiotics in poultry farming and animal industries to 60 %. Besides, the Netherlands is the world leader on deducing of new grades and export of seeds of various agricultural crops. Now the Netherlands takes the second place on export of foodstuff, conceding leadership of the USA which the areas in the sizes in 270 times exceed the Netherlands, on the area which makes 42.5 sq. km, the area of glass hothouses makes an order of 6 thousand hectares. The Netherlands I have experience in strengthening of a chain of creation of the added cost in agriculture, support of export of local farmers and the agro enterprises, and also in introduction of scientific researches in sector of a fruit-and-vegetable economy the Netherlands experience in the given sphere can be useful and to the Republic of Uzbekistan. In Israel less than 20 % of the earths are suitable for agriculture conducting, but thus farmers provide requirements of the population for foodstuff on 95 %. Considering an acute shortage of irrigation water in Israel, the technology of a drop irrigation of crops is developed. Thus the government of Israel in every possible way supports agrarian sector of the country, subsidizing farmers to 40 % from cost of purchase and introduction of new technologies. The main components of the "clever" farmer approach - the software, irrigation systems, and the innovative harvest technics which manages more cheaply thanks to subsidizing system. At the expense of the similar approach, and also close cooperation of the state, private and scientific sectors in agriculture Israel manages to keep high indicators of introduction of new technologies in agrarian sphere. The phenomenon of the Israeli agriculture consists that the low natural potential is compensated by high intensity and efficiency of introduction of new technologies. Traditional approaches under the authority of agriculture practically are not used; high level of innovation helps to achieve the maximum efficiency of branch at the minimum resource expenses. In the Republic of Korea state regulation is directed on all assistance to introduction of innovations and modern technologies to all spheres of economy and ability to live. The Republic of Korea agriculture also represents hi-tech branch. Experience of innovative development of agriculture of the Republic of Korea is unique and can be used in a solution of a problem of maintenance of food safety of developing countries

and formations of innovative agrarian system. In 2018 year the Republic of Korea Ministry of Agriculture declared that is going to invest in development of "clever" farms on all country and to increase their total area to 7 thousand hectares about current 4.01 hectares. In the Republic of Korea in agricultural productions various special thermo regulating, ventilating devices, devices for an economic and exact drop irrigation, highly concentrated liquid fertilizers, including made by a method extraction from seaweed are widely used. Hothouses which cope the computer where automatics completely itself regulates all parameters for favorable growth and development of plants are used and if necessary introduces corresponding corrective amendments. Thus experts of a hothouse economy can supervise process from the mobile phone. Experience of attraction of insects is interesting to pest control on a basis lures them in special traps also. On Taiwan for last 5-10 years the state has allocated to $100 mln for working out and introduction of innovations, including on creation of the research centers, working out of the software and mobile appendices, the big educational program for farmers. To clean from the market it is as much as possible intermediaries and to raise profitableness of farmers, processors and trading networks, the state has ordered working out of Internet portals on which farmers can conduct the pages and will advance thus itself in the market. To a portal have access as private buyers from the cities, interested in acquisition of fresh organic production first-hand, and wholesale buyers, переработчики. In Argentina at the state level the system of monitoring of a condition of crops, control over a condition of soils, data gathering and their analysis takes root. On a regular basis the satellite data is bought, the analytical data from meteorological stations, the enterprises, the research centers, laboratories which on-line take place on the general Internet portal which also works as service for landowners for data acquisition on the fields gathers. India is focused on increase of formation of farmer's mobile appendices Agro Value Added Services which provide farmers with the information on weather, the price for production, in particular, take root, the best technologies for cultivation of cultures etc. In each region the agrarian innovative and research centers are created. In Japan, according to the Ministry of Agriculture, the quantity of farmers in the country was reduced to 56 % to 1.82 million people, their middle age has grown with 59 till 67 years for the same period as children of countrymen prefer to work in cities, where payment above. For the decision of the given problem the Ministry of Agriculture of Japan in 2014 has accepted a policy of the "clever" agriculture directed on development of a robotics and information technology for increase of productivity of farms. For example, company Kubota has developed independent tractors in cost about 11 million yens and drone spraying pesticides, for automation of some field works, and company Seven-Eleven has opened the first automated farm on salad manufacture. It is predicted that the market of "clever" agriculture in Japan will grow on 14 % to 14.7 billion yens and almost will double the next five years to 33.5 billion yens. In Russia, according to experts, labor productivity in agrarian sector lags behind today productivity, for example, Germany, three times, and productivity below productivity to Germany and the USA in 2.5-3 times. In this connection in Russia in agriculture increase of productivity of agricultural manufacture and decrease in its losses are considered as the main aspects of use of digital technologies. According to the experts, in Russia the inefficiency of agrarian manufacture, including a lack of the information at farmers for acceptance of correct decisions, leads losses to 40 % of a crop, 40 more % are lost at processing, storage and transportation. Thus not all losses are connected with an environment, 25-30 % of result in agricultural manufacture depend on the person. By estimations FAO the United Nations, annual losses of grain from manufacture total amount in Russia make 25 %, while in the USA - only 1 %, the undeveloped countries - 30 %, and in the world as a whole - 10 %. In Russia consider that digitalization of agriculture can lead to reduction of loss of grain also.

Conclusion: Dynamical development digitalization of economy, in particular in agrarian sector in the developed countries represents a serious call to agricultural sector of the Republic of Uzbekistan which, despite a favorable environment, still does not possess sufficient competitiveness in manufacture and sale of production.

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