

# The introduction of the digital farming concept in the agricultural sector of Russia

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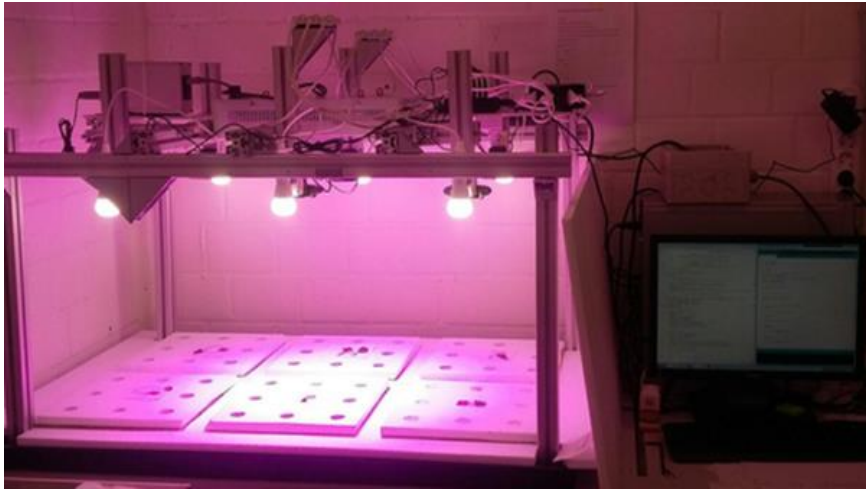
# Introduction

- ▶ Currently, digital systems affect all sectors of the modern economy and business outside the ICT sector itself and transfer industrial automation to a new stage of industrialization - Industry 4.0. This is an updated concept of "smart manufacturing", which is the next step in the digitalization of production and industry.
- ▶ investment (investment attraction), the transformation of economic sectors into competitive and efficient, technological and digital modernization of industry and creation of high-tech industries, development of digital industries and digital entrepreneurship [3].

# Materials and methods

- ▶ Digitalization of the real sector of the economy is the main component of the digital economy and a determining factor in the growth of the economy as a whole, including the digital industry itself, as a technology producer. Digital technologies are changing traditional business models, production chains and processes that lead to the emergence of new products, services, platforms, and innovations [4].
- ▶ An important step for the development of agriculture is the introduction of digital farming - a fundamentally new management strategy based on the use of digital technologies. Digital farming is a new stage in the development of the agricultural sphere, associated with the use of geographic information systems, global positioning, on-board computers and smart equipment, as well as managerial and executive processes that can differentiate the methods of processing, fertilizing, chemical meliorants and plant protection products.

# Result and Discussions



- ▶ Unmanned aerial vehicles. In agriculture, drones and UAVs allow: to calculate the vegetation index NDVI [17]; make orthophoto maps of the field with high accuracy; determine the dynamics of changes in the state of crops yield; control the perimeter of the field.
- ▶ Let us separately consider a wireless sensor network (WSN) for rapid assessment of the state of plants using neural networks [18].

# Conclusion

- ▶ Today WSNs are an important part of industrial use. WSN - multi-level, distributed networks, built on the principles of self-organization, with a large number of sensors and actuators, which are combined via radio channel. The implementation of sensor networks depends on the requirements of a specific application. Networks can be deployed both in open areas and in enclosed spaces, such as laboratories or greenhouses. WSN, which are developed for the needs of precision farming, must meet the requirements that are determined by the scope of use. These requirements include fault tolerance, scaling, manufacturing costs, the type of operating environment, topology of the sensor network, hardware limitations, data transfer model, and power consumption.
- ▶ World experience in researching the operation of wireless networks has shown that autonomy, which is one of the requirements for WSN, including a wireless network for express diagnostics of plant conditions, requires a reduction in the power supply of each network node and becomes an issue in increasing the network energy efficiency.
- ▶ The work on the development of models of individual network elements and routing protocols of the wireless sensor network is in progress and aimed at optimizing the energy consumption of sensors and increasing the energy efficiency of the WSN.