

Liubov Skokova

# **INFRASTRUCTURE AND ECOSYSTEM OF A SMART MANUFACTURING FACILITY**

*Infrastructure and ecosystem of a smart  
home and food production: introduction to  
innovative logistics and management*

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The book, composed of autonomous sections, examines innovative infrastructural components of a smart home, including energy supply, backup storage, water supply and purification, regeneration and recycling, as well as clean air provision, regeneration, and oxygen enrichment. It also addresses integrated issues of real - time monitoring and management of these components and their interconnections.

Descriptions of technical and software solutions are provided at a level corresponding to advanced global standards, enabling the practical use of artificial intelligence and neural networks in smart home construction and operation.

Particular attention is given to water preparation, purification, regeneration, and reuse as key factors in the feasibility of smart home systems. Each section presents original developments aligned with modern technological trends, along with considerations on the logistics of generating innovative solutions within smart home environments.

**Keywords:** *Innovative components of a smart home; infrastructural components of a smart home; regeneration and oxygen enrichment; backup energy storage within the smart home ecosystem; integrated innovative logistics; technological and design novelty; initial technical requirements; wastewater; use of artificial intelligence and artificial neural networks in the design and operation of a smart home*

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The process of creating a technical solution that constitutes an invention and at the same time has commercial potential requires extensive analytical preparation, a large number of comparative operations, and the identification of parameters and aspects capable of attracting investor attention and ensuring the necessary level of consumer demand.

The era of isolated inventions that could be implemented autonomously and were independent of the complex of technologies and integrated conditions of modern life, including environmental and ecological aspects as well as social usage factors, has passed.

In this context, it is quite difficult for authors and developers to navigate without a systematic approach and a clear methodology.

First of all, it is necessary to evaluate the emerging technological solution and systematize its parameters in comparison with earlier technical solutions and technologies that have already been created and have demonstrated commercial success.

Market requirements are often highly subjective, and it is necessary to find a connection between subjective factors and objective conditions related to the limits of technological equipment, the availability of appropriate materials, cost considerations, and the feasibility of manufacturing processes, without allowing these issues to undermine the positive and distinctive features of the future invention.

Preliminary analysis is recommended to be carried out according to the above system.

## INTRODUCTION

Characteristics of the complex nature of the proposed technology.

Analysis of the proposed technology in terms of the use of only well – known and repeatedly verified physical principles and laws embodied in a compact integrated design and technological solution.

Analysis of the proposed technology and device (method) for its implementation, enabling its application in real industrial systems without any modification of its design or any change in its operating principle.

Analysis of the proposed technology in terms of the use of only well – known and widely used components and their combinations.

Analysis of the proposed technology in terms of the possibility of integrated use, alongside widely known components, of new components in various combinations with existing ones, formed within the proposed process due to the properties and characteristics of the device implementing the technology.

Analysis of the proposed technology in terms of its level of universality and flexibility, allowing the application of flexible technological schemes within the same device or method used for its implementation.

Analysis of the composition of the proposed technology in terms of the possibility of using or incorporating a control, monitoring, and regulation system based on a minimal number

of process parameters that have a direct dependence and immediate impact on both process efficiency and the efficiency of the device itself during operation, taking into account the achievement of the required technological, energy, and environmental results.