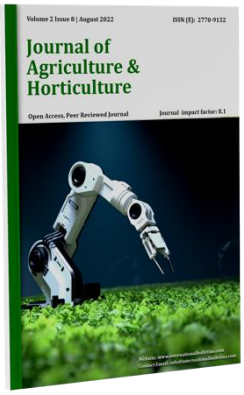

ADVANCED FOREIGN EXPERIENCE IN IMPROVING MANAGEMENT EFFICIENCY IN FOOD INDUSTRY ENTERPRISES

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Abstract: This article analyzes advanced foreign practices for improving management efficiency in food industry enterprises. The practical application of Lean Manufacturing, Industry 4.0, digital transformation, sustainable supply chains, and AI/IoT technologies is demonstrated using examples from major companies in the USA, European Union, Japan, and New Zealand (Gorton's Seafood, Nestlé, Coca-Cola, Lerøy Seafood, Unilever, Fonterra). It is proven that these methods have enabled a 25-35% reduction in operating costs, 15-22% increase in production, 25% decrease in waste, and 22% reduction in carbon footprint. Practical recommendations are provided on adapting these experiences to Uzbekistan's conditions, including pilot projects, personnel training, government support, and implementation of international standards (HACCP, ISO 22000). By 2030, OEE is projected to reach 88%, exports to reach $2.5 billion, and energy savings to reach 25%.

Keywords: food industry, management efficiency, Lean Manufacturing, Industry 4.0, digital transformation, sustainable supply chain, foreign experience.

The food industry is one of the most important and strategically significant sectors of the global economy, playing a crucial role not only in ensuring food security for the population but also in the sustainable development of the national economy, increasing export potential, and creating jobs. Today, factors such as rapid population growth worldwide, climate change, reduction in water and energy resources, and the increasing complexity of global supply chains are posing new challenges for food production enterprises. Improving management efficiency is key to solving these problems. In foreign countries, particularly in the USA, European Union, Japan, New Zealand, and other advanced nations, food enterprises have successfully implemented modern management methods such as Lean Manufacturing, Industry 4.0, digital transformation, sustainable supply chain, AI, and IoT technologies. This article thoroughly analyzes these advanced practices, assesses their impact on efficiency, and examines in detail the possibilities for adaptation by Uzbekistan's food enterprises [1].

Management efficiency is the ability of an enterprise to optimally utilize labor, material, financial, and time resources to achieve its goals. In the food industry, this indicator is measured by the following key parameters: OEE (Overall Equipment Effectiveness), resource utilization coefficient, waste levels, energy and water consumption, and quality control standards such as HACCP, ISO 22000, and GlobalGAP. According to a 2023 study by Deloitte, the implementation of Lean Manufacturing methods in food industry enterprises allows for a reduction in operating costs by 25-35% and an increase in production volume by 15-20% [2].

When analyzing global trends, while energy consumption in foreign countries averages 180-250 kW/t of product, in Uzbekistan this figure reaches 350-450 kW/t, water consumption abroad is 2.5-4.0 m3/t, while in Uzbekistan it is 6.0-8.5 m3/t, waste level abroad is around 1.5-

3.0%, in Uzbekistan 5.0-7.0%, while the OEE indicator remains at 85-92% in advanced enterprises and 65-75% in Uzbekistan [3].

The main reasons for these differences are outdated technologies, lack of digital management systems, low employee qualifications, and weakness of the management system. Among advanced management models, Lean Manufacturing waste elimination Six Sigma reduction of defects to 3.4 ppm TPM Total Productive Maintenance increasing equipment reliability Industry 4.0 digital twins AI IoT Big Data and blockchain technologies play an important role [4].

The practical application of the Lean Manufacturing method is clearly visible in the example of the USA and Europe, for example, at the US enterprise Gorton's Seafood in 2022, there were many delays in the production of 18% of waste logistics, after the introduction of 5S Kaizen Value Stream Mapping methods, waste decreased by 25%, production volume increased by 22%, and employee participation increased by 40% [5].

In Europe, Nestlé implemented Kanban and Just-in-Time methods as part of its Zero Waste program, resulting in a reduction in water consumption by 1 million m3 per year and an 18% reduction in energy consumption, setting a zero-waste target for 2025.[6] Industry 4.0 and the most striking example of digital transformation is Coca-Cola USA, which detects equipment malfunctions 72 hours in advance through enterprise IoT sensors and AI forecasting algorithms. It manages the supply chain in real time, reduces production downtime by 60%, and saves logistics costs by 8% [7].

The Norwegian enterprise Lerøy Seafood Group has implemented blockchain and RFID technologies that ensured 100% supply chain transparency, reduced carbon footprint by 22%, brought full monitoring of export product quality and safety[8], implemented regenerative agriculture within the UK Sustainable Living Plan program, transitioned product packaging to 100% recycling, implemented a plastic-free packaging system, aimed to achieve carbon neutrality by 2030, increased farmers' income by 15%[9].

Within the framework of the Fonterra Co-operative Group Farm Pride project in New Zealand, the use of GPS drones and AI technologies increased milk yield by 12%, reduced nitrogen emissions by 30%, and strengthened soil health[10]. These case studies show that advanced management methods not only reduce operating costs but also increase product quality, export competitiveness, environmental impact, and social responsibility. The possibilities for adapting these practices in Uzbekistan are high. Lean Manufacturing is highly effective in fruit and vegetable processing, dairy products, and meat processing enterprises.

IT technologies can be implemented at an intermediate level at enterprises in large industrial centers, such as Tashkent, Samarkand, Fergana, and blockchain should begin as a pilot project at export-oriented enterprises [11]. Among practical recommendations, it is important to introduce Lean Manufacturing at 2-3 enterprises in Tashkent, install IoT sensors in Samarkand, test blockchain supply tracking in Bukhara, organize pilot projects, open a Lean Academy in cooperation with Japanese JICA and German GIZ specialists, organize training for enterprise managers on Industry 4.0, provide tax incentives for the import of digital equipment by the state, attract international grants, FAO, World Bank, JICA, public-private partnership, PPP projects, HACCP until 2026, 80% of enterprises are ISO 22,000, mandatory for exporting enterprises, GlobalGAP for fruit and vegetable exporters [12] five-year forecast 2025-2030 OEE from 70% to 88%, exports from $1.2 billion to $2.5 billion, waste from 6.0% to 2.5%, energy savings from 6.0% to 2.5%, water savings from 25% to 30% [13] among the risks are financial

restrictions, lack of specialists, technological resistance, difficulties in adapting to standards, which can be solved through international loans, EBRD, ADB, PPP, attracting specialists from abroad, training,

In conclusion, foreign experience: Lean Manufacturing, digital transformation, and sustainable supply chains are the most effective ways to increase the management efficiency of food enterprises. As seen in the examples of the USA, the European Union, and New Zealand, these methods reduce costs, improve quality, enhance exports, and minimize environmental damage.

For Uzbekistan, adapting these experiences is an important step towards ensuring competitiveness in the global market. launching pilot projects in cooperation with the state, private sector, academia, and international organizations, establishing a personnel training system, implementing international standards, and attracting investments can increase efficiency by 25-30% by 2030, and this is a real goal. [15] State policy plays a crucial role in this process, as tax incentives, grants, and PPP mechanisms enhance enterprises' investment capacity, and it is also necessary to develop technologies adapted to local conditions in collaboration with research institutions.

For example, the introduction of solar-powered drying equipment using our country's sunny climate can reduce water consumption by 40%. If such innovations are localized based on foreign experience, the added value of export products will increase and the competitiveness of our country's products in the global market will increase.

At the same time, it is necessary to introduce online platforms and virtual trainings to improve the skills of employees, which will ensure continuous education even in the context of the pandemic. In general, the adoption of advanced foreign experience will take the food industry of Uzbekistan to a new level and strengthen the country's food security.

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