

# Artificial Intelligence and Food Industry

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**ABSTRACT:** The potential role of Artificial Intelligence is becoming increasingly clear. To keep up with this enormous growth, manufacturers are looking for revolutionary manufacturing techniques, and one such example is the Emergence of AI. The usability of AI provides some form of interactivity between the system users and the system itself, hence enhancing usability. One of the basic human rights is the right to decide. Until now, I have made do with my own brains. If a human solution is forced on me, I can argue, but in the case of “absolute” artificial intelligence, I will be forced to accept. Do I need this? In my research article, I tried to focus on the pros and cons of the adoption of AI in the food industry. With the help of SWOT analysis there are beneficial suggestions about how the industry can check whether it is good for their unique industry requirement needs and how much is the reliability of AI implementation in the food industry. The objective of this research is to find out how AI is doing for the betterment of the food industry and is it good to implement/adopt.

**KEYWORDS:** AI, Food Industry, SWOT Analysis

## **Introduction**

I use various household products, RTV, household appliances, which are produced and assembled from subassemblies in the process of automated line production, in which robots play a significant role. In some physically existing stores and shopping centers, you can find autonomous robots acting as information kiosks and /or customer advisor. In city parks you can find robots controlling people’s behavior in terms of applying anti-pandemic safety recommendations and instruments. More than 75% of millennials in the US and the UK would want to use AI technology to obtain better assistance in planning and cooking healthy meals. World population is projected to escalate to about 9 billion by 2050? To feed this vast number of people, the agriculture sector would need to increase its productivity by about 70 %. To successfully achieve this, technology will need to be a core unit in the food industry. Artificial Intelligence has a vital role to play in future food production. Food and beverage companies are moving fast using technology for operations and logistic efficiencies and onto how to meet consumer desires. The prominent players in the industry have embraced Artificial Intelligence to maintain strong empathy with their audience (Damlapinar 2019).

## ***Role/significance of AI in the Food Industry***

Implementation of AI programs allows for the automatization of manual tasks which offer more time to think about strategic tasks and improve employee efficiency. Consumer friction at the point of sale is also improved by the implementation of AI in the food industry.

## ***Speeding up manual tasks***

Implementation of AI programs allows to automat manual tasks so that no longer must do them on your own so there would be more time to think about strategic tasks and that improve employee efficiency. Consumer friction at the point-of -sale also improved by the implementation of AI in food industry.

### ***Improving worker-overtime ratio***

AI implementation for all day-to-day work to improve workers -overtime ratio.

### ***Running procedures and observance issues***

There are lots of procedure regulations that food and beverage companies must abide by and one can set some rules in the AI system for finding as well as eliminating inefficiencies by analyzing data and finding ways to improve.

### ***Sorting of Food***

Companies in the food industries take advantage of AI to develop machines that significantly improve the sorting of food. These technology systems are sensor-based and use features such as cameras and sensors to visualize food products with human perception. This AI technology segregated the quality of food with computer vision.

### ***Implementation of Personal Hygiene Habits by Employees***

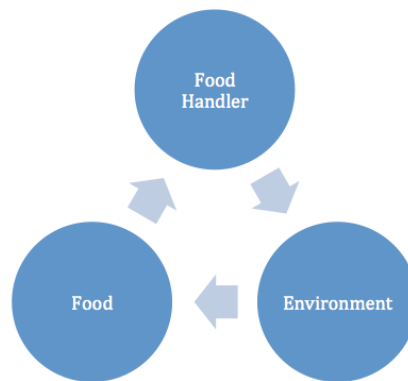


Figure 1. Food handler connection with food and environment

In figure 1 we can see how food handlers are connected with food and environment. AI helps to enable companies to quickly detect any inefficiencies in this aspect and eliminate them to improved food safety. CCTV Cameras with special facial recognition monitor the activities of food workers if they follow or not proper hygiene while making, delivering, and preparing food.

### ***Reduction in Maintenance and repair costs***

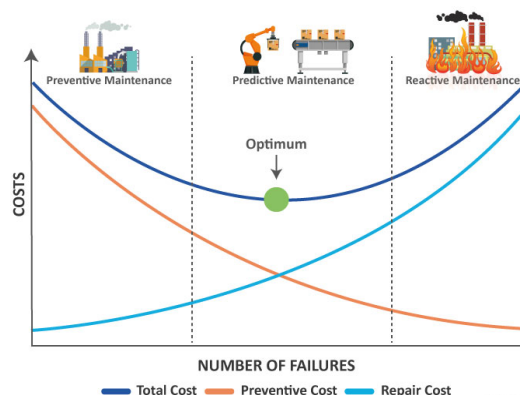


Figure 2. Maintenance and repair costs

AI can help to facilitate predictive maintenance from preventive maintenance which reduces cost.

### ***Self-cleaning and optimization Techniques***

The Self-optimizing-clear-place (SOCIP) technique of AI can improve cleaning time and drastically reduce resources used for cleaning including water. SOCIP uses features like ultrasonic sensing and taking optical fluorescence images to detect the tiniest amount of food leftover and microbial debris present in the equipment. This enhances the optimization of the cleaning maintenance process.

### ***AI is useful to optimize supply chain management***

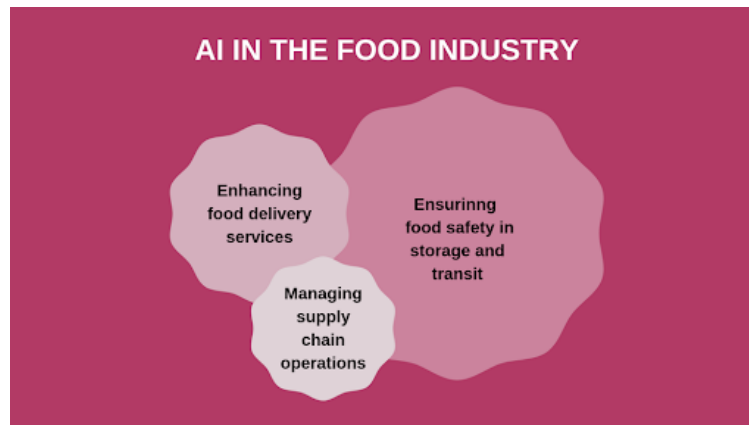


Figure 3. AI in the food industry

The FSMA (Food Safety Modernization Act) has made sanitary requirements stricter, considering the entire supply chain. The reason is that now cereals, spices, and other foods that don't require refrigerators are in danger of contamination. Previously such foods were not prone to contamination, but now that is changed (Olena 2020).

AI helps to minimize delays and maximize profit margins by providing close monitoring of every supply chain operations. Also helps companies to forecast for better management of pricing and stock products accurately. AI also used in the case of transparency issues to track products from the farm to consumers. Suppliers and retailers are now increasingly turning to technology to reduce waste and improve inventory management. When it comes to improving the visibility and management of the food supply chain, AI proves to be the best solution as it optimizes the reduction of waste and improves the freshness of the product (Sharma 2019).

### ***Revolutionizing the whole in-store shopping experience with new products***

Based on the available demographic data and statistical available, many food companies have been able to provide location-specific varieties of food flavor combinations that are targeted and preferred consumer groups (Research and Markets 2021).

### ***AI to analyze consumer data***

Monitoring conversations on social media and using unique algorithms, food industries can use AI to analyze consumer data and identify sentiments behavior that are crucial not only to know positive or negative experiences but also in the development and design of new products. This is proven as an immense contribution to the food industry because companies can now offer unlimited forms of flavor combinations, spices, and ingredients.

### ***Personalized customer services***

All these predictive analysis tools like chat boxes or voice assistant powered by natural language processing and tap consumer shopping data history of personalized consumer service experience provided by AI helps the food industry to monitor consumer preferences and what they always re-order. So, with the help of this AI featured tool food industry can feed personalized items in the consumers' food options.

### ***Introducing new recipe***

Thanks to AI technologies such as image recognition and machine learning, people can now save time, food and money in the kitchen while discovering creative and tasty recipes and even generating their own new and personalized flavors.

### ***Food selling sites***

Automated customer service and customer segmentation can significantly increase the accuracy and efficiency of administrative functions such as creating reports, placing orders, dispatching crews, and formulating new tasks (Olena 2020).

### ***AI in better farming conditions-***

Nowadays companies in the food business are analyzing how they can use AI to suit the future growing techniques of farming. Modern Applications of artificial intelligence in the food industry sector achieving significant reduction in downtime, reducing consumer friction at the point of sale, speed up manual tasks, and improving workers-overtime ratio to name a few.

### ***Optimal food delivery mechanism***

Lots of companies are using AI-based food delivery mechanisms which channelize the processes from food ordering to food delivery. The most successful food delivery services are -Uber Eats, Grub Hub, and Door Dash. Robotics are used in food processing, manufacturing and now robots are delivering food to doorsteps also. All these are possible with help of AI techniques.

These are the major companies operating in AI in Food & Beverages Market.

- TOMRA Sorting Solutions AS
- Rockwell Automation Inc.
- ABB Ltd
- Honeywell International Inc.
- Key Technology I
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### ***Challenges of AI and available solutions***

Everything has its pros and cons, so does AI. This amazing technology has the following cons.

- Companies must make sure that their employees should be skilled enough to keep this AI system always updated to avoid any future troubles.
- Various companies that lack such resources should find food and beverages solutions providers that have already established AI systems which will improve the front-end and back-end processes in the company.
- SAP and Bundled Solutions are some of these providers which built for food and beverages distributors.
- Cost factor is also a big challenge to adopt AI because margins are very thin in the food companies because pockets are tight for these companies not like Amazon and Google.

## Suggestions

SWOT stands for Strengths, Weaknesses, Opportunities, and Threats. Let apply this to know better decisions for the food industry about the use of AI.

<p><b>Strengths</b></p> <p>The food industry with AI can check their ability that how they can do well together? What unique function of AI can you draw on? What can other competitors see as your strength?</p>	<p><b>Weaknesses</b></p> <p>What could be improved with AI? Where is the lack of application of AI for development? What did competitors notice as weaknesses area?</p>
<p><b>Opportunities</b></p> <p>What opportunities are open with the implementation of AI in food industry. What trends could you take advantage of? How the food industry can change their strengths with the opportunity of AI.</p>	<p><b>Threats</b></p> <p>In the threats section, companies can analyze threats which are caused by AI. What are other competitors doing with AI? What threats do your weaknesses expose?</p>

## Conclusion

The global food and beverages market is expected to grow from \$5943.8 billion in 2019 to \$6111.1 billion in 2020 at a compound annual growth rate (CAGR) of 2.9%. The market is then expected to recover and grow at a CAGR of 7% from 2021 and reach \$7527.5 billion in 2023 (Research and Markets 2020). One fact that is noticeably clear with all the discussion and significance and role of AI in the food industry is that the food industry must invest in innovations to cut costs, increase revenue, and stay up to date with consumer trends.

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