

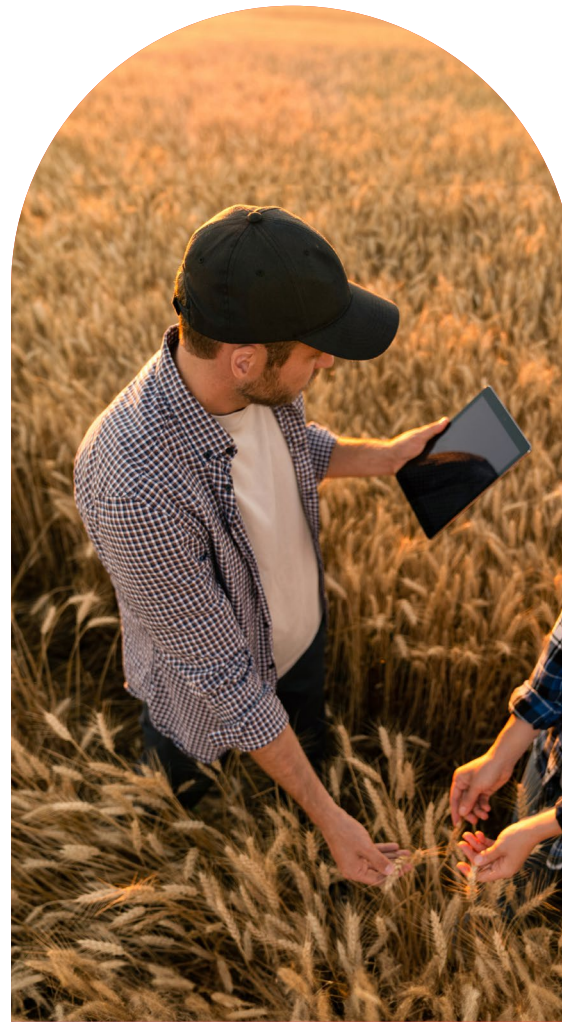
delaware

bite-sized innovation:
how AI revolutionises
the food industry



welcome to the future of food!

As we embark on a journey from 2024 to 2030, AI (Artificial Intelligence) in the food market is poised for a transformative leap. We're witnessing a revolution in the food industry powered by artificial intelligence. From machine learning dominating the tech scene to robotics stirring up the kitchen, AI is reshaping how we process, manage, and enjoy our food. In this e-book, we'll explore the key trends, insights, and breakthrough developments that are setting the table for a smarter, more efficient, and personalised culinary world. Get ready to feast on a buffet of AI-driven innovations.



01

the role of AI in
the agro-food
industry



02

the future of AI
in agro-food



the role of AI in the agro-food industry

01



enhancing business outcomes with AI

The agro-food industry stands on the brink of a revolution, with AI poised to transform every facet of the value chain. From predictive models in agricultural production to advanced analytics in food manufacturing, **AI is redefining efficiency and quality.**

In 2024, many companies recognise the potential of AI in transforming their operations, yet they often struggle to conceptualise its practical applications and the tangible benefits it can bring. The challenge lies in demystifying AI's capabilities and translating them into concrete use cases that can significantly **enhance business outcomes.**

delaware can serve as a source of inspiration, **guiding companies to identify robust use cases that we have successfully delivered.**

By bringing to the table our industry expertise and insights gained from collaborations with other clients, we can drive innovation.

Our commitment is to develop the most advanced and appealing solutions in partnership with our clients, ensuring that these AI-driven tools are not only cutting-edge but also seamlessly integrated into their business ecosystem, driving growth and efficiency.

38.30%

The **market size of AI in food & beverages** is estimated at USD 9.68 billion in 2024, and is expected to reach USD 48.99 billion by 2029, growing at a compound annual growth rate (CAGR) of 38.30% during the forecast period. This growth is a testament to AI's transformative impact on the industry, addressing **consumer demands for fast, affordable, and accessible food options.**



the role of AI in ...



01.1
the fields



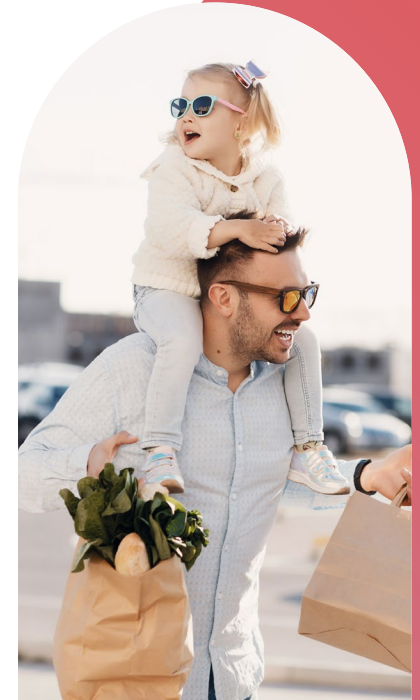
01.2
processing and
preparation



01.3
packaging and
storage



01.4
supply chain



01.5
customer
experience



strengthening seasons management with AI

AI's influence begins in the fields, where predictive models assist farmers in making timely decisions, such as the optimal moments for planting and harvesting. Quality control, powered by computer vision, ensures that only the best batches move forward in the supply chain, maximising both quality and volume.

AI strengthens seasons management by pinpointing the optimal times for activities like sowing, fertilising and harvesting. **Predictive models are crucial for maintaining quality and volume.**

AI's impact on agriculture extends beyond theoretical concepts into predictive models. These models provide insights into the optimal moments for critical activities such as planting and harvesting. For instance, consider MyEasyFarm, a venture by delaware, which exemplifies the power of predictive analytics. By gathering data and knowledge at precise data points—matching the right time with the right activities—MyEasyFarm empowers farmers to optimise their processes and achieve better yields.





Another crucial aspect is **food quality and food safety, driven by computer vision**. This technology ensures that only the best batches move forward in the supply chain. Imagine a scenario where AI algorithms analyse visual data from crops, assessing their quality based on predefined criteria. If a batch meets the required standards, it proceeds seamlessly through the production pipeline. However, if any anomalies are detected – such as subpar produce or signs of disease – the system flags it.

This quality inspection activity occurs on the manufacturing side, where human experts can validate AI's assessments. By combining **data mining** (understanding the data) with **computer vision** (ensuring the right quality), the entire supply chain benefits. The goal is threefold: quality, safety and volume. When farmers deliver higher-quality produce, they not only contribute to overall food security but also receive fair compensation for their efforts. AI's role in agriculture management is transformative, **bridging the gap between traditional practices and cutting-edge technology**.

average
response time
from 35 days
to seconds

RumeXperts

success story

In the innovative intersection of agriculture and artificial intelligence, RumeXperts stands out with its transformative approach to dairy farming data. Their journey began with the recognition that dairy farms are treasure troves of underutilised data, from cattle tags to milk tank monitors. RumeXperts, leveraging a partnership with Digital Wallonia and Delaware, embarked on a mission to harness this data's full potential. Their online platform, Salve, exemplifies this by **analysing farm data in order to proactively alert farmers to issues affecting milk quality**, thus significantly shortening the response time from an average of 35 days to mere moments.

The **evolution from descriptive to predictive analytics** marked a significant shift for RumeXperts. By identifying patterns within the collected data, they developed AI-driven predictions to alert farmers of potential risks before they manifest.

RumeXperts' success story is a testament to the **power of collaborative innovation**. By integrating predictive models into their platform, they have transformed raw data into actionable intelligence. This collaboration between business acumen and data science has paved the way for a new era of resource-efficient cattle farming, inspiring the agro-food industry.



AI's role in modern processing and preparation

In factories, AI systems analyse data points across the production process, learning and adapting to create models that optimise resource usage. This not only leads to cost savings but also enhances the ability to forecast demand and manage inventory effectively.

Within factories, AI systems play a pivotal role in revolutionising food processing & preparation. These intelligent systems meticulously analyse data points across the entire production process, continuously learning and adapting in order to create models that optimise resource usage. The benefits are twofold: **cost savings** and enhanced **operational efficiency**.



AI analyses data from factory sensors to improve processes, ensuring cost-efficient operations without compromising quality

Let's explore the key aspects



Demand forecasting and inventory management

The strength of AI extends beyond the production floor. It enables accurate demand forecasting and stock optimisation. Imagine a scenario where AI algorithms consider meteorological data, predict demand based on the price elasticity and the scarcity of raw materials. An example: cacao may be very scarce due to bad harvests. Due to fixed sales prices of pralines during the year, the impact of the scarcity is only seen the year after in finished product sales. Armed with this information, operations can proactively manage production levels—scaling up or down as needed. The result? A finely tuned supply chain that meets consumer demands while minimizing waste.

Efficient production methods

AI focuses on understanding the most efficient ways to produce end products. It seeks the optimal balance between cost-effectiveness and delivering the highest quality. By analysing data from every machine in the factory, AI learns from historical patterns and generates new models. For instance, it can minimise water and electricity usage while maintaining product quality. The ultimate goal is to take full advantage of cost efficiency without compromising on excellence.



AI's impact on food processing and preparation truly transcends mere automation—it's about intelligent decision-making that ensures both economic viability and product excellence.

elevating food quality, safety and compliance with AI

AI extends its reach to packaging, where it ensures that products are wrapped correctly, and all labels, including barcodes and expiration dates, are accurate. In the realm of delivery, AI evaluates the most efficient routes, maintaining service level agreements and minimising penalties.

In the domain of **food packaging**, AI's capabilities are harnessed to ensure impeccable packaging standards. Sophisticated computer vision systems meticulously inspect each package to confirm that it is wrapped according to quality, safety & compliance regulations, barcodes are scannable, and expiration dates are clearly legible. This rigorous validation process guarantees that every item meets the stringent quality requirements before it moves to the next phase.



Furthermore, AI oversees the proper storage of individual pallets, affirming that each one is positioned correctly for subsequent steps. This meticulous **attention to detail ensures that the quality of the product is preserved from packaging to delivery**, adhering to the highest standards.

When it comes to food preparation, AI's influence is equally transformative. For example, cookie manufacturers can leverage AI to analyse data from baking ovens, providing insights that ensure the end product meets the desired quality. By monitoring the food production process closely, AI aids in achieving the perfect balance of taste, texture, and appearance. This level of precision in cooking not only enhances the culinary experience but also contributes to consistent quality across batches, elevating the standard of food manufacturing.



**5% boost
in sales by
installing IoT
devices on
in-store
bread slicers**

La Lorraine Bakery Group

success story

A compelling case study is the La Lorraine Bakery Group (LLBG), a family-owned Belgian bakery, which has embraced IoT to synchronise supply with demand, aiming to boost sales by at least 5%. LLBG's IT manager, Bart D'haese, aimed to decode sales patterns and optimize bread distribution. By installing IoT devices on in-store bread slicers, LLBG could track when and where bread was sold, providing valuable data to align production with consumer demand and reduce food waste.

The success of the pilot led to an expansion from 3 to 20 stores, with plans to scale nationally and internationally. This initiative exemplifies how collaboration between the agro-food industry and IT can drive innovation and create a shared vision for success.

AI-driven proficiency in supply chain and innovation

In the supply chain administration, AI orchestrates the seamless delivery of products from factory to reseller. The precision of AI in maintaining Service Level Agreements (SLAs) and avoiding penalties is paramount, especially when dealing with perishables like fresh food where time is of the essence.

For specific regions, AI explores the most efficient supply networks and the best roads to market for the product according to food quality and safety, and food compliancy rules and regulations.

The creation of new or improved products also benefits from AI's analytical power. AI can be the new taste-tester; identifying, combining, and testing new flavours.



AI's personal touch in customer experience

In the dynamic world of retail and food manufacturing, customer experience reigns supreme. Let's explore the details:

Data dilemma and personalisation challenges

- Retailers possess a treasure trove of selling and customer data, but manufacturers often find themselves on the outside looking in. Retail owns selling and customer data, whereas manufacturers don't; they must 'buy' this data. The asymmetry poses a unique challenge: how can manufacturers personalise experiences without direct access to customer insights?
- AI steps in as the bridge, leveraging available data to create tailored experiences. From understanding individual preferences to predicting future needs, AI transforms raw data into actionable intelligence.



Intelligent recommendations and basket analysis

- The magic of AI lies in its ability to infuse intelligence into buying recommendations. Imagine an AI-powered system that suggests the perfect wine to accompany a gourmet meal or recommends complementary ingredients for a family dinner, based on what combination of ingredients people are usually buying together.
- Customer segmentation further refines the process. Whether it's a single professional or a bustling family, AI deciphers patterns, identifying optimal moments to promote products, ensuring that the right recommendations reach the right audience. AI's precision ensures that families who only shop during the weekends because they don't have time during the week receive relevant offers when they need them most.

AI isn't just about algorithms; it's about enhancing human experience. Whether it's a family meal, a refreshing beverage, or a personalised recommendation, AI adds that extra touch of magic.

New product introduction

- Innovation thrives when AI meets creativity, allowing a future where AI accelerates product development. Combining flavours and new tastes is something that takes a lot of time, but an AI engine can experiment. It can also scrape social media to cluster taste evolutions.

the future of AI in agro-food

02





the future of AI in agro-food: challenges and opportunities

Despite the potential, the implementation of AI in the agro-food industry is not without its challenges.

A significant gap exists in the maturity levels between large corporations and SMEs, with the latter struggling to keep pace. **The investment and maturity needed to integrate AI into their processes are significant hurdles for SMEs.** delaware plays a crucial role in democratising AI, helping mid-market companies harness its capabilities and realise its value.

Looking ahead, the opportunities for AI in the agro-food industry are vast. As companies bridge the maturity gap, **AI will become an integral part of operations**, driving financial success and enabling a focus on quality.





3 pivotal challenges

In the quest to revolutionise the food industry through data and AI, there are three pivotal challenges. These insights paint a picture of a future where data and AI not only drive efficiency but also foster a more sustainable and interconnected food industry.

Ecosystem mindset

Ecosystem mindset, where companies are not isolated entities but part of a coordinated data exchange that spans the entire value chain, from field to fork. Multiple parties, sometimes more than five companies, rely on a shared data ecosystem. This interconnectedness is not about adding complexity but optimising the entire chain to be more ecological, cost-efficient, and ultimately democratising prices for consumers.

Data interoperability

Data interoperability is high on the agenda. There are a lot of calls for a unified set of standards for collecting, processing, and exchanging information among diverse stakeholders, including industry players, government bodies, manufacturers, and sellers. It is about creating a common language for data to facilitate seamless interactions across the food industry's multifaceted landscape.

Sustainability

How can the value chain optimise supply and demand in today's food industry? We still see a lot of waste and unconsumed products. Sustainability goes beyond recycling packaging; it's about optimising supply and demand through AI, which can significantly reduce overproduction and control waste.

delaware: your strategic partner in AI-driven food industry transformation

delaware stands at the forefront of the AI revolution in the food industry, not merely as a technical builder but as a strategic partner.

We really want to make sure that we understand what your needs are and how genAI can help you solve that. delaware's approach is to first identify where the real value can come from, aligning technological capabilities with the client's unique requirements.

delaware's expertise is not confined to technical knowledge; it extends to a deep understanding of the industry's nuances. This involves a collaborative effort to inspire and share ideas, helping clients pinpoint the most impactful use cases. delaware brings a wealth of industry expertise to the table, ensuring that solutions are not only relevant but also tailored to the specific needs of the food business.

In essence, delaware's role is to clarify and demystify AI's potential, creating a roadmap for clients to navigate the complexities of AI integration. By combining advisory services with industry knowledge, delaware helps clients to not just envision but also actualise an AI-empowered future.



contact our experts or share your thoughts

get in touch



Alban Leong

alban.leong@delawareconsulting.com



Michael LoBosco

michael.lobosco@delawareconsulting.com

delaware

we commit. we deliver.

The materials, including any images in this ebook, are protected under international copyright law.