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Green light for the smart bakery

Stergiou Family is a beloved Greek bakery, for its carefully crafted, delicious snacks – sweet and savory. It is a household name offering tradition and innovation across its broad portfolio. With its recent expansion, the business gained its second production facility, where it carefully built a fully automated, smart bakery.

By Catalina Mihu

The family-owned business, now in its second generation, is proud of its strong heritage and in-house tradition. As a leading snacking and bakery company, Stergiou Bakery offers a diverse range of fresh bakery products, including cakes, croissants, donuts, and traditional Greek tsoureki. In recent years, the portfolio grew to include the HoReCa sector with an extensive bakery assortment.

A household name

Stergiou Family products are beloved in the whole country. All Greek men know the Stergiou brand: they build a special relationship as they learn to appreciate their sandwiches, croissants and other snacks during their mandatory military service. The bakery has an established tradition of supplying the army, which goes back to when the business started. Around 1958, Georgios Stergiou, the company's founder and the father of today's owner – Dimitris Stergiou, was preparing and delivering fresh sandwiches with his tricycle cart in downtown Athens. He quickly created a market for his business, which included army canteens among his first customers. The market proved fruitful: since then, the name Stergiou has been associated with quality, customer service, and reliability.

The family company has tripled its business over the past 10 years; it is now running two plants with a total capacity of over 220 tons of dough per year, producing 270 types of bakery products, with a team of 350 people. For retail, the portfolio includes a range of packaged goods, distributed with their own trucks to supermarkets, grocery stores and kiosks. In 2015, Stergiou Family Bakery added a segment for HoReCa, with frozen specialties that are sold to hotels, restaurants and cafés all over Greece. The bakery's current production capacity exceeds 220 tons of dough per day, with the flexibility to scale up production further.

Retail products are delivered fresh through its own fleet of 120 trucks, ensuring door-to-door service to supermarkets, mini-markets, and kiosks – in total, 12,500 delivery points across Greece. Its HoReCa products, which are frozen, are distributed to hotels, restaurants, and coffee shops.



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Stergiou Family has been growing together with its network, for over 50 years. From its production facilities just outside Athens, the company bakes and distributes its products in a smooth-running network spanning about 4,000 km from the production facilities, including islands. The business was built around its flawless delivery concept, which has been perfected over time. Efficiency is of the utmost importance, and so is sustainability; the company regularly optimizes its routes to make sure the environmental impact is minimized. Bigger trucks are used for fewer delivery runs, and even the tires are a part of the company's sustainability work: they are all recycled when replaced. Artificial Intelligence is used to optimize their routes, too, with a live monitoring system for all 140 trucks. The ERP not only tracks routes, but also the status of each truck and even the temperature inside. That's not all: the smart system also allows the bakery to anticipate incoming orders very accurately, so that production runs are optimized in advance.

Sustainability is a key priority of the business: "We recognize the importance of respecting both the environment and the local community, and we take proactive steps to minimize our impact. As part of our commitment, we have invested in renewable energy to offset 25% of our environmental footprint," according to the company. Moreover, processes and technologies are established to minimize energy loss and reduce food waste.

A smart factory blueprint: Stergiou Family Bakery technology line-up

Stergiou Family recently expanded its production to include frozen products, with a matching state-of-the-art facility. The fully automated, smart bakery is a project five years in the making and started operations in 2025. With the EUR 40 mil-



"This is industry 4.0! The factory is fully-automated."

Dimitris Stergiou, owner, Stergiou Family Bakery

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lion investment in the new production facility, the family business has made an impressive leap forward that stays true to this philosophy: the fully automated, sustainable plant ensures impeccable delivery between processing stages, in-house, too. This expansion was driven by the significant increase in demand for frozen products, particularly from the hospitality industry, as well as supermarkets expanding their bake-off business.

The complete project was managed in collaboration with WP BAKERYGROUP, and it combines solutions from:

- E 80: Laser-guided vehicle system
- Frigo Stahl: refrigeration systems, including the deep-freeze robotic warehouse
- WP BAKERYGROUP: tunnel oven and handling systems
- Pattyn: automated packaging line
- Sancassiano: dough mixing system
- Sancassiano: liquid ferment production system
- E 80: inventory management systems
- Rademaker: dough make up line

The project: a brand-new production site

The new plant, spanning 40,000 sqm was built in Avlonas – about 40 km away from the first factory, just outside of Athens. It was a concept five years in the making: about two and a half years were spent defining the concept and designing it down to the smallest detail. The development, from blueprint to fully set up facility, took another year and a half, and around six months after that – equipment installation and commissioning. The plant started production on July 24, 2024.

The new industrial plant in Avlonas, Attica, is dedicated to the HoReCa portfolio of frozen products. It truly embodies the Stergiou Family's vision of a smart plant, designed to reflect their

two main priorities: product innovation and state-of-the-art technology, with the optimum setup to streamline processes and a flexible design to match production needs.

> "At Stergiou Family, we are committed to being pioneers in the bakery and snacking sectors. Our aim is for each launch to create value and elevate the way our customers engage with our products, ultimately enhancing their experience and satisfaction."
>
> *Dimitris Stergiou, owner, Stergiou Family Bakery*

When selecting the solutions for the new plant, two critical factors played a dominant role in the decision-making process: one was achieving top-class product quality, with a focus on the in-house preparation of long-fermentation liquid sourdough, as a key raw material, and a high-end cooling and shock-freezing process, doubled by a state-of-the-art seep-freezing storage facility.

The second factor was a high level of automation, to optimize production efficiency and flexibility – a truly smart factory of the future, Stergiou underlines.

Industry 4.0 deep freeze warehouse

Product handling at the end of the production line is the first encounter with what makes this plant smart: it is entirely autonomous for all the cold chain process steps, from picking and handling, to storing and shipping. It is also the first area that can be seen when entering the production space, where the visitor is immediately greeted by several Laser Guided Vehicles (LGVs) from the E80, the Italian developer of automated and integrated intralogistics solutions. The LGVs are either neatly 'parked', waiting on standby (with a charging station nearby), or at work – carrying the packaged goods for inspection and storage inside the warehouse freezer. From there, the LGVs also load the products into trucks, according to delivery orders and the established routes, so that the products are always immediately available at each stop. Their 'traffic' area is clearly marked, while each unit can also detect any obstacle in their

Stergiou Project: WP Riehle components

1. WP SCORING ROBOT (cutting robot)
Type: IRB 660
Robot arm type: 6-axis robot (articulated arm robot)
Maximum height of robot (measured from floor): 3.30 m
Robot weight: 1,750 kg
Reach: 3.15 m
Load capacity: 180 kg
The camera transmits the position of the dough pieces to the robot. This robot and this attachment are used to score 11 different products.
Scoring with cutting technology: water jet
Scoring tool: 13 nozzles per row
Number of cutting patterns: 3
Belt height (cutting height measured from the floor): 1.43 m
Capacity: 660 dough pieces/min



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operating area. With a 360°-angle vision, thanks to the Proximity Laser Scanner (PLS) devices, they are completely safe, for the people in the facility, for each other, and for the products they handle.

Once a pallet is complete, a signal is sent out to the LGVs that it is ready to be picked up for wrapping. If the pallets run out, the system will have the robots bring more from the drop-off point to the loading station. Each pallet is inspected and will be corrected if the products are not correctly aligned, before wrapping. But, since the system has been calibrated in detail, this hardly ever occurs. Once the pallet is wrapped and labeled, it is again inspected. Pallets that pass the check will be sent into the cold storage, at -22°C. If they don't meet all requirements, they go back to assembly. Throughout the process sequence, there is no human intervention, anywhere.

A quick walk inside the cold storage completes the picture of the system's smart setup: only occasional visitors will need the lights to be turned on, to see their way around. LGVs efficiently manage the deep freeze warehouse, which can be set to temperatures as low as -26°C, entirely on their own. They handle the (palletized, wrapped and labeled) products, storing them in the assigned warehouse space, where they are scheduled to stay for around nine days, and loading the selected ones for delivery. The warehouse also shows sustainability was at the top of mind in its design, from the setup of the airflow distribution – for consistent cooling and low noise, to the choice in environmentally friendly refrigerants.

On average, 100 pallets are sorted per hour, according to orders that need to be filled. The deep-freeze storage was designed with growth in mind – as is the entire plant, and is set up to easily accommodate increased production volumes.

The pallets themselves are included in this way of thinking: they are cleaned if they are dusty and thoroughly inspected. Since they are made of wood, not plastic (a choice made to streamline distribution), it's very important that they enter the freezer dry. When a pallet does not pass the

2. WP STACKING ROBOT (stacking robot)
Type: IRB 4600
Robot arm type: 4-axis robot (articulated arm robot)
Maximum height of robot (measured from the floor): 3.30 m
Robot weight: 465 kg
Reach: 2.55 m
Load capacity: 40 kg
Capacity: 7 peel boards/min
Stacking capacity: 274 boards on demand
The peelboards at Stergiou are: 1.25 x 1.25 m, 18 kg weight
Belt height (removal height measured from the floor): 0.9 m
Maximum stack height of a stacking position: 56 boards (1.68 m)


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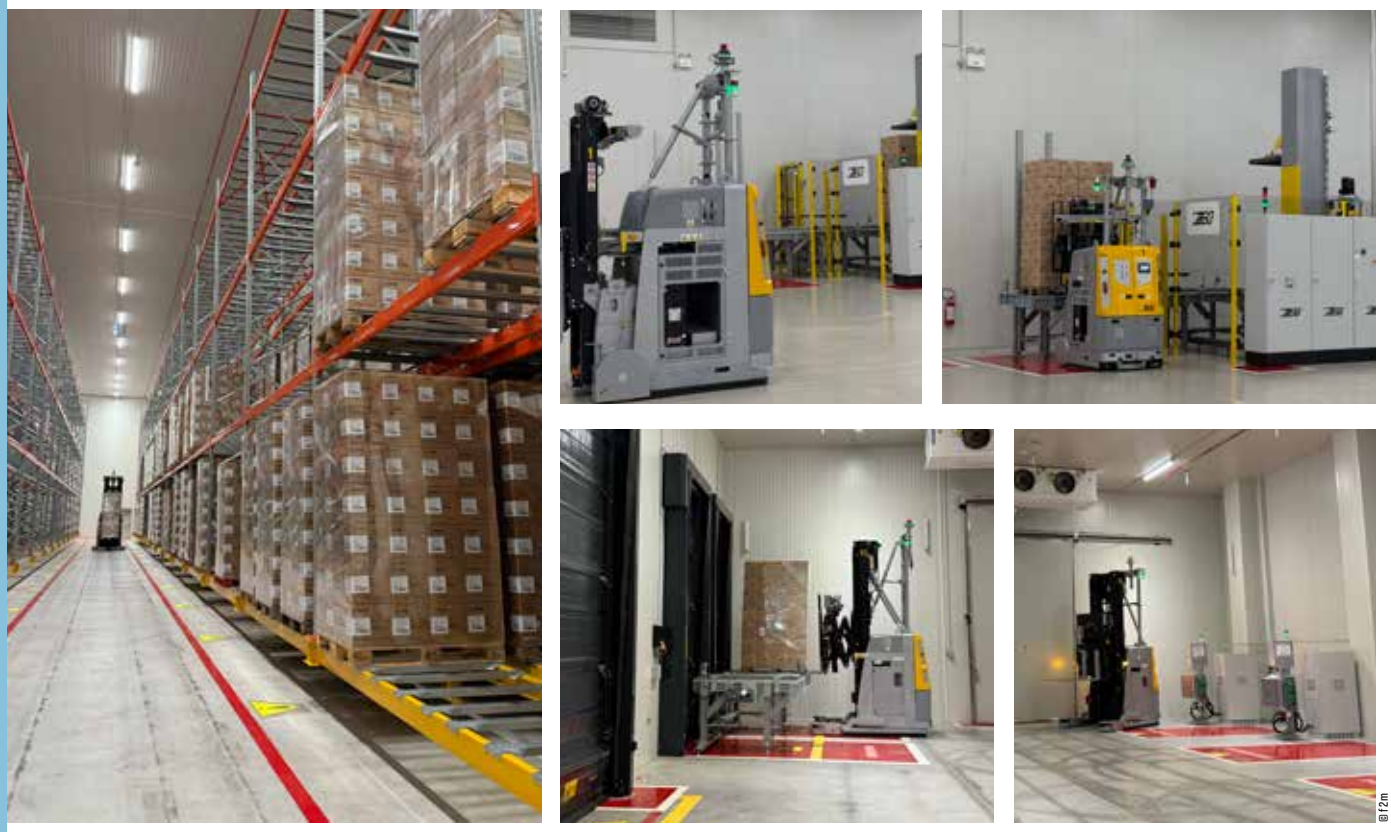

inspection, the smart handling system assesses each situation for the corresponding action.

A clean plant is a must

Every detail was taken into minute consideration in the design of the facility, including air management: not only are the temperatures in complete control, but the factory is also equipped with a positive pressure system for maximum hygiene and safety. Air only goes out, whenever a door opens, but outside air and particles, or wandering insects, cannot enter the facility.

State-of-the-art breadmaking

A fully automated bread production line was a must for Stergiou Family, for the new plant. Rademaker custom-designed a bread line to match the bakery's new facility and their unique range of specialties. "The artisan bread line is capable of handling a great variety of dough types to produce artisan-style products, with the flexibility to form various shapes," Rademaker details.

> "We understood that Rademaker can offer us more than just 10 tons of iron. This is very important. They have experience, they know what they are doing and they have a good system."
>
> *Dimitris Stergiou, owner, Stergiou Family Bakery*

The starting point of building the custom line was the end result, the products themselves. Key factors included the types of products, recipes, shapes, sizes, weights and production capacity. "Once we had a thorough understanding of these elements, we collaborated with a team of technologists and technicians to design a line configuration that best fits Stergiou's needs. Together with Stergiou, we finalized the line concept, ensuring seamless integration into the overall bakery facility, as our line is part of a larger process. This required a

Stergiou Family Bakery at a glance

- Founded in 1958
- 12,500 delivery points all around Greece
- A portfolio of 270 products
- A team of 350 people
- A fleet of 120 trucks
- Two modern facilities:
  - Avlonas facility (new): 50,000 sqm, with a storage capacity of up to 500 tons of flour and a deep-freeze storage space for up to 4,000 pallets
  - Acharnes facility: 11,000 sqm, where up to 130 tons of dough can be produced daily
- In-house-made sourdough, with long fermentation times
- Automated robotics integrated in production, Industry 4.0 powered production
- Smart logistics
- 35% of the company's energy needs come from renewable energy sources
- Recycling: separating paper, plastics and organic waste



clear understanding of the preceding and subsequent production processes. Together, we developed the most optimum layout and footprint of the line in order to work around it to efficiently manufacture their products," Rademaker explains.

A testing stage followed, at the Rademaker Technology Centre (RTC), where bakers from Stergiou and the host's bread technologists worked together on some of the most important products. Based on the testing results, the technical solutions needed took shape, with recommendations considering the entire production process. The line was first switched on for the final acceptance test in Culemborg, at the RTC and then finally installed in Avlona.

Then, while the line was set up in its new home, Rademaker and Stergiou technologists configured the production. Mechanical installation in the new facility took about six months and fine-tuning the process – five more months. The advanced technology in the entire facility also implied a learning process, in synchronizing everything. For example, the steam generated at the oven's entry unexpectedly vanished without the products benefiting from it. The owner recalls, pointing out the steam measurements on the HMI: "Although steam was generated, there was no steam in use. We had to adjust the overpressure in the facility, which we use to keep out insects and dust, to keep the steam from going directly out in the chimneys."

New technology upgrades

This flexible line features a Dynamic Pre-Sheeting System (DSS) that transforms dough batches into a uniform dough sheet. Several gentle reduction stations then gradually reduce the sheet to the required thickness without compromising the dough's integrity. In the final forming stage, the dough is shaped through precise, controlled steps to achieve the desired product shape while ensuring weight consistency for optimal efficiency during production. Then the products





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> *Dimitris Stergiou, owner, Stergiou Family Bakery*

are deposited onto peelboards and transported to the proofing system.

Rademaker's latest technology developments were incorporated into this line: "An innovative dynamic hopper transports the dough in a controlled manner, keeping the shape of the dough chunks linear and constant. Area sensors and separate belts carefully guide the chunks in the sheeter, ensuring size and weight accuracy. Chunk weight and length are exceptionally accurate, leading to a more stable and consistent dough sheet and eventually high-quality baked products," the Dutch technology maker explains.

Many of the Stergiou doughs contain a high water percentage, meaning the line needs to be able to process liquid and sticky doughs well. In the previous DSS version, oil used to be added to prevent the dough from sticking to the DSS hopper. "In the new update, the oil was replaced by wax, reducing the required amount by a factor of four compared to oil," Rademaker highlights the latest features the line has received, which are incorporated into Stergiou's line. This not only makes the line easier to clean, but also brings considerable cost savings. Rademaker estimates the return on investment for the wax distribution system to be only one year. "Cleanability is improved due to easily removable parts and because wax is used instead of oil. But, perhaps even more importantly, the wax version of the DSS creates a more consistent chunk volume and a corresponding more consistent dough sheet. This results in a higher accuracy on the final product," Rademaker highlights.

The Stergiou line also features a hybrid dough weighing system, making sure that the dough weight is always correct with no impact on the product shape in the process. In addition, a dough re-work system was integrated, which helps all of the return dough reenter the process, including side trims and omega trims. "Thanks to the controlled distribution of rework dough, the recycling process is highly stable and reliable," Rademaker explains.

The line also includes a new molding conveyor, with an improved molding performance com-



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Pinsetta is the newest product in the company's portfolio, launched in February

pared to the previous system. It also includes a simple, single-operator control that allows fast and safe adjustments of the molding table (in height and molding degree), for fast changeovers, easy cleaning and maintenance operations. For maximum process efficiency, the bakery produces one product range per day, and changes production from the HMI for the next day's shifts.

Switching production from one product run to the next is a matter of selecting the needed tooling in the operator panel. The machine automatically bypasses the tooling that is not needed for the selected specialty. For maximum efficiency, the line has easily removable tools, exchangeable scrapers and bins. The Unique Fit Tooling system ensures no errors will occur during operation and changeovers. Rademaker explains: "Because of the lightweight and more compact tooling, handling and detaching the tools is easy and can be done by one person, with no need for any additional devices."

We love sourdough!

Stergiou Family knows consumers love sourdough, which has long been established in Greece. In the new facility, they invested in being able to provide great-tasting, premium sourdough products, using self-produced sourdough. For this, they set up a fermentation system, to allow time to work its magic (assisted by high-end technology) and produce sourdough in-house under optimum conditions, consistently. A batch of 40,000 liters of sourdough takes 24 hours to be ready for mixes, with all the parameters under complete control in the process, from the temperature to the amount and the pH, as well as the resulting acidity. The bakery's breads are made with sourdough.

"Consumers like more acidity in their food in the South of Europe. That's why we like lemon, we like balsamic vinegar, we like these flavors. For bread, this acidity comes from sourdough.

> "Our roots lie in our rich family heritage, which has shaped our commitment to high standards of value, safety, and ethics."
>
> *Dimitris Stergiou, owner, Stergiou Family Bakery*

So, in terms of taste, we benefit from using it. But, there are many advantages to sourdough, products achieve a better color, the crust is more crispy and the crumb retains more humidity – improved characteristics all around," Dimitris Stergiou shares.

New creations, coming up!

Traditional snacks such as cakes, croissants, donuts, and Greek tsoureki are among Stergiou's popular specialties. But, the company also looks at new, emerging trends: "There is a growing demand for high-protein products, driven by the increasing popularity of protein-focused diets," they illustrate. Products made with traditional ingredients, such as sourdough, are also on the consumers' and Stergiu's radar.

New product launches are a key priority for the bakery, as it views regularly renewing its assortment as essential to staying relevant and meeting consumer demands. This is why, potential launches are continuously evaluated and backed up by research. The communication channels are kept open: "Our main sources of inspiration come from consumer research and social listening, which allow us to better understand consumer needs and map emerging trends." The company maintains a close relationship with customers, developing concepts suitable to their needs.

The new line came with the opportunity to introduce a new, trendy product – pinsa with a twist, to appeal to a wider, dynamic market. It's called Pinsetta. With a high hydration level and an open structure, Pinsetta has a bit more height than the traditional pinsa, to elevate the classic sandwich concept, while allowing it to be sliced comfortably. The new product was launched in February 2025 and was welcomed with excitement. "It contains sourdough, which acts as a natural preservative, ensuring that the product remains fresh for a significantly longer time in the display. It has a 'handcrafted' appearance, yet is fully baked, providing maximum convenience," Stergiou describes.

Stergiou continues to focus on snacking options, for a reimagined offering that can meet the nutritional needs of those seeking balanced and fulfilling alternatives. In all its creations, the bakery keeps convenience in mind.

Prepared for the future

Looking ahead to the next years, Stergiou set out to continue growing by staying true to our roots while also embracing the future. "Our roots lie in our rich family heritage, which has shaped our commitment to high standards of value, safety, and ethics. We remain dedicated to putting our customers first and maintaining the trust we've built over the years. At the same time, our eyes are looking to the sky, as we actively monitor emerging nutritional trends and technological advancements. Industry 4.0 is guiding us toward adopting innovative solutions that meet the evolving demands of consumers, allowing us to stay ahead while upholding the principles that have made us a leading brand in Greece."

While the existing plant is modernized and home to five production lines, the brand new facility now runs one bread and bun line for high production volumes of up to 4 tons per hour, depending on the product; but, it is designed to easily expand production capacity with additional lines. In Greece, frozen bakery is a big market and Stergiou is prepared to earn its share. +++

