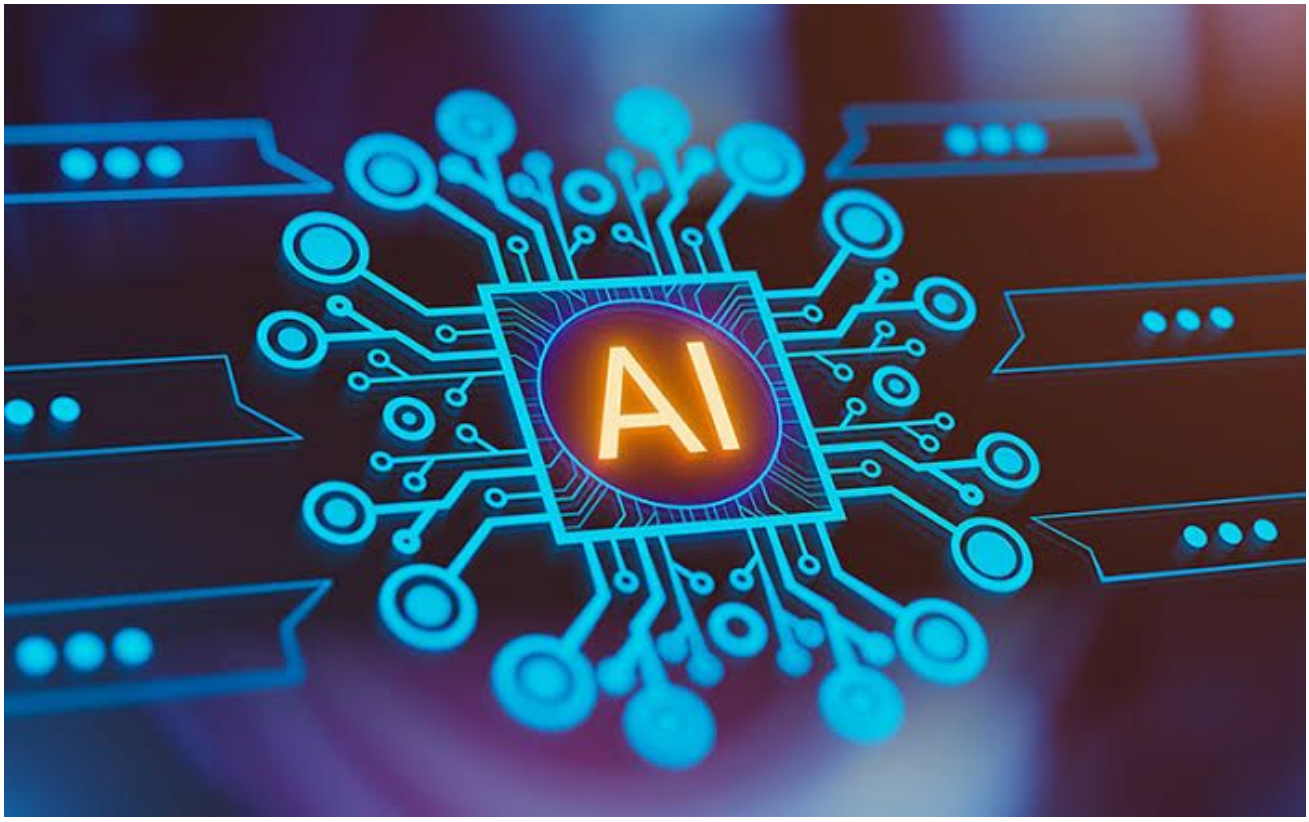
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Italy’s Wine Industry Turns to AI

Growers are using sensors, drones and digital traceability to protect vineyards as climate change reshapes where grapes can thrive.

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Italy’s wine sector is turning to artificial intelligence, sensors and digital traceability as climate change reshapes where and how grapes can be grown, according to industry specialists who say the shift is becoming essential for protecting yields, reducing inputs and preserving the identity of vineyards.

The push toward what Italian companies are calling the “smart vineyard” reflects a broader change in global viticulture. Rising temperatures, shifting rainfall patterns and more frequent weather extremes are forcing growers to adapt in ways that go beyond

new grape varieties or traditional field practices. In the Northern Hemisphere, winegrowing has already moved roughly five degrees of latitude north in recent decades, reaching areas once considered too cool for Vitis vinifera, including parts of the United Kingdom and Scandinavia. At the same time, vineyards have climbed to higher elevations in mountain regions such as the Alps and the Andes to escape heat stress.

In this context, digital tools are being presented not as a luxury but as a practical response to risk. The idea is to connect data from nurseries, vineyards and wineries so that each stage of production can be monitored and traced. That includes tracking plant material from the nursery all the way to the bottle, using information systems that can record health status, varietal identity and field performance. Supporters of the approach say this kind of traceability can help growers make faster decisions, cut waste and better defend margins in a market under pressure from climate volatility.

The nursery is becoming one of the most important testing grounds for this model. Companies such as Vivai Cooperativi Rauscedo, one of Italy’s largest vine nurseries, are using digital systems to manage quality at industrial scale. The company produces about 80 million vine cuttings a year, and its operations now include tools such as graft tomography, artificial vision for sorting plant material and multispectral imaging from drones over rootstock fields. The goal is to turn the nursery into a real-time laboratory where data feeds predictive models that can improve plant health and productivity before vines ever reach a commercial vineyard.

Breeding is also changing. Researchers and nurseries are combining genetic databases with digital platforms to identify resistance traits more quickly and develop grape varieties that can better withstand disease pressure and abiotic stress linked to climate change. One example cited by industry players is work on resistant varieties derived from Glera, the grape used for Prosecco. These efforts are aimed at reducing pesticide use while keeping varietal identity intact, a balance that remains central in a sector built on origin and reputation.

The challenge is not only scientific. It is also regulatory and cultural. Technologies of assisted evolution, known in Italy as TEA, still face skepticism in some parts of Europe, and advocates say clearer communication will be needed if these tools are to gain wider acceptance. They argue that digital systems linking genomic research with vineyard management software could create a direct line between laboratory innovation and field practice, making compliance easier while improving traceability.

In the vineyard itself, growers are increasingly relying on sensors, satellite imagery and drones to measure water stress, nutrient needs and canopy conditions plant by plant. The promise is more precise irrigation, more targeted treatments and lower use of agrochemicals. But experts say technology alone does not deliver those gains. The value comes from turning raw data into decisions that can be acted on quickly in the field.

That is where management platforms and consulting firms are positioning themselves as key partners. Their role is to help growers interpret data on carbon footprint, water savings and input efficiency so those figures can be used not just for internal planning but also for certification and market positioning. In a sector where sustainability claims are increasingly scrutinized, measurable results matter more than broad promises.

The discussion will come into sharper focus at the Agrifood Insight Summit on Sept. 24 at BOOM in Osteria Grande, near Bologna, where companies including Quin and QGS plan to bring together managers and professionals from across the wine chain. The event will center on how process management, data systems and artificial intelligence are changing agricultural production and how those tools can be used day to day in vineyards facing hotter summers, greater disease pressure and tighter economic margins.