

# Fine Wine

LTC Future Series Season 3:  
Technology & Fine Wine

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## Foreword on the Future Series Season 3: Technology & Fine Wine

I commend the London Technology Club for curating such an insightful look at the fine wine world, highlighting some of the challenges that the industry has faced of late and the ones that lie ahead. After reading it, I feel optimistic about the role technology can play to connect fine wine growers, merchants, consumers and the wider ecosystem for a sustainable future and responsible prosperity for all.

At the core of ARENI is the desire to create a forum for thought-leaders in the wine trade, and beyond, to work together toward the common good. This is necessary and urgent if fine wine is to a) remain culturally relevant and b) provide a positive impact for both people and the planet.

Since its inception, and thanks to the exceptional insight and dedication of Pauline Vicard, ARENI's co-founder and Principal, the Institute has been advocating for the need to lean faster and further into digital. Each of the Fine Wine ecosystem building blocks (wineries, importers, retailers, on-trade) are encouraged to add a digital dimension to what they do, in order to take control of the narrative, move on from reliance on face-to-face interactions, increase reach and engagement and pre-empt potential future regulations. ARENI identified three areas where Fine Wine can consider technology (and if there is a disconnect currently between wine and tech, where they can reconnect):

- technologies deployed and used during the production process, where Fine Wine winemakers are more likely to invest and engage with technology

- technologies related to distribution, sales and customer engagement, where Fine Wine wineries have been historically slow to invest money, time and talent

- data-driven technologies directly empowering the Fine Wine consumer, which to date have had a very uneven level of use and engagement, depending mostly on individual consumers' intent and initiative, rather than widespread industry promotion

Players in the wine world are notoriously short on time and resources, yet they don't naturally think to collaborate. Thanks to reports like this one, and the dialogue and debate they provoke, we hope there will be a collective willingness to increasingly work on solutions to challenges of this magnitude together. Potential gamechangers like technology must be shared, welcomed, and embraced. Diversity, inclusion, concern for the environment and increased focus on personal health are converging on wine. Our collective responsibility as actors and stakeholders is to lean into the challenges and offer solutions. Technology shines a searchlight on our blind spots and weaknesses, but also on the huge untapped potential in our field.

We value our partnership with the London Technology Club and enjoy the numerous discussions we have shared with both members of ARENI and the Club about technology in Fine Wine. A toast to Simon Pavitt and his team for his dynamic approach to this treacherous and timely topic.



**Nicole Rolet**

Co-Founder and Chair of ARENI, the Global Institute for the Future of Fine Wine, an independent research and action organisation, and Principal of Chêne Bleu, the multi-award-winning wine estate.



## About the London Technology Club

The London Technology Club is an exclusive community of family offices, private and institutional investors, venture capital firms, technology experts and pioneers. The club combines hard-to-access co-investment opportunities, education, and relationship-building opportunities in the tech sector under one live and digital umbrella, providing access to competitive VC funds with attractive returns.

We organise events with leading technology visionaries, entrepreneurs and investors. A number of prominent international investors are members of our Advisory Board, such as June Felix, CEO of **IG Group**; Jim Mellon, chairman of **Burnbrae Group** and Martin Gilbert, co-founder of Aberdeen Asset Management and chairman of **Revolut**.

In 2019 we wrote **The Future Technology in Wine report**, one of five reports that year focusing on how technology would effect topics our members are passionate about (Formula One, Art, Longevity and Philanthropy being the others). Two years later, we revisit the impact of technology on wine, this time with a sharper focus on fine wine. Since our last report, 12 bottles of Bordeaux wine have been to the International Space Station and back, survived zero-gravity conditions and travelled almost 186 million miles<sup>1</sup>. It is true to say that everyone in the fine wine world will have also experienced quite

a journey of their own these past few years. For many it has been nothing short of a crisis. The pandemic created the destruction of so many routes to market and a forced 'formula one level'-esque acceleration into digitisation across all facets of the fine wine industry. For many, it was necessary just to stay in business. It was as if the fine wine world was avoiding technology and digitisation up until the pandemic. But it became clear it could avoid technology no more.

According to Margareth Henriquez, president and chief executive of **Krug Champagne**, talking at Wine Future 2021: "[What] the pandemic had done is strip back just how well companies were doing before it. A crisis will show where you are strong, but also where you are weak."

Media provocateur Tom Goodwin coined the term *Digital Darwinism* in his book *Digital Darwinism: Survival of the Fittest in the Age of Business Disruption*. He explained the evolution of consumer behaviour when society and technology change faster than some companies' ability to adapt. For an industry considered to be old, fragmented and complex, the fine wine world has been slow (even overtly resistant) to adopt mainstream, let alone cutting-edge, technologies. One cannot deny that the pandemic has been both a wake-up call and an accelerant for the industry.

1 BBC

According to Nicole Rolet, co-founder of fine wine institute **ARENI** and principal of winery **Chene Bleu**: “The destruction of so many routes to market made everyone realise just how much fine wine depends on its communities for its survival. Technology moved from a nice to a must-have, in order to do effective business”.

There is an irreversible shift in consumer behaviours occurring, for example in wanting direct relationships with winemakers, having a plethora of options and channels to buy, collect and invest in wine, and a diversification in fine wine demand from mainly Bordeaux, to numerous wine regions around the world. There is also a shift in power to discerning consumers brought about by outside technology entrepreneurs bringing a Silicon Valley mindset and experiences into the world of fine wine.

Indeed, when purchasing the prestigious Burgundian winery **Château de Pommard**, American serial tech entrepreneur Michael Baum noted:

“ It’s the combination of technology and wine that gets me most excited.”

As this report outlines, there is currently a raft of pioneering businesses building, innovating and gathering momentum. A new era for fine wine is beginning and we believe those that will benefit most will be tech savvy fine wine consumers. These pioneering companies have not just popped up out of nowhere – many are decade-old passion projects. What is notable, is that they are being driven by those outside the wine world coming in with fresh perspective.

As you will see, evolution of fine wine is being instigated by trailblazers across science, finance and tech, most of which proudly proclaim that their lack of wine expertise plays to their advantage – being ingrained within the industry but not belonging to the old establishment.



**Simon Pavitt**  
London Technology Club  
Chief Operating Officer

We see solutions from Silicon Valley’s Michael Baum (with **VIVANT**), Microsoft’s Eric Levine (with **CellarTracker**), Palantir’s Alex Fishman, PayPal’s Max Levchin, Yammer’s David Sacks (all with **Delectable**), banking’s Grant Ashton (**67 Pall Mall**), Gary Boom (**Bordeaux Index**), James Miles and Justin Gibbs (**Liv-ex**), Arnaud Christiaens (**SGC**), satellite’s Daniele De Vecchi (**Saturnalia**), computer science’s Tommy Nordam Jensen (**WiV**), Indian digital talent search’s Pretaak M. Srivastava (**Terraview**), antivirus software’s Heini Zachariassen (**Vivino**), medical device and therapeutics’ Greg Lambrecht (**Coravin**), and physics’ Dr Cici Muldoon (**VeriVin**).

We explain how those that are digitally-savvy and embrace technology will be increasingly empowered across all facets of fine wine consumer needs – from discovering to storing to investing . Challenging antiquated systems and processes, a new wave of innovation is emerging.

*“Digital Darwinism is inevitable, and the only survivors will be those wineries that have the ability to adapt.”*

**Paul Mabray, Pix**

In our opinion, the biggest beneficiary in the medium term will be the consumer. Data-driven technologies directly empowering the fine wine consumer. To paraphrase and add to a mission outlined by Napa Valley-based online store and storage company **Vinfo**, it’s about preserving the integrity of every bottle of wine so that it can be enjoyed exactly as the winemaker intended. It’s about getting the right bottle, in the right condition, in the right hands, and uncorking just at the right time.

## Contents

### 01 The First Sip

- 1 . 1 A future day in the life of a fine wine lover
- 1 . 2 Defining fine wine and the market

### 02 The Winemakers and Production

- 2 . 1 Gathering the data: a new generation of sensors
- 2 . 2 Gathering the data: space vitrification
- 2 . 3 Managing the data: operating systems for vineyards
- 2 . 4 Using the data: earlier yield estimates
- 2 . 5 Using the data: climate change
- 2 . 6 LTC focus on the winemaker: Mike T Barrow, Mendoza and Costaflores 2.0

### 03

- 3 . 1 Merchants, distributors, sommeliers and consultants
- 3 . 2 New style of connecting: The winemaker direct to consumer
- 3 . 3 LTC focus on the intermediary: Grant Ashton and 67 Pall Mall

### 04

- 4 . 1 Discovering
- 4 . 2 Receiving
- 4 . 3 Experiencing
- 4 . 4 LTC focus on the disruptor: Michael Baum and VIVANT
- 4 . 5 Storing
- 4 . 6 Enjoying

### 05

- 5 . 1 Demand and supply
- 5 . 2 Factors in investing
- 5 . 3 Bringing diversification beyond Bordeaux
- 5 . 4 The twelfth factor
- 5 . 5 Tokenisation and NFTs
- 5 . 6 The Metaverse
- 5 . 7 LTC focus on the truth hunter: Dr Cici Muldoon and VeriVin

### 06 Will technology change the definition of Fine Wine?

- 6 . 1 Final thoughts from Pauline Vicard, ARENI Fine Wine Institute

# 01 The First Sip

*“It’s the combination of technology and wine that gets me most excited.”*

## Summary: A vision for the future?

Written by Simon Pavitt, London Technology Club

*This, in our humble opinion, is a typical day not too far away for a fine wine lover:*

I am tech-savvy and believe that technology, including artificial intelligence and synthetics, could one day create the perfect wine, or at least the perfect wine personalised for me. I am happy fully embracing tech for my discovering, enjoying, storing and investing in fine wine. In fact, technology gives me the edge to get better, faster and simpler access. Through technology I can find better value and returns from fine wine compared to the everyday oenophile.

The first thing I do is remotely check how things are at the vineyard I invested in. Through [Terraview’s](#) dashboard, I can look at the winery operating system and today’s tasks. The advances in sensor technology enable the likes of [ChênOX](#) to generate barrel aging data to inform decision-making. I also check [Saturnalia](#) for the ongoing change in vintage conditions and therefore future price predictions. It’s also going to be interesting to get the vineyard’s wine back from accelerated aging in space. Many vineyards now are sending their wine up to store on satellites to bring on earlier, common features of maturation. Why wait 20 years for a wine to mature when five years in space has the same result?

I next go to [WiV](#) and check my wine NFTs, seeing that some critics have reviewed wines I have ownership of through digital tokens, and that the price has gone up. I trade them there and then – a few clicks and everything is automated and processed. I next get an alert from [Homer](#) to say that one of my cases of wine has changed location. I message my portfolio manager at [Cult Wines](#)

and check in. Everything is fine – the wine is going over to [VeriVin](#) to be non-invasively analysed for case consistency and provenance.

I spend the morning selling a few equity shares in collectable fine assets on [Rally](#). Not many people get a small percentage share in 2014 Domaine de la Romanée Conti, 2016 Chateau Petrus and a 2016 Screaming Eagle. Rally has taken off in Asia, so prices are going through the roof. Streaming in the background I usually have a [67PallMall.tv](#) Catch Up playlist on of all things Italian content.

I also need to check the latest ratings on [Wine Lister](#) to get an update on its analysis of my wine collection. I have a quick look at what they have identified as undervalued wines using their vintage value identifier. A few selections have been added to my watchlist, so I go onto Bordeaux Index [LiveTrade](#) and place bids to buy, I then offer to sell some of my portfolio. I’ll go back to my dashboard later to see whether any of my bids or offers are now completed trades.

As I am off to Tuscany tomorrow I go on to [CellarTracker](#) to see what wine is in my Italian cellar. I want to do an evening with friends vertical tasting Ornellaia but am missing a 2014. The API from CellarTracker immediately looks to the latest prices of the wines from [Liv-ex](#) and simultaneously from Pix to see all the best options to buy it (from the producers, most inexpensive, closest, fastest, or from a peer-to-peer sale). By looking online we can see my friend who lives in the nearby town has one in the far-left corner of her cellar. So, we consult [Liv-ex](#) to get the latest price and I agree to trade with her. I



don't give her cash or transfer money. She'd prefer me to allocate to her tokens on the [OpenVino](#) blockchain for several bottles of [Costaflores](#) Mendoza Malbec MTB 2018 instead.

I have an immersive lunchtime online tasting on [VIVANT](#). To get me in the mood, I grab some champagne out of the fridge. It was recommended to me by [Pix](#) for the perfect lunch time tippie based on my preferences. It was delivered to me earlier by [Drizly](#). Don't judge me – I won't drink the whole bottle that early in the day! Using Coravin Sparkling I can indulge in one glass, putting the rest of the bottle back for later.

I head out to a dinner with like-minded club members of Le Cercle of [SGC](#). We are shown the latest dashboard of analysis and scores of Bordeaux's best soil from their lab and drink the most exclusive release based on the blend of the best parcels. Over dinner we talk about the Bordeaux domaines we have bought in the metaverse. There is a good chance this virtual real estate is going to include places where people will want to create immersive experiences. Another benefit of being an early adopter in fine wine technology.

While there is all this talk of technology, the club members and I remind ourselves of how fine wine is a special type of product anchored in history, with someone quoting Robert Louis Stevenson's quote:

“Wine is bottled poetry.”



# Defining Fine Wine and The Fine Wine Market

## Defining fine wine

The simplest way to define fine wine is merely wine that is of exceptional quality. However, whether a wine is considered exceptional depends on who you ask and their tastes – which of course means it is subjective.

A second way to define fine wine would be price, i.e., simply wine that costs substantially more than table or mass-market wines. In terms of price, the Fine Wine Institute, ARENI, has segmented fine wine by three tiers, setting the lowest tier at €30, with each tier being ex-cellar per bottle.

- Fine Wine 1st Tier – €30-150
- Fine Wine 2nd Tier – €150-450
- Fine Wine 3rd Tier – €450+

For others, a fine wine can simply mean an investment grade wine – something that can be bought and traded for potential profit, like the sought-after wines of Bordeaux and Burgundy. Consumers, connoisseurs, collectors, and investors looking to acquire and trade wines as they reach maturity is known as the secondary market.

For Brian Ward, director of Wine for the [Winston Art Group](#): “Fine wines are distinguished from mass-market wines by their ability to age, value on the secondary market, and producers’ long track records for excellence.”

After three years of research based notably on Think Tank sessions, ARENI came up with the following

- 2 [Morgan Stanley Interview](#)
- 3 [Grand View Research, Inc.](#)
- 4 [Grand View Research, Inc.](#)
- 5 [The IWSR](#)
- 6 [Morgan Stanley](#)

definition of fine wine: A fine wine is complex, balanced, with a potential to age – though highly drinkable at every stage of its development. A wine that provokes emotions and wonders to the one drinking it, while reflecting the expression of truth intended by its maker, and which is sustainably produced<sup>3</sup>.

## The Fine Wine Market

Wine is one of the most fragmented industries and consumer products in the world. Just take the US and UK markets together: more than 110 million mainstream wine lovers could be served by more than 230,000 wine sellers with more than 12 million wine labels.

Fine wine as a market is hard to quantify as it depends on your definition of fine wine. Fine wine producers are dispersed all over the world. In comparison, the fine whisky market has been consolidated, where three-quarters all Scotch whisky production is controlled by just four companies.

The global wine market size was estimated at \$418 billion in 2020 and is expected to reach \$435 billion in 2021, \$686 billion by 2028, expanding at a CAGR of 6.4% from 2021-28<sup>4</sup>. The online wine market, according to the IWSR, is predicted to be worth \$40 billion by 2024<sup>5</sup>.

Wine in the shortest supply is investment grade wine on the secondary fine wine market, which makes up 1% of fine wine produced. The secondary market for fine wine, according to Morgan Stanley, sits at around \$5 billion<sup>6</sup>.



## 02 The Winemakers and Production

*“A bottle of wine is a celebration of the producer’s skill, but the tools involved that define and refine the skill may be changing.”*

Technology is becoming widely accepted when it comes to producing fine wine, with sensors now commonly used to collect data and adjust actions in both vineyards and cellars, as fine wine winemakers strive to understand every aspect of their environment to achieve precision viticulture. Gone are the days when winemakers have to ‘do a Henri Jayer’, writing conditions daily into a black book. There are so many ways to capture and source data.

While some could regret this shift from traditional winemaking to data analysis, most fine wine producers we met agreed that the more they know and understand about both their vineyards and winemaking processes, the less they had to do, resulting in wines that are also more unique.

Wine is monoculture. Agriculture based on years of trial and error, learnings and expertise passed on through generations of winemakers. The winemaker is battling the elements and looking to achieve homeostasis i.e., the ability to maintain a stable internal state, which includes the health of the soil, vines, and grapes. Vineyards are at the mercy of uncontrollable forces such as frosts, droughts, fire, pests, rot, hail, mildew and more. Winemakers are also making a constant mixture of decisions that can have an impact from the immediate to the next 30 years. Winemakers are looking for a state of equanimity.

According to Paul Mabray of Pix:

“Wineries are risk adverse (you only get one chance to get a vintage right) and constrained by the ability to scale beyond the limitations of either vineyard size or what wine is already in barrel/bottle.”<sup>7</sup>



We maintain our belief that future wine makers will be data analysts and empowered decision-makers. Technology has added to the grower’s toolbox, gathering, managing and analysing the data about their vineyard and other factors. But with increased data and knowledge has come increased awareness of climate change, the influence of soil quality, nature vs synthetics, and intuition vs predictive algorithms.

The traditional and mostly analogue world of fine wine seems very remote from those global issues, yet technologies and new digital models are raising questions about the very nature of fine wine.

Most winemakers remain cautious about, firstly, new technology and secondly, implementation. According to an attendee of ARENI’S Fine Minds 4 Fine Wines Think Tank (FW4FM): “For me, using data in the winery is like using a GPS when driving. It can save you a lot of potential stress and time while getting you to your destination, but you still need to know how to drive, otherwise technology is just useless.”

Another attendee added: “We know that data-driven consumer technologies are an issue that we need to address, but there is a huge chasm between our enthusiasm for cutting edge technologies such as blockchain and the reality, with winemakers having issues spending \$100 a month for a website.”

# Gathering the data: A new generation of sensors mastering barrel ageing

We take a look now at the gathering, managing and analysing of data. Vineyardists adapting to the future are having to look both closely at their feet but also from above, via space.

French Cooperage **Taransaud** is transforming the role of the oak barrel from being simply an ageing vessel to becoming a source of information during the barrel ageing process.

ChênOX provides sensors attached to the inside of the barrel's bung, which is able to measure the dissolved oxygen levels in the barrel without having to open it or remove any of the wine. This can help determine when to perform certain cellar operations, such as topping, racking and sulfiting, as well as inform of any issues on a microbiological level as they occur.

The ChênOX chip receives information on dissolved oxygen levels and cellar operations, communicating this to a mobile device. Based on this live feedback, winemakers can make live, informed decisions on how to intervene in the aging process.

"The goal for us is to gain a greater understanding of liquid and oxygen transfer processes through wood when wine is aged in barrels, together with interactions with environmental parameters in wine cellars and the physical and chemical parameters of liquids contained in the barrels," said Henri de Pracomtal, president of Taransaud.

An initial trial was conducted at Bordeaux's Chateau Phélan Ségur, where sensors were also used to measure carbon dioxide, weight, temperature, humidity, and the pressure both inside and outside of the barrel. The results demonstrated that the greater the humidity in a wine cellar, the lower the pressure in the barrels, which leads to the creation of air pockets and, ultimately, higher oxygen levels in the barrel. So, while a higher humidity environment will prevent evaporation, it simultaneously increases the ageing wine's exposure to oxygen.

Another innovative company is Canadian internet of things specialist **Barrelwise**. Its system offers an opportunity to protect barrel ageing from multiple factors that are a key measure of quality throughout élevage.

## Gathering the data: space vitification

In November 2019, 12 bottles of Petrus were shipped to the International Space Station on a cargo spacecraft<sup>8</sup>. Researchers wanted to study how microgravity (e.g., weightlessness) affects wine as it ages. The wine, sealed in a canister, orbited Earth for 438 days, travelling at 17,000 mph, covering over 186 million miles before returning back to Earth on a SpaceX Dragon cargo spacecraft in January 2021. Scientists and a group of wine tasters, including Bordeaux specialist Jane Anson got to try a batch at the University of Bordeaux's wine institute in March, to compare it with Earth-aged bottles: "It's hard for me to say if it was better or worse. But it was definitely different," Jane told the BBC. "The aromatics were more floral and more smoky - the things that would happen anyway to Petrus as it gets older<sup>9</sup>."

It was the first stage in a six-part experiment led by Space Cargo Unlimited that aims to further our



understanding of how organic material adapts to the stresses of changing environments. Grapes were chosen for the first mission because of their sensitivity to small fluctuations in the conditions in which they were stored.

Early indications suggest vines grow faster in space, despite limited light and water. The second mission on Blue Origin will be looking at vine calluses, with mission three seeing 320 vine plants have a six month stay at the ISS. The next three experiments, scheduled to launch by the end of 2022, will focus on bacteria, yeast, and fermentation processes.

One country sensing an opportunity with space and wine is Georgia, which has what is now considered the oldest known winemaking site on record, giving it an 8,000-year-old viticulture tradition. Georgia wants to reinforce its wine heritage by putting its top space and wine scientists onto a mission to grow grapes on Mars.

"If we're going to live on Mars one day, Georgia needs to contribute," Nikoloz Daborjginidze, founder of Georgia's Space Research Agency and an adviser on the wine project, told the Washington Post "Our ancestors brought wine to Earth, so we can do the same to Mars<sup>10</sup>."

PR perhaps, or a good leapfrogging strategy to put

itself back on the map for wine?

In our 2019 report we talked about extreme transparency versus closely-guarded winemaking secrets. With the proliferation of satellites orbiting the earth observing from space (100,000 projected by 2030<sup>11</sup>), so much information can now be gathered, collated, analysed and inferred. Just as technology has enabled more data to be published and consumer access, many winemakers will struggle to keep closely guarded secrets away from prying eyes. We talk about how satellite technology could disrupt En Primeur in the Part 4 of this report.

## Managing the data: Operating systems for vineyards

Terraview is a comprehensive operating system for vineyards based in Spain, the US, France, Switzerland and Australia. The platform is a cloud-native, deep tech OS and uses machine learning and AI to solve complex problems. Its aim, through blending a global team of viticulturists, designers, and engineers, is to

8 CNBC  
9 BBC

10 Washington Post  
11 Astronomy

empower the wine industry with innovative yet easy-to-use tools. With the mission statement, to “drive quantum growth for a greener future for vineyards”.

The co-founder and CEO Prateek M. Srivastava has a history of building companies, previously instigating two start-ups in the executive search and ed tech space. His last executive search start-up was acquired by a well-known early-stage venture fund in India.



## Using the data: earlier yield estimates

Grape growers can now predict their yields much earlier in the season and more accurately thanks to Cornell engineers and plant scientists devising a low-cost system via a smartphone app. By videoing grape vines whilst passing through the vineyard (via tractor or walking) at night, uploading the video to a server, the system, via computer vision processes the data. Yield estimates have proven to be much more reliable than traditional methods. Traditional methods have error rates of up to 24% vs actual yields<sup>12</sup>, the new method cuts this by half.

The project is funded by the National Science Foundation, the US Department of Agriculture’s National Institute of Food and Agriculture and the Cornell Institute for Digital Agriculture.

## Using the data: climate change

As technology has improved our knowledge, it has also increased our awareness of the collective problems we face. We have been able to collect and share data about climate change more widely. Through technology, the likes of Hans R. Schulz president of Geisenheim

University in Germany – a leading expert on viticulture and the impacts of climate change – is now equipped with compelling data and evidence about the effects.

The temperature in Geisenheim, has increased by about four degrees Fahrenheit over the last 40 years, making the average temperature in Geisenheim similar to that of Bordeaux in the 1980s. In addition, since 1980, Geisenheim soil temperatures have increased by an astonishing 7.2–8.1 degrees Fahrenheit on average over the three months of summer<sup>13</sup>. Bordeaux, meanwhile, has seen its temperature rise over the past 40 years by about four degrees. Whilst this might benefit harvesting Rieslings in Germany or sparkling wine in England, the full effects of rising soil temperatures are still to be understood...

As such, forward-thinking grape growers are adapting to the future of climate change now. The effects of climate change on variable and extreme weather patterns are undeniable, affecting crops and vintages. Look at devastating frosts in France this year leading to a forecasted historic low in harvest size. Growers will continue to have to adapt to produce high-quality berries that yield the wines consumers expect. A future winemaker will see altered temperature, water availability and soils.

Such a challenge for the entire industry can only be overcome by collective collation and sharing of data. The industry needs to come together and harness new technologies in order to ensure sustainable agriculture and wine for future generations.

## LTC Focus on the winemaker: Mike T Barrow, Mendoza and Costaflores v2.0

In the LTC 2019 wine report we featured Mike T Barrow, the pioneering winemaker who, in 2003, gave up his thriving career in IT in the US to move to Mendoza, Argentina and start a boutique organic winery named **Costaflores**. Fast forward to 2021 and Mike has established the most progressive and forward-thinking winemaking lab in the world.



There are a raft of winemakers leaning into future-facing technology. For example, Dan Petroski and **Massican Winery** and his crypto diary and Massican Magazine in partnership with **Phaidon Press**. But if you want to know what the near future of wine is now, follow Mike and **Openvino.org**, the world’s first opensource winery. Mike takes leading edge tech theory and puts it into practice to test and demonstrate its efficacy as well as share all the learnings. Here we explain what Mike is up to across seven interconnected initiatives that make up overarching pioneering wine project.

### 1) Winemaking

Starting with the foundations: Mike’s first harvest was in 2007 after planting the vines in 2004, now providing him with 14 years of experience making wine. His wine is 100% organic, three co-fermented grape varieties: Malbec, Cabernet Sauvignon and Petit Verdot. Harvest takes place at the end of March each year with 20 people over two busy days. Wine is produced in April/May. The wine needs three years aging, including one year in stainless steel or oak tanks (about 10-15% of the wine is in oak and the rest of it is in stainless steel) and two years in bottle. Here Mike’s mission is simple: to produce outstanding natural organic wine. If there is a way of bringing in technology into the process, Mike will integrate it – from IoT sensors, 360-degree cameras, to accounting

and ticketing software. Capturing data from all factors affecting the wine from the environment, temperature in the tanks, cold storage and human effort, Mike is developing precision farming which fuels decision-making around of irrigation levels and when to harvest.

### 2) Openvino

The goal of OpenVino is to create the world’s first open-source winery and wine-backed cryptocurrency. Inspired by the open-source software movement, Mike is five years into this process. Mike’s mission here is to take disruptive technologies around transparency, traceability, tokenisation and provide proof of concepts.

Costaflores is the wine guinea pig. The name OpenVino is because Mike publishes all activities and data on his **wiki site**. The sensors he has deployed in the fields are linked to blockchain for bio-digital certification. Mike has a benefit mindset: he is happy to share his intellectual property of the winery to the world for extreme transparency. Mike wants to provide consumers with a new way to interact. All the data is published, sharing the ‘making of’ in the process, with blockchain technology validating this. Taking a key from all the data and placing it in the blockchain means it’s not updated or altered. Mike is optimising wine making in the grape growing, collecting feedback from customers and sharing that information with the world so others can benefit.

12 Cornell Chronicle  
13 Good Fruit Grower



### 3) Vintage Coin Offering

Once Mike knows how much wine has been produced from a vintage (e.g., 16,384 bottles in 2018), the company issues a digital token for each bottle. The 2018 vintage was called MTB18. The company puts the tokens up for sale, allowing people to essentially acquire the right to one of the bottles. The buyer then has 10 years to 'burn' i.e., redeem the digital token. The wine takes three years to be ready to drink, with the MTB18 vintage made available May 2021. Whoever is holding the digital token at that point can purchase the bottle of wine through the site. This could be a consumer, an importer, a reseller, anybody in the chain and there are different incentives for different stakeholders along the way. They don't have to order the wine at that time; they can hold the tokens, for example MTB18 expires in 2028. Mike has effectively successfully tokenised vintages.

### 4) Open Vino Exchange

Mike has tokenised the 2018,19,20 and 2021 vintages. The next phase for Mike was to provide an exchange for people to buy and sell the tokens, the reference currency is Ether on the Ethereum blockchain.

Mike's phase two for the OpenVino exchange is to open the platform out to other wineries to be able to do the same. Concentrating on five Argentinian wineries first, Mike will then extend to others in Spain and then beyond. Mike's vision is to enable other wineries to do tokenisation and NFTs via the platform. He is not looking to charge others a licence – it is 100% open source. OpenVino is working with the National Wine Board of Argentina to look at certifying wines, compare chemical analysis data for wines to be tokenised across the country. He expects other Argentinian wineries to be tokenising their wine in 2022. Mike has purposely built the [OpenVino exchange](#) in a modular way so other wineries can choose which modules to implement. Mike has proven the concept with MTB – now he is opening the opportunity up to other wineries to follow on the [Ethereum](#) network.

### 5) 'You drink it you own it'

For each bottle Costaflores produces Mike also creates an NFT token unique to that single bottle. If a person drinks the bottle, they can scan a QR code on the label that takes them through to a site where they can provide feedback on the wine. Those that provide feedback automatically become a shareholder of the company through a smart digital contract. Each NFT token associated with its unique bottle is mapped to one share of the company (through a trust corporation). You drink it, you become part owner of a vineyard in Mendoza. Mike's belief is you should provide something in return for people's feedback. Note the data goes to a third party that separates personal data and only gives the winery the feedback data. The third party doesn't share the personal data but keeps the legal corporate shares and legal information for the share distribution. Owners could then trade (buy, sell or exchange) the NFT token (i.e. a share of the business).

However, Mike has had challenges with the serialised label printing for the unique QR code which was prohibitively expensive to outsource printing. But his can-do attitude means it's just another small hurdle to overcome. Mike simply purchased and imported a label printer from the US to print out their own back labels. All elements in the process are registered on blockchain so are under decentralised management, traceable, transparent and irrefutable.

### 6) Openvino Labs

Mike now has plans to build a new three-story lab on the site of Costaflores. He wants to have a space to explore further software and hardware, internet of things, sensors, code development, smart contracts, image analysis and so on. All on site in the lab, driving and trying ideas from a winemaker's perspective. All to be published on OpenVino. Mike's latest tech pursuits include taking the bio mass from the vineyard (prunings, cuttings and waste material), shredding it into powder, then inoculating it with mushroom mycelium to create new multi-bottle packaging.

### 7) Wine Drop

One challenge Mike has faced with the project is the increasing success of Ethereum blockchain. When people are looking to redeem their tokens, the fees paid to transact the smart contracts (also known as 'gas fees') have become cost prohibitive on Ethereum. In the past this was a few cents for each transaction but because of the explosion of decentralised services built on Ethereum, fees have gone up to \$60-70 due to the amount of congestion on Ethereum blockchain. To redeem six bottles of MTB21 VCO at \$2, the digital asset holder has to pay \$50 of gas fees. Mike is pragmatic about this as it is something affecting all projects on the Ethereum blockchain, expecting the problem mid-to long term being solved.

In the meantime, Mike wanted people who had supported to project to be able to drink his wine. Mike is therefore doing a wine drop, where he has made MTB17 wine available to anyone who has MTB tokens for 2018, '19 and '20. The only thing the person has to do to receive a bottle of MTB17 wine is to pay for shipping and handling, with a maximum of 60 bottles free if someone has 60 tokens.

It's amazing how far Mike has come just in the two years since we last spoke to him but there is much

more for him to do at Costaflores. From liquidity mining and yield farming, to maximising the return of investment from crypto assets related to the Ethereum blockchain.

Mike's approach is to test, learn, deploy, trial, experiment and execute many areas of technology that are leading edge. He takes things that for many are conceptual and through his focus on producing wine, makes them happen. Mike wants to not only prove things work, he wants to show a better way and, by sharing his experiences, help others embrace technology in their experience of wine (whether that's buying, investing, consuming or making). Mike talks about the journey so far as three phases, linked to the three grape varieties grown at Costaflores.

Phase 1 was Malbec- establishing the platforms for his own wine and vineyard.

Phase 2: Petit Verdot is the ability for others to use the same platforms and assets e.g. OpenVino Exchange.

But there is a phase 3... Cabernet Sauvignon. We can't wait to hear what technology that will be....



## 03 The Intermediaries and Distribution

*“We are living in a Golden Age of wine online, and the pandemic has fast tracked wine’s much needed move to digital and selling direct to consumer.”*

Because fine wine is so vast we can’t cover everything, but with producers and consumers being more empowered, we are also seeing a move towards disintermediation within the industry, with intermediaries including merchants, distributors, sommeliers and consultants.

It is important to note the unique organisation of fine wine distribution, as fine wine routes are rarely direct and still require a relationship with value-adding middlemen. Fine wine consumers constantly underline how important intermediaries have been and still are on their road to fine wine appreciation and purchase because they offer consumers tailored insight, knowledge and access to coveted bottles.

“Fine wine consumers have deep relationships with wine merchants and the experts who serve them. There are a number of reasons for this: they want people to spot fraud and counterfeits; open doors to coveted bottles and exclusive experiences and tastings; and offer them wines perfectly matched to their palate,” according to Pauline Vicard of ARENI Fine Wine Institute.

Paul Mabray of Pix is quick to remind us of the inherent challenges with direct-to-consumer, namely differentiation, value exchange, lack of selection versus buying regular retail (which provides selection, value exchange, customer support, shipping and retail sophistication).

As we see more producers starting to build direct communication and distribution platforms to cut out the middlemen, we are also seeing consumers become more and more empowered. The lines are being blurred between producer, distributor, and buyer (for investment or consumption).



## New style of connecting: The winemaker direct to consumer

**Adegga**, the online wine market in Portugal, are a leading example of a new style of intermediation. The platform brings consumers and wine producers together that allows wine lovers to discover new wines and purchase them directly from the producer. Adegga helps producers share the story behind each wine in direct contact with interested consumers, without barriers and sharing efforts with other producers.

As an intermediary, Adegga has had to constantly innovate. In 2006 it was one of the first two wine social networks in the world, and in 2009 it created the first single universal code for wines (AVIN). In 2013 it developed and launched a smart wine glass, and in 2015 it created the first WineMarket event to provide an online store with all wines in the tasting. The company’s natural evolution demonstrates the change to direct to consumer.

# The Disruptive Model: SGC

In 2006 Arnaud Christiaens, a former financier saw an opportunity to disrupt the traditional wine making model in Bordeaux, where the prestigious classification had not been modified for over 150 years. He realised that through modern technology, he could run deep scientific soil analysis to help producers discover and harness the perfect growing conditions in their vineyards. Arnaud's view: The better the soil, the better the wine. Arnaud tapped into a group of scientists dedicated to analysing soil across Bordeaux's vineyards using state-of-the-art technology. They had dug 20,000 holes across Bordeaux's legendary wine regions. Arnaud mapped out the region with different parcels given different scores. Analysis broke a vineyard's soil down to four main pillars: layers of ground quality, irrigation, nitrogen levels and the strength of the vine. Approximately 3% of vineyards had top tier scores.

Arnaud negotiated with numerous vineyards to lease the top plots with the best soil (some for up to 50 years). No chateaux appear on the bottle, the vision being to focus on wine produced from the top soil. It enabled estates to sell a portion of their wine, many of which were simply producing wine for volume as they were out of the top classification (and no one has been allowed to enter since 1855) and didn't realise they had some of the best wine producing rare plots of soil under their feet.

Due to being limited to only the best soil, quality was high, yields were low. SGC therefore began to sell direct by invitation and referral only, creating a circle of collectors and true wine lovers, named Le Cercle. The coveted membership allows an allocation of an annual 48 bottles for £20,000 split across 3 appellations of Pomerol, Saint Emilion Grands Crus and Medoc. Arnaud focused on superior individual parcels of vines that scored 17-20 (out of 20 maximum points) in his system to go into these three cuvées grand vin. However, he has extended this now to a second

wine, aptly named, SGC La Liberté, which requires the soil to score between 15 points plus. This wine will be available to a larger audience and retail at approximately £160 per bottle. SGC is already in the process of expansion of its disruptive high-tech principles to other geographic wine regions. SGC plans to increase availability of their new lines of wine such as La Liberte more widely around the world through new innovative channels.

Arnaud plans to ensure that the latest technology to select the best soil will continue to be updated: "Precise zoning and knowing the factors that define the best soil are our USP" said Arnaud. Showing that something else can exist in Bordeaux despite the traditional rules of engagement by pushing the boundaries of wine production with cutting edge science, one must expect SGC to replicate the model in other leading wine regions of the world - Bolgheri, Burgundy or Rioja first?

Whether by invitation only or not, the trend of direct to consumer continues.

According to Pauline Vicard of ARENI: "We are entering into the golden era of winery direct to consumer, due to technology and software powering third-party fulfilment, compliance, legal and lobbying, many of the barriers or expertise intermediaries would provide.

"While intermediaries still have a role to play, consumers expect estates to be in charge of their own communication and storytelling. They also demand a space where they can interact directly with the Chateaux e.g., online, in the chateau's region, within their own markets".

Technology is forcing middleman to really prove value, from both the producer and the consumer's side. We cover the empowered consumer in parts four and five.



## LTC Focus on the Intermediary: 67 Pall Mall's Physical and Digital Expansion

One fine wine brand that has fully embraced a hybrid digital business model is the fine wine private members' club **67 Pall Mall**. The Club, founded in St James's London in 2015 by then-banker Grant Ashton, was originally designed to be the perfect physical place for wine aficionados, enthusiasts, makers, traders, writers, journalists and sommeliers to meet and share their passion for wine.

In 2020, the club adapted quicker to the challenges than any other business we know during the pandemic. The fine wine club accelerated its plans to expand, starting with a virtual membership. It immediately adopted a virtual calendar of wine tasting online webinars and events. The take up from members, new prospects, wine experts and winemakers keen to engage with audiences digitally was unrivalled. More than 600 hours of original content was created in the first year of lockdown. The club kept all of the recordings and built a bank of digital content. It also developed proprietary technology for sustainable tasting kits, in effect becoming an online retailer to deliver wines to members 'as the winemaker intended' to pair with live online webinar tastings. The club has sent out

over 7,000 wine sample packs and bottles.

Working tirelessly to ensure members' love of wine and engagement with the club didn't suffer as well as the success of the virtual member content, it led 67 Pall Mall to launch a TV channel with a studio opposite the club on London's Pall Mall. The club successfully launched **67PallMall.tv**, a streaming service dedicated to fine wine, in Q1 2021. The channel offers six hours of original content per day, including livestreamed professional wine tasting and additional on-demand content available to wine enthusiasts across world.

"67PallMall.tv perfectly exemplifies the proliferation of the streaming market, where entrepreneurs, experts and enthusiasts from a multitude of backgrounds expand their network and monetise quality content through OTT [over-the-top] technology," says Steve Russell, chief product officer of Red Bee Media, which streams the channel on its platform.

Red Bee Media's OTT platform gives brands and content owners the possibility to easily and quickly launch a fully-fledged streaming service, no matter

the audience or business idea. It supports all content formats including live, linear, catch-up and on-demand, as well as a full range of monetisation options. Audience segmentation is carried out with advanced geo blocking functionality and digital rights management options. Many of RBM's other services integrate easily with the platform, including content aggregation, metadata, and automatic captioning. It is the future for many brands looking to create their own content platform.

Talking about 67PallMall.tv, 67 Pall Mall's Director of Communications Stephanie Barnett says:

"Our Channel Director said to me to launch a channel within 9 months which was unheard of and I didn't think it would be possible, but once again it's amazing what focused minds can do".

67 Pall Mall is now entering a phase of aggressive expansion, increasing its footprint of physical clubs.

First with 67 Pall Mall Singapore – due to open at the end of 2021 – and with the next clubs planned for Bordeaux, Napa Valley, Verbier and Beaune (Burgundy). Each will house TV studios enabling winemakers, specialists, and leading wine authorities to guide viewers for tastings and features from around the world.

Grant Ashton, CEO and Founder of 67 Pall Mall says: "Embracing technology enables us to offer an even fuller picture of the wine world, where members and virtual members can taste our recommended wines in real time, together and at a distance. Our physical clubs will be fine wine lighthouses accompanied by our expanding digital capabilities in content and experiences."



## 04 The Consumers and Enjoyment

*"Enjoyment is the key theme of the integrated content plans of all forward-thinking platforms."*



For this extensive section focused on the fine wine consumer, we have divided it into sections based on a fine wine consumer's journey: discovering, receiving, experiencing, storing and enjoying wine.

## Technology for Wine Discovery

There is a race to be the 'sommelier in your pocket', from search engine-focused website **Wine-Searcher** aiming to be the 'Google for wine', to **Vinolyze** providing personalised recommendations based on artificial intelligence. Clearly the opportunity is connecting people to wine they want to buy or making it as easy as possible to have wine curated for them.



### Wine-Searcher

Wine-Searcher is a web search engine enabling users to locate the price and availability of a given wine, whiskey, spirit or beer globally, and be directed to a business selling the given beverage. The site also includes an encyclopaedia of wine regions, grape varieties and wine producers.

The company was founded by former e-commerce manager of Berry Bros & Rudd, Martin Brown, in 1998. The platform is considered to have transformed the commercial landscape for wine by providing global retail price transparency. As of March 2021, Wine-Searcher had 12.5 million wine, beer and spirit listings from around 23,000 active stores and businesses across 130 countries. The website and its associated apps attract 5.2 million active users each month and 64 million users made more than 255 million searches to compare prices in 2020.

Brown has stepped down to be replaced by Julian Perry, the creator of UK-based tech company Limitless. Perry is tasked with increasing revenues from the current \$42 million per annum. Limitless specialised in software design, networking deployment, systems administration and application development, showing where Wine-Searcher is looking to evolve. Wine-Searcher is one of the most formidable specialist online databases and is often referred to as the 'Google for wine'. But others would argue they are also looking to become the same...

### Vinolyze

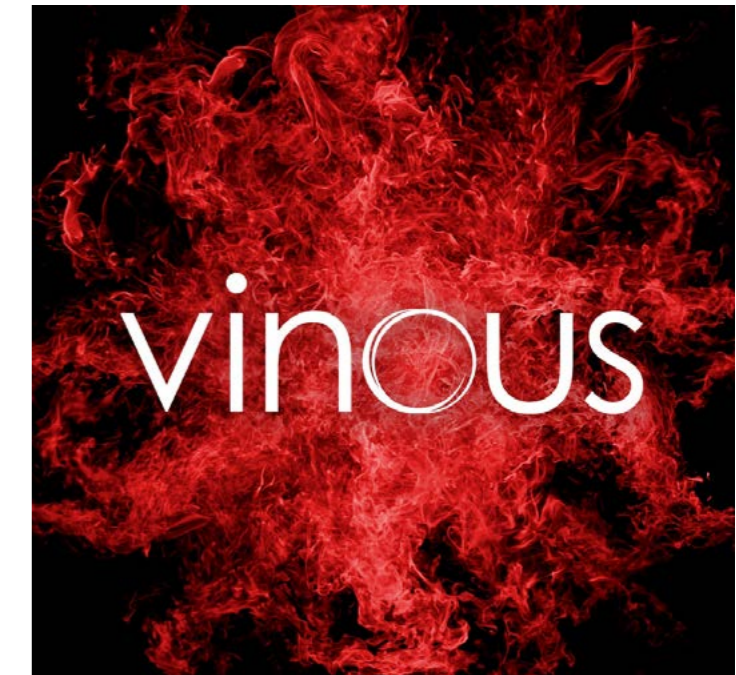
Vinolyze, founded in March 2020, is a virtual sommelier providing a personalised wine recommendation system. It is designed to provide an objective recommendation service for consumers based on their individual taste, wine composition data and artificial intelligence. The system matches consumers to wine based on their tastes via a consumer questionnaire against unique wine chemical compositions. The more it is used, the better the recommendation engine can be optimised. The next phase of the company will be the integration of AI.

### Vivino

Platforms such as **Vivino** are accumulating huge data sets now (1.5 billion wines scanned by 50 million users). Vivino raised \$155 million in one funding round in February 2021 to grow its user base and commercialise the data.

Founded in 2010, Vivino is the world's largest e-commerce platform for wine. Despite 600 wine apps being available when launched, Vivino is leading the way – according to the founder Heini Zachariassen, it is 50 times larger than its closest competitor<sup>14</sup>. Vivino is led by industry heavyweight board chairman Christophe Navarre – former CEO and chairman of Moët Hennessy.

The commercial model is to receive a marketing fee from each sale made through the app. Vivino's winery partners can also pay to have sponsored content on the app. With such deep funding pockets, the company is looking to push on, develop more product solutions and aggressively scale.



## Delectable

Perhaps Vivino's Zachariassen was referring to Delectable when he mentioned being 50 times the size of competitors. The Delectable app has been downloaded over a million times. Users can scan a wine label with their smartphone and immediately pull up reviews. It was purchased by wine critic Antonio Galloni's *Vinous* platform (one of the world's most influential wine publications) in 2016 and quickly launched a new premium subscription that integrated expert reviews from *Vinous*' team of top professional wine critics. However, many in the industry believe the app has been atrophying since it has been under new ownership. Galloni is aiming to build a digital ecosystem that brings together reviews, articles, videos, maps and other wine-related content – buying other businesses such as *Banquet*, a mobile tool for helping consumers find and purchase wines.

## Wine Access and others

According to the *Wineaccess.com* headline: "The barrier to the world's best wine isn't price, its access. The world's best wines are made in limited quantities. Finding them is the hard part. That's what we do". The platform, based in Napa, California, looks to be a curator and partners with the likes of the MICHELIN Guide and the world's finest tastemakers to make it easy to discover and enjoy the world's most inspiring wines. The platform promotes its expert team and personal connections to unlock access to the most exclusive wines.

Other notable competitors in the US include *Wine.com*, *WTSO*, *SommSelect* and *Last Bottle Wines*. *Last Bottle Wines*, also based in Napa, offers 30-70% off the retail price of one wine per day. The company has been going for 10 years, tasting more than 40,000 wines per year to narrow them down to 2,700 wines that it offers to customers. The company has sold more than 11.85 million bottles since 2011, with the average order per customer of 17 bottles. To show the rate of growth over the ten years, in 2011 the Last



Bottle warehouse was 1,200 square feet - by 2021 that had grown to 100,000 sq feet.

## Pix

*Pix* is the new kid on the block, started by Paul Mabray, a serial entrepreneur and technologist in the wine world, and the so-called 'pied piper of all things digital in the Napa Valley'.

According to *The Buyer*:

“ There are few real visionaries in the world of wine, but software and consumers insights expert Paul Mabray, is one of them<sup>15</sup>”.

When Mabray, launches a new business, the wine world takes note. After successfully founding two wine software companies – *WineDirect* and *VinTank* – Paul has switched his attention to the world's first wine discovery platform. His new mission is to pair people with bottles that bring them joy.

Mabray launched *Pix* to help wine lovers find their perfect bottle of wine from sellers they can trust. He is looking to disrupt digital wine advertising. *Pix* is a state-of-the-art search engine that also offers guides, advice and reviews. Designed to help you discover the wine you're looking for via one screen, *Pix* also

provides other recommendations and new ways to buy wine and arrange delivery.

The vision is nicely summarised by Mabray: "our mission is to pair people with bottles that bring them joy".

*Pix* aims to be the meta-layer for consumers at the point of purchase. Examples where it can help include searching online, when overwhelmed at a store's wall of wine, or when confused while looking at a restaurant's menu. It features wines from more than 4,000 integrated partners, representing more than 230,000 wines and 12 million offers worldwide. Its role is as a recommendation engine rather than a pure sales site, and to connect wine sellers to customers for a lifetime.



Part of *Pix*'s plan is to engage consumers to drive awareness and engagement. Enter *The Drop*, an online magazine that connects people to wines they'll love. Led by media professionals, *The Drop* is an entity in its own right, free of commercial interference of any kind, but clearly it will help drive awareness and adoption for *Pix*.

*Pix* has a team of 31 already – which, for an early-stage company, demonstrates Mabray isn't messing around. It includes high-profile appointments such as Felicity Carter as executive editor, whose most recent role was editor-in-chief of *Meininger's Wine Business International*.

*Pix* has recently announced a Series A funding round of \$10 million. The funds are to be used to invest in more technology functions and marketing reach for the platform.

You have wine publications buying wine tech (e.g., *Vinous* buying *Delectable*) and new wine tech platforms creating wine publications (*Pix* creating *The Drop*). Each platform is looking to insert itself into the wine buying process at a different point.

Outlined by Mabray and neatly summarising this section: “Pix is different from Vivino or Drizly or Wine.com because it doesn’t insert itself in the transaction. For retailers, the sale is yours. Pix is different from Wine-Searcher because you can look for a wine, but you can also look for a wine for a gift, or a food match, or an occasion. Our focus is discovery: discover the wine you are looking for, discover ways to buy that wine and discover other wines to buy. Pix is different from Delectable by building on data from retailers and agents, and not relying on user-generated content. Pix is different from all its competitors because it’s free. Wine lovers want platforms to discover wine. But the numbers prove they’re reluctant to pay”.

## Technology for receiving fine wine

As Mabray mentions, Drizly.com is an alcohol delivery platform. In 2020, the company raised \$50 million in a Series C funding round, led by New York-based investment firm **Avenir**, **Tiger Global** and other existing

investors, taking the total raised to \$120 million. As Covid-19 remained entrenched across the US for most of 2020, e-commerce sales surged. Alcohol was among the biggest beneficiaries from the uptick. Until the pandemic, most consumers had not purchased alcohol online. But the convenience of getting alcohol delivered straight to their door became the norm. As Cosmopolitan suggested: “Nobody will miss out on a memory because they were schlepping to a liquor store”.

Then in February 2021, Uber announced it would purchase Drizly for \$1.1 billion in cash and stock. Its marketplace is to be integrated into the UberEats app, and it will maintain a separate Drizly app, according to the companies.

“By bringing Drizly into the Uber family, we can accelerate that trajectory by exposing Drizly to the Uber audience and expanding its geographic presence into our global footprint in the years ahead,” said Uber CEO Dara Khosrowshahi.

The US Federal Trade Commission (FTC), however, confirmed it is reviewing the deal for potentially hampering competition in the online and grocery delivery market. Watch this space...



# Technology for experiencing fine wine

## LTC Focus on the disruptor: Michael Baum and VIVANT

*“It’s the combination of tech and wine that gets me most excited.”*

Michael Baum

### Introduction

Michael Baum is a serial technology entrepreneur and venture capital investor. Best known as the founder and CEO of the big data software giant Splunk, Michael took the company public after his previous five tech startups had been successfully acquired. In September 2014 he and his family switched gears to a new project, purchasing the prestigious Burgundian winery Château de Pommard.

As the first American to secure a wine estate in Burgundy, it was the manifestation of a 30-year enchantment with fine wine. What began as a passion has turned into a mission to change the way wine is sold and enjoyed. Michael is applying Silicon Valley thinking and experience to a very traditional industry, ruffling a few French feathers in the process.

Michael’s career to date is characterised by a string of business wins in Silicon Valley. Having already successfully founded and sold five technology companies by 2003, Michael then co-founded Splunk with Rob Das and Eric Swan with Michael the CEO for the first six years. It was a pure-play big data company scaling quickly as companies wanted more operational intelligence and so used Splunk’s big data software to understand machine-generated data, applying it to security, compliance and reporting. The company reached profitability in 2009 and had a record-breaking \$5bn IPO in 2012.

The same year as the public listing, Michael found a new mission off the back of his success: bringing Silicon Valley know-how to the world. He created Founder.org, an organisation that provided funding and mentoring to graduates with a good idea to ensure that they brought them to fruition.

Initially the organisation backed 10 entrepreneurs per year, but it has now grown to supporting 50 of the most innovative start-ups from universities around the world each year. Each are awarded up to \$100k and undertake an intense 12-month program that often leads to Founder.org Seed and Series A funding rounds.

By 2014 Michael and family were ready to switch gears from terabytes to terroir:

“Having spent much of my career as a Silicon Valley innovator and entrepreneur, I have always been seduced by the world of wine.”

In September 2014, Michael became the CEO & Propriétaire of **Château de Pommard**, a Burgundy winery established in 1726 based in a small village of just over 500 inhabitants. The family (Michael, his wife Julie and their two boys) moved to the estate that consisted of 20 hectares of clay-rich soils and pinot noir vines. They became the fifth family in 300 years to steward the Domaine, which includes two chateaus built in 1726 and 1802.

Michael is not the first Silicon Valley success story to invest in wine. But rather than going to Napa Valley, he went to Burgundy, with its guarded traditions.



the traditions of Burgundy. In 2019, the winery had more than 30,000 clients visit from 92 countries. During the pandemic, the visits from clients making the pilgrimage to Burgundy ground to a halt. Instead, the business saw much larger retail traffic online, with clients' average order value and spend significantly up. Michael accelerated his focus on bringing a different mindset and platform to engage with consumers and removing the barriers for clients to experience the wine. Baum's ambitions are to apply tech to the wine business: "Burgundy has a tradition that's powerful but limited, which only appeals to a certain audience. And, historically, producers have sold onto wholesalers, so they haven't had to think about their brand," Michael says.

“That’s very different to how things are done in Silicon Valley, where the model is to really be in touch with the consumer. So, at Pommard we’re taking a more Silicon Valley model: 90% of our sales are now direct to the consumer”.

The result is **VIVANT** is the first wine experience platform streaming live experiences from wine regions around the world. Launched in late 2020, the platform hosts 30-60-minute immersive experiences, where members meet the most interesting people in wine and discover the world's best tasting wines.

“We’re taking what we’ve introduced at Château de Pommard – wine experiences and vineyard visits – and we’re reaching more people by effectively putting that on a digital platform. I don’t know why this hasn’t been done before,” says Michael.

VIVANT has created a groundbreaking Interactive Tasting Method™ (ITM) that enables users to challenge each other on a leaderboard and earn Cheers, Tasting Points and Wine IQ Points as they improve their wine knowledge and tasting skills. The platform also recently launched 'Private Events' experiences, which is a bespoke offering for corporate events (ideal for team building for remote workforces). This includes a new video wall function so participants can see and communicate with each

However, Michael was not going to accept things not changing just for tradition's sake. One of his first decisions was to switch to organic and biodynamic farming and winemaking, alongside converting the historic buildings into a new winery, wine school and five-star hotel. Michael's family share the workload: his wife Julie is involved in the restoration of one of the chateaus, while Michael is more on the winemaking and business side. While proud to be nearly three centuries old, Chateau de Pommard is getting in shape for the next three hundred years.

With the winery's winemaker, Emmanuel Sala, Michael replaced tractors with horses to plough the soils between the vines. Playing to the strengths of The Clos, Michael could ensure the wines are free of pesticides and herbicides and contribute to the regeneration of the soil.

## Technology & Wine

According to Michael, moving to Burgundy was part of a:

“lifelong dream to do something different and find a different pace of life” where “frequency is measured in decades, not seconds or milliseconds, like in Silicon Valley”.

A natural disrupter, Michael is starting to challenge

other visually, as well as through the chat function.

The wider purpose of the platform is to accelerate the wine world's transition to a sustainable future by amplifying the voices of responsible winemakers, showing consumers naturally produced wines taste better (currently only 3% of the world's wine is produced naturally), and building a global wine community committed to a better way.

All featured winemakers sign the VIVANT Pledge, promising:

- To grow grapes and make wine with respect for consumers and the environment.
- No synthetic chemicals in the vineyard.
- No additives in the winemaking process.

- Complete traceability of the grapes, the winemaking, and the ageing process.
- A commitment to workplace equality and diversity.

Michael is looking to both lead the way by increasing transparency in his winery – the whole process behind Pommard wines will, using VIVANT, be trackable from the budding of the plant to the shipping of the crate. Michael firmly believes no one in the future will want to drink wine with chemicals in it. He also plans to scale up a platform that connects wine lovers from around the world, curating other biodynamic, organic and responsibly produced wines.

“Essentially we are winemakers, wine lovers and wine educators who believe in wine that's better tasting, better for you and better for the planet,” says Michael.







# Technology for storing fine wine

*"Storing fine wine is viewed as an artform in many quarters."*

Rachel England writing for *Cult Wine*<sup>16</sup>.

The 'oenophile's regret' is opening a fine vintage only to find it's not as good as expected or not representing what the winemaker intended.

The likes of Napa's *Vinfolio* offer secure, climate controlled, earthquake-tested, fully traceable, 'white glove' storage. *Vinfolio* have kept more than 650,000 bottles in pristine condition for more than 15 years<sup>17</sup>. The business also has *Vincellar*, a free, comprehensive, user-friendly cellar management system available on both mobile and web.

Temperature, light and humidity are all factors that can have a detrimental impact on the maturation of a bottle of wine. In short, if you are to store wine for the long-term, you need professional-grade storage. However, technology is making wine storage more mainstream and user-friendly. Here's more on each:

## Temperature

Average room temperature is 21°C. Anything above that ages the wine more quickly, dampening flavours and aromas. It is optimal at 12°C and a range of 8-18°C is recommended. Consistent subterranean temperature is key. Multi-zonal temperature controls allow wines to be chilled ready to serve, while other wines mature at cellar temperature.

<sup>16</sup> *Cult Wines*  
<sup>17</sup> *Vinfolio*

## Light

Wine cellars are increasingly considering lighting as a key part of protecting wine. *LUMINO* solutions provide for many top restaurants (such as *HIDE* in London). *VectorFLEX* with *ColorCORE* technology is a product *LUMINO* use for high colour rendering and colour consistency. The anti-UV glass solution guarantees no UV output, ensuring the integrity of the wine is protected while eliminating the risk of bottle labels being bleached.

## Humidity

When humidity is higher than 70%, the potential effects can be mould and degradation of the labels and glue. When humidity is below 50%, corks will begin to dry out resulting in loss of liquid in the bottles and the possible degradation of wine. Advances in hygrometer precision has increased the ability to measure humidity.

The wine cellar of today and tomorrow also sees increased use of IoT (Internet of Things) sensors and connected apps. All facets from temperature, light, pressure and humidity can be remotely monitored and controlled.

Insurance company *Chubb* is running a pilot scheme which it hopes to roll out to all of its wine cellar clients using IoT sensors and a connected app. The app provides round-the-clock monitoring of temperature, humidity and vibration). Anything outside pre-determined ranges triggers a text or phone call to the property manager.

## Wine Wall Displays

The stock place to store one's wine has traditionally been a cellar. But technology has meant underground space is no longer needed to store wine. From spiral cellars to wine walls, prized wine storage is now about bringing joy to one's home rather than just a hidden function.

The wine wall allows wines to be showcased behind glass. *Cellar Maison*, for example, has developed its own evaporator system – the technology distributes an even curtain of cool air over the wines. Remote monitoring, automated control systems and touchscreen panels will become the norm. A key feature could also be switchable glass, stopping UV light from entering the wine wall, switching back to clear glass when deciding on one's next pick or showing off one's collection to guests.

Typically, they don't store mountains of wine like a traditional cellar, unless you ask fine wine members club *67 Pall Mall* which is installing a wine tower in its new club in Singapore to help house a wine list of more than 5,000 wines from 42 countries.

## Wine Cellar-Tracker Technology

For those with medium-to-large collections and optimum conditions, the next challenge is keeping an inventory of your wine and location.

The future is intelligent and accessible wine inventory software for wine-cellar tracking. Solution providers include *eSommelier*, *CellarTracker*, *VinoCell* and *MyCellarMaison*. Like other SaaS platforms, numerous applications can be added via APIs – for example consumption history, current market valuations, current and predictive drinking windows, trading, critics scores, influencer appraisals and social media links. The information can be accessed from anywhere in the world – from the dining table (being able to look at your cellar stock as if it was a restaurant wine list) to select a bottle for dinner or to check your stock

and peruse your assets from elsewhere.

Cellar wine tracking can also be used for reassurance – for example *The Elertus Wine Protection System* detects environmental threats or, for security, new technology such as *Homer*. *Homer Technology*, founded by finance pioneer Jane Siebels, is a security and authentication device that uses patented software in conjunction with in-house designed hardware that can be customised for different products

- It works with redundant systems of Satellite, GPS, WiFi and Bluetooth which locates valuables anywhere in the world within 3 meters (using what3words which LTC members have invested in).

- It ties the device to the valuable allowing for security and value add to the consumer by providing an unbreakable blockchain protected record of authenticity and ownership.

- It protects privacy while prolonging battery life with remote activation, which can only be initiated by the owner of, for example, a *Homer* protected case of wine.

*Homer* can authenticate sealed cases of wine, make sure they are not tampered with and geofence them so they are only activated when the owner notifies the system or they travel outside the geofence. *Homer* takes the physical property of the case, creates a cryptographic key and places a protected provenance record in a blockchain. The vintner can periodically check the location and transfer the ownership when cases are sold.



Adding developments in intelligent wine inventory software and cellar tracking alongside new capabilities – such as label recognition, auto valuations, predictive drinking windows, reviews and appraisals and social media connections via plug in APIs – means more and more technologies and features can be bolted on. In which case, you need a central wine hub or personal wine operating system.

## CellarTracker

Enter **CellarTracker**. What originally began in 2003 as a passion project for founder, ex-Microsoft programmer Eric LeVine, is now a hugely powerful wine database and valuable industry resource. LeVine came up with the idea after growing frustrated trying to keep track of his expanding wine collection. LeVine's Capstone has grown to be one of the world's most comprehensive wine databases, with over 725,000 users, tracking more than 13 million bottles of wine and 10 million user reviews and tasting notes. The platform makes use of the power, passion and wisdom of the community to be an invaluable industry resource.

CellarTracker allows users to independently track the current market value of their cellar as distinct from the purchase price (acquisition cost). This is primarily useful for insurance purposes but also to keep tabs on how different wines are appreciated. It allows users to quickly and easily create their own wine database, capturing photos of wine labels to identify them in listings of over 3.5 million wines.

The company has recently been advertising for data scientists, UX designers and front-end and full-stack developers, demonstrating the core functions they are looking to accelerate in the future. Expect many other wine-related businesses wanting similar talent. In the future your cellar, via CellarTracker, could easily be visited by friends and family as you let them explore your cellar and choose your wine for the dining table from anywhere in the world.

# Technology for enjoying wine

Wine hangovers are often the worst because of the high concentration of congeners, histamine and serotonin release. The dream for many fine wine consumers is enjoyment of wine headache-free.

Momentum is gathering around supporting the body's natural ability to metabolise wine. We all know alcohol consumption puts extra demands on the body, and companies are looking for a solution to the hangover problem.

One such is **Alcotox** which contains a blend of amino acids, N-Acety Crysteine, Alpha Lipoic Acid, L-Glutamine, L-Gylcine, Vitamins C, B1, B5 and B6. Manufactured in the UK Alcotox has capsule supplements that you take before drinking, one per drink during and afterwards. The aim is to target acetaldehyde for hangover prevention and support liver function. Acetaldehyde is the primary metabolite of ethanol oxidation. It is a compound that is relatively toxic and is responsible for the alcohol-related flushing, headaches, nausea and increased heart rate (the hangover that persists for a significant time after drinking). Alcotox contains all three of the glutathione pre-cursors Glycine, Glutamate and Cysteine to maximise the production of intra-cellular glutathione, the body's own master anti-oxidant. The company is also trialling infusion into wine bottles, providing the raw materials within the drink itself without affecting taste.

## Enjoying: Naturally



The Wand from PureWine is a small paddle-shaped device that, according to the product's website, uses "patented nano-pore resin technology" to remove wine's sulphite preservatives and histamines, two components the company says lead to side effects like headaches, next-day hangovers, upset stomachs, stuffy noses, flushed skin and congestion. The Wand works without changing the natural taste, aromas or colour of the wine.

Each wand is a single-use filter (made from food-grade, BPA-free plastic) that is stirred into a six-ounce glass of wine, for three minutes, which ensures the histamines and sulphites are reduced so you don't have to suffer the ugly side effects – all without affecting taste. The filter absorbs the histamines and sulphites without releasing any chemicals that could change the smell, colour or taste. In fact, due to aerating through stirring, owners of The Wand suggest the wine tastes better after using it. CEO David Meadows has a PhD in chemical engineering, decades of experience working in the pharmaceutical industry and dozens of patents.

An alternative to the The Wand is **Üllo**. Founded in 2015, the Chicago-based start-up has a simple mission to bring wine back to its natural state. Like The Wand, the process of selective removal ensures the integrity of the wine is not compromised, allowing you to reveal the true nature of the wine. The Üllo decanter is hand-blown from crystal and uses a sophisticated polymer to selectively bind sulphites while allowing other compounds in wine to flow through unaffected. Each Selective Sulphite Capture™ filter purifies one 750ml bottle of wine. The sulphites are reduced to a more naturally occurring level in most wines.

The future is likely to see more products linked to the negative and positive effects of sulphites and sulphur dioxide, alongside biogenic-amine toxicity and wine intolerances.

## Enjoying: By the glass

**Coravin**, the well-known wine preservation system technology, changed the game for many fine wine consumers and resellers by enabling access to bottles of wine without disturbing the wine's ageing process. The company received a total of \$64.3 million in funding over six months from **Quadrille Capital**, **Windham Venture Partners** and **Jaina Capital**, with the last round at the end of 2016. Its valuation will increase with its latest innovation: the first preservation system for sparkling wine. Coravin allows sparkling wine to stay fresh in bottles for two weeks after opening. The likes of 67 Pall Mall will in the future be able to offer sparkling wines by the glass without the risk of wastage.



## 05 Collectors and Investors

*“Fine wine is an artisanal product that can only be made in miniscule quantities. Every time a rare bottle is consumed, the value of the remaining bottles gets a welcome boost.”*

### Demand and Supply

As mentioned earlier, when defining fine wine, it can simply mean an investment grade wine – something that can be bought and traded for profit, like the sought-after wines of Burgundy and Bordeaux. Supply of wine is inherently finite in nature — once consumed it cannot be replaced. Many are considered a Veblen good, i.e., demand goes up as the price increases. On the other side of the coin is demand, which is still on the rise with the increase of high-net-worth individuals, particularly across Asia, Africa, and Latin America, still developing a taste for fine wine. The increased demand coupled with restricted supply places increased pressure on liquidity and prices. Prices for the top fine wines continue to increase.

A report by Morgan Stanley valued the secondary market for fine wine sitting at around \$5 billion per annum. The wines that are the most prevalent on the secondary fine wine market, those that constitute the investment grade market (less than 1% of fine wine produced), are also the wines in shortest supply. Morgan Stanley concludes that a worldwide shortage of wine is imminent as demand is already exceeding supply.

Wine as an investment is often placed in the SWAG category (silver, wine, art and gold), achieving comparable results in terms of returns and reduced volatility: if you invested £100 in the fine wine market in 1952, your investment would now be worth £420,000. On the other hand, £100 invested in the stock market would now be worth £100,000...

The 100 most actively traded wines in the world have shown returns over a 10-year period exceeding that for FTSE and S&P 500, with lower volatility than gold<sup>18</sup>. The longest-running index shows that across the last 30 years, wine has delivered over 10% compounded

annual growth, which compares to 8% for UK equities (including reinvestment of dividends) and 4-5% for gold and oil. In fact, fine wine has outperformed almost every other major financial index over the past two decades<sup>19</sup>.

For many, wine is a tax-free asset that performs consistently while providing portfolio protection in a way that traditional financial assets fail to offer. Fine wine allows diversification from a traditional investment portfolio and offers low correlation to equities.

According to Cult Wines’ August 2021 report, “potential concerns about inflation amid some supply chain difficulties could also be boosting demand for real assets such as wine<sup>20</sup>”.

### Factors in Investing

When considering which wines to invest in, there are 11 major areas an investor will consider .

1. Brand
2. Producer history
3. Vintage quality
4. Critic score
5. Vintage production
6. Supply (availability on the market)
7. Historical price performance
8. Comparative price analysis
9. Market trends
10. Drinking window
11. Scheduled re-scores

<sup>18</sup> Cult & Boutique

<sup>19</sup> Cult Wines

<sup>20</sup> Cult Wines

Digitally savvy investors now have more tools and capabilities than ever before to increase their curation of data and intelligence for fine wine investing. This means all 11 areas of consideration are becoming increasingly accessible due to technology.

If we take, for example, historical price performance, comparative price analysis and market trends, the establishment of the **London Vintners Exchange** (Liv-ex) in 2000 was a game changer in the wine investment industry. It soon became the global platform for wine trading and indexing, leading to more transparent pricing and information.

Liv-ex, founded by James Miles and Justin Gibbs, started with a group of 10 founding members in London, and a vision to make fine wine trading more transparent, efficient and safe. With more than 500 customers – from start-ups to established merchants and suppliers – in 40-plus countries, Liv-ex publishes the actual prices at which wines are transacted and has

Liv-ex conceived the Standard-in-Bond (SIB) contract to assure stock condition, delivery and faster payment and provide cost-effective logistics and storage solutions. Its APIs can automate much of this to further improve its merchant members' gross profits.

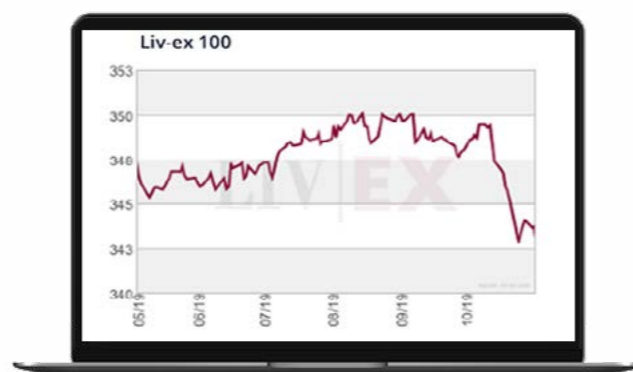
Direct trading on the Liv-ex is only available to professional wine merchants. Private investors have to go to distributors, auction houses (note deep-pocketed Asian buyers now make up the majority of global wine buyers at auction for top brands with *Domaine de la Romanée-Conti* dominating demand<sup>21</sup>) or the secondary market (e.g., fine wine retailers). For the most digitally savvy investors, there are arbitrage opportunities between the major markets (for example London, Hong Kong and New York).

Liv-ex produces two key indexes: the Liv-ex 100, which tracks the price movement of 100 of the most actively traded wines in the world, and the Liv-ex 1000, tracking 1,000 wines.

21 *VinoJoy News*

The Fine Wine 1000 is now a key tool by which the general health and direction of the secondary fine wine market can be determined. According to Liv-ex, the nature of buying fine wines is changing in the following ways:

- Buying direct from producers remains the most favoured buying channel among buyers, who are highly price-conscious.
- Buying from other wine businesses can improve access to more wines, but squeezes margins and increases risks.
- Buyers see the efficient settlement of trades as a major challenge.
- Most merchants expect producers to sell more of their wines direct to consumers in the next five years, creating more competition.
- Technology is making it easier for buyers to source more fine wine from more sources – a trend they expect to continue.



## Wine bid and Bordeaux Wine Index

The likes of **WineBid** have, for 25 years, innovated in the wine 're-commerce' market and the concept of 'sellers with cellars'. WineBid has created the largest global online audience and buyer base of wine enthusiasts who bid weekly on wines with an individual bottle value sometimes exceeding \$10,000. According to WineBid CEO Russ Mann: "The next 25 years will be equally eventful and rewarding for wine collectors and enthusiasts globally, as WineBid supports and promotes an increasing diversity of wines coming to market, an even broader and more diverse base of customers seeking those products, and even more convenient, engaging and fun buying and winning experiences<sup>22</sup>."

Then there is **Bordeaux Index** which has become a major disruptor in the way wine is bought and sold. The company's strengths lie in its ability to re-sell wine at investment exit without value leakage. The company has built LiveTrade, a two-way online trading platform that means most investment-grade wines can be purchased and subsequently sold instantly, in volume and at tight spreads. The platform currently guarantees that there will be instantly-tradeable bids and offers, 24/7, on around 500 of the most actively traded fine wines – predominantly across Bordeaux, Champagne and Tuscany. Bordeaux Wine Index guarantees all transactions on LiveTrade, i.e. if you buy from the platform, you will get a pristine case of wine.

The platform is the only sizeable fine wine trading venue which is pan-market, meaning producers/negotiants/merchants/collectors/investors all trade together. In addition, it has no membership fees or extra costs for settlement. This is partly driven by new users (user signups were up around 60% in 2020

22 *WineBid*  
23 *Decanter*

and are up over 40% for the partial 2021 year) and due to a strong uptick in activity from existing users, particularly in Asia and the US. Bordeaux Wine Index estimates such volumes are three times those of the next largest platform, Liv-Ex, in the relevant wines.

LiveTrade is now poised to make a significant step forward in scale and reach. This is off the back of the 2019 investment from **Société Jacques Bollinger**, the family-owned holding company behind Bollinger Champagne, taking a minority stake in Bordeaux Wine Index<sup>23</sup>, and the appointment of Matthew O'Connell as CEO after a long-term role at Goldman Sachs.

In early 2022, Bordeaux Wine Index will be launching an expanded version of the platform which includes all wines and spirits (though the market-making will remain restricted to the group of around 500 wines). It will allow – with certain restrictions – users to sell any wine from UK/European professional storage, something which will transform the wine broking space. Most people currently broke wine with the merchant they store with, due to the wine needing to be within that storage to be listed on the merchant's broking list. The upgraded/expanded platform will come with a full suite of API functionality for efficient and effective interaction with trade players.

## Bringing Diversification Beyond Bordeaux

More wines from more regions and more vintages are now available at the click of a button. Tracking via Liv-ex shows that Bordeaux's share of trade in 2010 represented 90% of trades. Interest in fine wines beyond Bordeaux has rapidly risen and diversified. Interest in wines from Burgundy, Italy, Champagne, the Rhone and the US has grown exponentially. In 2019 Bordeaux's share of trades was 54.4%,

dropping down in 2020 to 42% as Italy has come to the forefront for investment-grade wines. During November 2020, Bordeaux claimed a 37.6% market share vs 23.4% for Burgundy and 15.1% for Italy. Liv-ex is seeing the number of brands traded and the total number of wines traded going up each year.

Just as the wines being collected and traded increase, the number of fine wine investment companies, wine funding vehicles and packaged offerings has grown. We are in the age of the managed portfolio of investment-grade fine wines. Investing made simple with technology breaking down the barriers.

Platforms such as **Vinovest** and **Rally** (which provides other rare collectables such as classic cars) are on the rise, with Rally raising \$30 million Series B led by Accel<sup>24</sup>). **Oeno**, which has \$240 million in assets over three continents, expanded to North America in April 2021. The company continues to grow operations from its London base to Hong Kong, Singapore and Shanghai<sup>25</sup>. Technology is fuelling its growth, as it is getting easier and easier to invest in such vehicles and track portfolio performance at the touch of a button. Oeno is launching its new investment app soon.

Technology is also providing new ways to curate wine into a new offering – for example the data-driven wine recommendation platform **Wine Lister**. Wine Lister provides ground-breaking buyer recommendations via an algorithm that takes into account a wine's quality and value within its vintage appellation, as well as indicators from industry intelligence sourced from key players in the fine wine trade. The results are simple, impartial Wine Lister scores.

Ella Lister, the founder and CEO, is driven by the desire to see a more comprehensive, logical and progressive wine rating system, combining her passions as a wine writer and fine wine market analyst.

## Satellite Predictions

**Saturnalia** is the first platform fully centred on fine wines capable of offering users, enthusiasts, collectors and professionals a 3D view of vineyards: from the most notorious Bordeaux “grand cru classe” to the MGA of Barolo, Barbaresco, Brunello, Bolgheri, Burgundy, with many other wine areas expected to be mapped soon.

Saturnalia is a service offered by **Ticinum Aerospace**, which originated in 2014 as a spin-off of the University of Pavia in Lombardy. Daniele De Vecchi, Saturnalia project manager and team leader, came up with the idea of supporting the fine wine world with data directly derived from the Earth observation satellites.

The platform ingests geospatial data collected from both satellites and weather stations to unlock insights about any single vineyard worldwide. In collaboration with Liv-ex, qualitative behaviour also is analysed against value variations.

Saturnalia offers a comparison between the satellite-derived results published in November, soon after the harvest, and the main critics' assessments revealed after the Bordeaux En Primeur tastings. This enables wine investors to obtain pre-emptive information on predicted scores and prices to help them steer their investment decisions.

Saturnalia owns a custom-designed vegetation index that creates the Saturnia Evolution Index. Then there is the Saturnalia Variation Index which summarises all the recorded values from the Evolution Index to evaluate the season overall. The output is the Saturnalia score which is produced with AI-driven algorithms. Saturnalia is able to extract a potential

<sup>24</sup> Business Wire  
<sup>25</sup> Cult Wines

scoring for a wine without any tasting involvement and based on objective sources, such as satellite data, weather data and territory/orographic information. Saturnalia carries out predictive modelling using observations from satellites and vineyard imagery to forecast the quality of a vintage and then the likely price movement of a fine wine in the market.

One could imagine platforms evolving into a curator of the curators, taking the output and intelligence from Wine Lister, Saturnalia and others to provide another meta-layer of insight and analytics. Perhaps the future is consolidation and acquisitions to create the most comprehensive analytics for investing in fine wine.

## The Twelfth Factor

We mentioned the 11 factors influencing fine wine investors. We would add a twelfth, which is more personal and less about the data:

### Enjoyment

Many investors invest in wine they like, as the worst-case scenario is that they can drink and enjoy the asset. Wine is a tangible asset with an intrinsic value. As Bloomberg says:

“The best investment vehicle is one you can drink”<sup>26</sup>.

Perhaps it's nostalgia about serving the wine at one's wedding, or drinking it on the first date with your now spouse. Perhaps it's the visit to the winery while on holiday and meeting the owner and sharing a fantastic experience with them.

Investing in wine can be about the experience. For example, auctions offer the chance to buy and

<sup>26</sup> Bloomberg  
<sup>27</sup> Wiv

taste wines but also to enjoy the atmosphere and competition for the scarce asset.

“Collectors are different at the highest level — they move in the same circles, tasting groups and events, and don't buy wines like stocks and bonds. There is passion behind the act and a thrill associated with the chase,” says Clifford Korn, managing director of **Acker, Merrall & Condit**, the oldest wine shop in America and the world's largest fine and rare wine auction house.

## Tokenisation and NFTs

“The challenge is that while the fine wine market consistently offers better returns than comparable sectors, the speed, complexity and cost of the wine trading process mean that it is often passed over when investors are looking for ways to diversify a portfolio”<sup>27</sup>. Tommy Nordam Jensen, WiV

A new generation of wine investors want to add fine wine to their portfolio and are used to their assets being liquid, being able to trade quickly and transparently.

**WiV** is turning wine into non-fungible tokens (NFTs). Its NFT Platform allows wine producers and collectors to instantly buy, sell and borrow money against their wine. The platform gives users rapid access to finance without having to endure extensive bureaucratic processes.

WiV's blockchain technology allows users to securely collect and store information about each unique assets' provenance and transaction history. WiV manages the physical asset, the wine or case of wine in insured wine vaults. The token represents the actual ownership of the wine.

“In 50 years, if you own a bottle of wine that has been

recorded on a blockchain, you will irrefutably own that bottle of wine. And because the wine's journey through those 50 years will be tracked, it will be possible to show how it has been stored, and whether it's been stored professionally. This means that the token will show both proof-of-ownership and proof-of-value". Tommy Nordam Jensen, WiV

By buying through the WiV platform, owners have the possibility to trade wine quickly, transparently and at a low cost as a result. They also have the confidence in the value of their investment with provenance managed transparently.

However, there is a certain reliance on buyers in the future using the platform and wanting to engage with NFTs and tokenised wine. The auction house **Christie's** remains cautious, despite the world seeing the Christie's Beeple \$69 million NFT sale: "We're willing to explore NFTs but there's nothing on the table," Pablo Huarte, the house's head of wine and spirits for continental Europe, says. "When it comes to wine, we're staying classic for the moment."

## The Metaverse

The metaverse is a potentially vast three-dimensional online world where people can meet and interact virtually. There has already been a move to digitise many parts of wine business and communications (Zoom cellar tours, virtual vineyards and the online tastings described in this report). The future vision of the metaverse, though, is more immersive online interaction, and shared experiences.

Anyone with children will know this is already playing out in millions of homes around the world with online games like Fortnite and Minecraft, where users create richly imagined virtual worlds. Within the wine industry, the metaverse allows you to create a universal platform to sell, promote, drink and discuss wine. It is not about the tangible objects you own

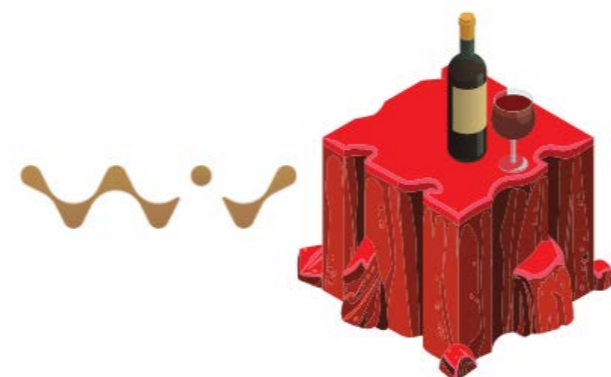
but instead what the consumer (or their avatar) is consuming.

The likes of WiV are developing a presence in the metaverse. Its partners with wine producers, distributors and merchants and is looking to develop multiple projects in this metaverse space.

Tech players, such as **Facebook** and **Nvidia**, are investing huge amounts of capital (financial and human) into the metaverse. Jensen Huang, the boss of Nvidia, told Time magazine that he wants to create "a virtual world that is a digital twin of ours". Epic Games, best known as the creator of Fortnite, announced in April 2021 a \$1 billion round of funding to build a "long-term vision of the Metaverse" which will help the company further develop connected social experiences.

Metaverse enthusiasts envisage a rush to buy virtual land. There are currently a few thousand unique landowners on each of the main blockchain-based platforms. Just like there was a rush for domains in the early days of the internet, could there be a rush to own domains in the metaverse? Could there be iconic vineyards in the metaverse where people can congregate, take a virtual tour?

"All of virtual land and these virtual spaces are basically real estate on which experiences will start to centre, on which attention will start to focus. In the near future, the metaverse could become a significant part of the wine industry so watch this space,"<sup>28</sup> says Tommy Nordam Jensen, founder and CEO of WiV.



## LTC Focus on the Truth Hunter

Is the wine inside the bottle what the Investor has bought?  
Dr Cecilia Muldoon, Founder & CEO Verivin

As a wine investor, numerous factors can influence the value of your wine collection, from currency fluctuations to market supply and demand, global recessions and ever-evolving consumer trends. As the world changes, so too do your bottles. Wine is one of the most complex liquids we know, a chemical chameleon that is constantly evolving over time. Wine lovers the world over understand that this change can be the source of much enjoyment – there's nothing quite like opening a perfectly aged bottle of Bordeaux – but also the cause of anxiety. Imagine coming home with a bottle of that coveted white Burgundy and realising that it had prematurely oxidised or, even worse, was actually a fake. This is where VeriVin comes in. We are an Oxford-based technology company with solutions aimed at helping you track and understand any changes to both individual wines, as well as your entire wine collection.

Our foundations as a company lie in physics and our team of physicists focus on the non-invasive spectroscopic analysis of complex liquids. The first application of our technology is in the world of wine. Our company's mission is to make testing a bottle of wine as easy as pushing a button on your smartphone. Since we last outlined our technology to the London Technology Club a few years ago, we've put at the centre of our work the SLA001, a portable device that scans the contents of bottles through the glass and compares the resulting optical fingerprint to a growing database of similar scans. Since no two bottles of wine have the exact same fingerprint, this comparison can provide a whole host of information about what is going on inside the bottle, from whether or not the wine is affected by faults such as oxidation or light

strike, to whether the wine is otherwise chemically different from other bottles purported to be from the same vintage or vineyard.

### An Old Problem: Oxidation, Fraud and Fakes

The wine industry as a whole faces broad issues of transparency, provenance certification and quality control. The EU reported that losses due to scams and/or counterfeit wines cost €1.3 billion per year. In the world of fine wine, industry experts estimate that up to 20% is fake, and it is estimated that up to 10% of all bottles are affected by one wine fault or another, which may result not just from issues with the wine itself but also from poor storage and transportation over the long lifetime of many bottles. The costs incurred are not only direct, such as a decrease in the value of the bottle itself, but also indirect and intangible through increased shipping and time costs and damage to a producer's or merchant's brand value and reputation.

### Non-Destructive Testing is the future

Currently, the only way to test involves a corkscrew, taking a sample, and an outside laboratory, which is slow, costly and impractical for particularly rare and valuable wines or for larger batches of product. VeriVin's solutions promise to circumvent these issues and allow testing to happen quickly, accurately and on-site, all without having to open a bottle of wine. By using the Internet of Things, VeriVin is creating a global interconnected network of SLA001 devices to

gather an ever-increasing number of optical scans. The company's machine learning algorithms improve and develop with each new data point acquired, and with them our ability to track how bottles of wine change over time.

### Proof that it works at scale

Although the company is relatively new, we've already proven that our solutions work. One importer noticed that the wine he received for his shops started to taste different from the wine he had originally received and tasted at the winery. The bottles and labels were the same, yes, but something had changed as the wines crossed an ocean to reach his stores.

In our non-destructive testing and analysis of these bottles, the VeriVin team were able to prove the importer's hunch: the wines he had initially received were indeed different from the ones he subsequently received. This same conclusion was reached for a major wine distribution company in the UK. VeriVin's analysis was able to prove that declining customer reviews for a particular wine were not the result of changing consumer tastes, but rather reactions to a different wine being supplied. The unique VeriVin solution tested hundreds of bottles without damaging them; this wouldn't have been possible with traditional methods.

### Protecting High-Value Cellars

These cutting-edge testing solutions have not only helped wine businesses ensure consistency in their product but have also aided private wine enthusiasts in maintaining their collections. Using an SLA001, a collector was able to determine that a subset of his collection was oxidised – dinner disappointment successfully avoided – and was able to track how and how quickly individual bottles in his collection were changing over time.

The broader commercial applications of VeriVin's technology are potentially groundbreaking for not just the wine world, but for any industry that needs a quick and easy testing solution for a complex liquid. The team plans to focus initial efforts on wine, but in the future this technology can be applied to spirits, olive oil, honey, pharmaceuticals and more. Greater knowledge of change means a greater ability to manage it. VeriVin is providing solutions to manage it in your winery, warehouse or cellar, one bottle at a time.



## 06 Will Technology Change the Definition of Fine Wine?

*"No more guesswork when picking a wine, no more disappointment when tasting the first sip..."*

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## FINAL THOUGHTS

### From Pauline Vicard, ARENI FINE WINE



Transformative technologies and digital companies are changing the world in almost unfathomable ways. The fine wine world is also challenged by these technologies, which are transforming both production and distribution systems.

I would like to revisit ARENI's definition of fine wine and see how well it stands up to the challenges of technology.<sup>1</sup>

#### Technology and free will

"Fine wine reflects the expression of truth intended by its maker."

When making wine in custom-crush facilities like Wheeler Farms Winery in Napa Valley or UC Davis's brand-new winery, it's possible to access each and every data point collected during the winemaking process by phone, and then act on it. When each press, tank or barrel of the winery is producing hundreds of data lines, it should soon be possible to have access to enough data to produce an algorithm for a perfect fine wine.

And I am not talking here of a wine recipe that will give the same wine every year, but about a data-based decision that will lead to unique expressions of vintage, with practical solutions to solve each unique challenge or lack of harmony. When wine tanks come with an inbuilt knowledge of how to adjust winemaking, what does it mean for the "expression of truth" and the relationship between fine wine and its maker?

#### Technology and fine wine appreciation

"Fine wine provokes emotions and wonder in the one drinking it."

The above definition expresses clearly that part of what makes a fine wine is indeed in the eye of the beholder. If a wine doesn't give you any kind of emotions, then you are allowed to call it something other than 'fine'. What science tells us now is that our emotions are no more than a chain of chemical reactions, that can be understood by algorithms, triggering different kinds of actions based on these

understandings. So, hypothetically, if we were able to collect enough data on our emotions when drinking wine, how this bottle makes us feel compared to this one, we could come up with an exact list of what is, for us, a fine wine and come up with an app that would match the emotion that we want to feel with the exact bottle of wine that is fine for us at this moment. No more guesswork when picking a wine, no more disappointment when tasting the first sip...

#### Technology and sustainability

"Fine wine is sustainably produced."

In the short-run, technology will have the biggest impact on the "sustainability" part of our definition.

This last part of ARENI's definition of fine wine is a new addition, that only came up in the latest version of our white paper. We know, though, that some wines that are currently considered fine are not yet (fully) produced in a sustainable way, in either their environmental or social practices.

Yet technology is now facilitating sustainable practices so much so – from water management to a better use of vine nutrients, from robots to assist workers in highly physical tasks to batteries able to stock solar energy – that there should be no more excuses for fine wine producers not to be highly sustainable.



<sup>1</sup> "A Fine Wine is complex, balanced, with a potential to age – though highly drinkable at every stage of its development. A wine that provokes emotions and wonders to the one drinking it, while reflecting the expression of truth intended by its maker, and which is sustainably produced." – ARENI, Define Fine Wine White Paper, 2019



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**Stephanie Barnett**, 67 Pall Mall

**Robert Eden**, Chateau Maris

**Dr Cecilia Muldoon**, VeriVin

**Dan Thomas**, VeriVin

**Emelyn Rude**, VeriVin

**Richard Hemming MW**, Jancis Robinson.com

**Pauline Vicard**, Fine Minds 4 Fine Wines

**Nicole Rolet**, Fine Minds 4 Fine Wines

**Mike T Barrow**, Costaflores / OpenVino.org

**Paul Mabray**, Pix

**Felicity Carter**, Pix

**Joe Fattorini**, Pix

**Guy Woodward**, Club Oenologique

**Adam Lechmere**, Club Oenologique

**Catherine Bourassa**, Clementine Com

**Clemence de Crecy**, Clementine Com

**Antoine Abou-Samra**, Table for Two

**Natalie Wang**, Vino Joy

**Daniele De Vecchi**, Saturnalia

**Tony Hallett**, Collective Content

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