

## **Abstract**

### **Module 5 - Diploma Thesis**

**Sebastian Schier**

**November 2023**

# **The intelligent bottle of wine - combining blockchain and the internet of things: A holy grail for vintners?**

The wine industry is one of the most traditional industries whose history has endured for over 8,000 years. At the same time wine is a consumer product meaning it is important to adopt and evolve to stay relevant.

This diploma - thesis focuses on high-end wines with a retail price of EUR 40 plus and is not looking at current issues in the mass market. However, there are challenges which are relevant to all categories. At the same time there are unique tailwinds to high - end wines.

Looking at the most recent report by Rob McMillan on the "State of the US Wine Industry 2023", it becomes apparent that the wine industry as whole has not been able to engage with younger consumers in their prime spending years. At the same time story - telling and emotional experiences are becoming more and more important, which offers tremendous opportunities for high - end wineries, which use sustainable farming practices, incorporate biodynamics, and take great care in their winemaking. However, wine knowledge is very asymmetrically distributed posing a major hurdle for wine producers and consumers alike. Additionally, with increasing online trade, it is important to control supply and protect heritage and eventually to connect with the final customer.

This diploma - thesis looks at combining blockchain technology and the internet of things to support vintners in their quest to protect their heritage and attract new customers. It looks at the benefits of using this new technology and discusses potential implementation hurdles. It also encompasses input and feedback received during discussions with winemakers and members of the industry. There have been conversations with more than 100 counterparties including ones with multiple meetings.

## **The ecosystem**

The immutable, phygital connection between the digital twin (NFT) and the physical bottle is at the center of the ecosystem. To achieve this, a dynamically encrypted NFC tag is immutably attached to the respective bottle, providing each with a unique and clear ID. This ID is stored as an NFT on the blockchain and subsequently assigned to the rightful owner. In this way, each NFT in the ecosystem unambiguously represents a matching physical product. Owners communicate with the intelligent bottle by simply tapping it with their smartphone.

Benefits include a new authentication standard. The intelligent bottle directly connects vintners with their costumers creating a new level of customer relationship management and revenue opportunities. At the same time costumers will get a new revolutionary wine experience coupled with a digital wine cellar and tasting journal.

Vintners are set to benefit the most from the introduction of the intelligent bottle of wine. However, fragmentation and slow adoption rates show that this is a long journey as there is no "perfect" vintner and visionary actors are needed. Iconic & leading producers face the most anti - counterfeiting pressure and have a developed business mindset. However, they have been selling their wines successfully for generations and are typically no first movers. Many wineries are rightly focused on producing the best possible product and sometimes lack the internal structures to manage such a transition. Macro - economic factors as raw material inflation and shortages have not helped adoption in recent years. At the end it is crucial to find innovative vintners with a strategic mindset who want to set a mark and see the long - term benefits of the intelligent bottle of wine.

### **Potential catalysts**

Merchants can be a possible catalyst to drive adoption as they are in many cases the "client - facing" part in the value chain and are very much business - minded. However, not all are set to benefits from this innovation. Grey - market traders as well as merchants relying on the mark-up between release and end - consumer pricing could see the innovation as a threat. This could be used by vintners to focus their distribution network on the merchants with sustainable end - consumer relationships.

Late cellar releases can be another tool to promote adoption. It enables wineries to test and experience the innovation on a smaller scale and gives end - costumers a state - of - the - art authenticity proof.

Starting from December 2023, EU regulation 2021/2117 on wine labelling will require wineries to list comprehensive details about their products. The information can be stored digitally and thus offers a great catalyst for innovative wine labelling.

Wine, as no other alcoholic beverages, meets the current *zeitgeist*. It is about producing a natural product that enhances life, fun, live events, and experiences. Many vintners use sustainable practices and incorporate biodynamics and organic farming. The intelligent bottle of wine can transport that message to the next generation of wine consumers and to create more wine enthusiasts.