

Complex automation of processes at the enterprise

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Abstract. Illegal production and circulation of wine and alcoholic beverages has a negative impact on the health of the population and leads to a decrease in tax revenues to the budget. The SCANDARD system is a digital identification system built on blockchain technology and artificial intelligence algorithms that provides electronic traceability of wine and alcoholic beverages. The system tracks the life cycle of product from manufacturer to consumer, controlling its quality, managing production and supply processes, and controlling product disposal. This article describes the development and implementation of the SCANDARD system, its legal and organizational principles, its integration and support at enterprise level. The article also discusses the possibilities and economic benefits of the system, such as increased sales, reduced packaging costs, inventory control and sales rates. The SCANDARD system provides a new channel of interaction with end consumers and creates personalized marketing strategies and target information for consumer.

The purpose of adopting the electronic traceability of the circulation of wine and alcoholic beverages is to settle certain issues of the circulation of wine and alcoholic beverages, as well as to strengthen control in order to ensure the full payment of taxes on such excise goods and to combat their illegal production and circulation.

Illegal production and circulation of wine and alcoholic beverages has an impact in many aspects: first, it negatively affects the sphere of public interest - it contributes to the increase in cases of alcoholism, including among vulnerable groups of the population; secondly, it leads to a decrease in tax revenues to the budget.

In view of this, we believe it is necessary to take additional measures aimed at counteracting the above-mentioned phenomena, in particular, by defining the legal and organizational principles of digital identification, ensuring electronic traceability, circulation of wine and alcoholic beverages, which is designed to strengthen control over the circulation of such excise goods.

The company “Ukrderzhcyfra” with the financial support of the State Innovation Finance Institution and the assistance of the Ukrainian Corporation for Viticulture and Wine Production Industry “Ukrvinprom” and Scientific Center “Ukrainian Wine Institute” developed the [SCANDARD] system - a system for monitoring and managing the life cycle of a product unit from the producer to the consumer, which is implemented in the production industry.

The [SCANDARD] system is built on Blockchain technology and artificial intelligence algorithms, which, by labeling (encoding) each unit of product with an individual DataMatrix code, allows tracking the product's lifecycle from production to sale and disposal, obtaining reliable information about its circulation in real-time.

[SCANDARD] is a system for monitoring and managing the product lifecycle from the manufacturer to the consumer, and even disposal, which is being

implemented in the industrial sector. This system allows tracking the product at every stage of its lifecycle, controlling its quality, managing production and supply processes, and monitoring the disposal of the product. This improves production efficiency, reduces waste and the risk of problems with the product, and improves relationships with consumers and other interested parties.

The main goal of implementing the [SCANDARD] system is to protect the manufacturer's products and brand from unfair competition and shadow circulation of products, to control intermediaries, distribution, logistics, and track the geography of product distribution, and to create a new channel of interaction with end consumers.

Integration of the [SCANDARD] system and its further maintenance at the enterprise will include:

- Manufacturing and industrial application of unique DataMatrix codes of the [SCANDARD] system on the enterprise's products – “digital passports” of each unit of the product, their processing and storage in a secure cloud repository;
- Manufacturer's cabinet, with access to an online platform for ordering and generating codes, monitoring and analytics of the circulation of all produced units of the product;
- Mobile application - product scanner, for enterprise employees, logistics, distributors, retail and consumers;
- Information and technical support of the [SCANDARD] system;
- If necessary, equipping the enterprise's production lines with equipment for individual product coding (marking) and reading without interfering with the production processes.

The estimated term of integration and testing of the [SCANDARD] system at the enterprise will be up to 2 months from the date of signing the Implementation Agreement. In the future, based on individual business

needs, the company has the opportunity to develop additional technological and analytical management tools using the [SCANDARD] system.

Opportunities of the Scandard system. Information on the movement of goods/services through the logistics chain in real-time. Protection of the manufacturer's intellectual property rights. Each unit of product has its own digital passport, making forgery technologically impossible. Guarantee of quality and origin of the product for the end consumer. Control of warranty period, expiration date, and use. Business analytics of a new level without additional costs. Consideration of geodata and points of sale of counterfeit goods when generating reports. Feedback from the consumer. New personalized marketing strategies, direct discounts, loyalty programs, targeted information for the consumer.

Economic advantages. Increased sales volumes of products due to a reduction in the percentage of counterfeit goods in circulation. Reduction in costs for packaging due to the abandonment of other product protection elements. Control of product stocks and sales rates. Motivation of buyers through highlighting the use of the product protection technology [SCANDARD] in advertising materials. Digitization and automation of main processes, production planning, and increased product turnover.

Technologies used:

The core of the system: BlockChain Hyperledger Fabric.

API Server: Go language. It is used for integration with external systems, manufacturers' offices, chatbot. ESC cluster with auto-scaling capability.

Manufacturer's cabinet: React.

Mobile apps: React Native.

Database: Amazon RDS. All sensitive data are encrypted with AES encryption.

Simplified algorithm of the System [Scandard]:

- 1) Adding manufactured products to the Information System. containing products, certificates, photos, description.
- 2) Ordering marking codes and receiving codes in a convenient way through the manufacturer's office.
- 3) Application of marking codes on products. An automatic printer on the production line or a manual printer - an applicator. Or ordering the printing of marking codes it a printing house, when making labels.
- 4) Activation of marking codes by automatic scanner or manually using mobile application. If necessary, marking codes can be activated during generation. From this stage, your products are protected and tracked.
- 5) Transfer of products. Fixing the transfer of products for all chains of business processes: warehouse, logistics, distribution, retail, and consumption. Each fact of transfer between chain participants is additionally recorded by geolocation. You have the opportunity to determine the origin and "history" of any marked product.

- 6) Inspection of products and formation of analytics. Data collection and display of information at all stages of the product life cycle, both for consumer and for manufacturer. Detection of dishonest distributors, fakes. Control of retail warehouse stocks. Organization of feedback with your customer.
- 7) Further integration [Scandard]. According to your needs, we will develop additional functionality for efficient work.

The following actions were taken during the implementation of the project, which ensured the creation, promotion, and sale of the [SCANDARD] system:

1. The computer program "System for monitoring and managing the life cycle of goods, services, documents, events, and SMART protection of products from counterfeiting, forgery, and smuggling [SCANDARD] 1.x.x" was fully created and accepted onto the balance sheet of the Enterprise.
2. The Ministry of Economic Development, Trade, and Agriculture of Ukraine issued a decision on the registration of the copyright agreement on February 3, 2020, No. B/n, under which the property rights to the work "System for monitoring and managing the life cycle of goods, services, documents, events, and SMART protection of products from counterfeiting, forgery, and smuggling [SCANDARD] 1.x.x" are transferred to LLC "Ukrderzhtsifra". Registration number 4890 as of April 9, 2020.
3. An examination was conducted and a Conclusion was obtained from the State Special Communications and Information Protection Service of Ukraine on March 26, 2020, No. 1092, stating that the complex of means of the software product "System for monitoring and managing the life cycle of goods, services, documents, events, and SMART protection of products from counterfeiting, forgery, and smuggling [SCANDARD] 1.x.x" meets the requirements of regulatory documents for technical information protection in the scope of functions specified in the document "System for monitoring and managing the life cycle of goods, services, documents, events, and SMART protection of products from counterfeiting, forgery, and smuggling [SCANDARD] 1.x.x Technical requirements for information protection against unauthorized access."

Conclusion

The introduction of electronic traceability in the wine and spirits industry using the [SCANDARD] system is crucial in the fight against the illegal production and circulation of these excise goods. The system allows you to track and manage the life cycle of a product from

the producer to the consumer, providing control over intermediaries, distribution, logistics and geography of product distribution. Through the use of blockchain technology and artificial intelligence algorithms, the [SCANDARD] system offers economic benefits such as increased sales, reduced packaging costs, and automation of core processes.

Direct access to the target audience is implemented: if the consumer scans alcohol and related products, marketing information is sent to him. An additional channel for collecting and controlling information about production, logistics, points of sale and distribution. Control of distribution, regional supplying of products.