1. Hypersmart Contracts: first use cases

This section hosts a collection of first use cases of Hypersmart Contracts in decentralized and trustless parts of value chains.

1.1 *Use Case 1- Reverse auction in supply chains*

A reverse auction (also known as a procurement auction) is a process where a producer (the Master) seeks new suppliers (the Participants) through a dynamic bidding process. The general procedure is the following one:

- A request for proposal (**RFP**) is issued (usually via a market maker or on the buyer's website) on the reverse auction site, for a group of products or services. The RFP is open for a specific time, depending on the buyer's needs and on the type of products/services.

- Interested suppliers contact the market maker (or visit the buyer's website) and place their offers (quantities, prices, delivery times, etc.).

- The buyer then awards the supply contract(s) to the winning bidder(s).

A reverse auction mechanism is useful because it normally reduces the price of the goods/services to be purchased. There is an on-going competition among suppliers for securing tenders which pushes the suppliers to submit compelling offers and maximize their winning probability. However, from the perspective of the offeror issuing the tender request, **choosing the cheapest bid is not equivalent to making the best possible choice as a whole.** Multi-facet parameters ought to be considered: for example, the quality of the bidder services (declared, inferred or measured), all other relevant terms and conditions of the offer, the capacity constraints of the suppliers, the risk of non-fulfillment or of delayed delivery, etc.

Figure 1. Hypersmart Contracts as integration of A.I. & Blockchain technologies for maximally optimizing supply chain

These criteria need to be considered to avoid or at least reduce 'hidden costs': wrong planning decisions, inefficiencies in production and in other processes of the buyer's value chain, sale losses, lower customer retention and many others. Including all such complex criteria for making an optimal choice in a reverse auction process is not an easy task: given the tremendously high complexity of modern business, it is common to have to **compute thousands of variables** as well as several conflicting goals and constraints.

To solve such a problem, it is necessary to use **big data optimization techniques and algorithms** that leverage on the latest findings in artificial intelligence and related fields. For example, a current ORS GROUP **Hypersmart Solution** optimally generates the distribution plans throughout a complex supply chain network by **solving hundreds of thousands of optimization problems** (each entailing up to 100 million variables) **in seconds.** The availability of **Blockchain** technologies adds now the possibility of **automatic execution of such Hypersmart Solution in a decentralized and untrusted environment,** both in domestic and cross-border trades, eliminating the related paperwork and bureaucracy.

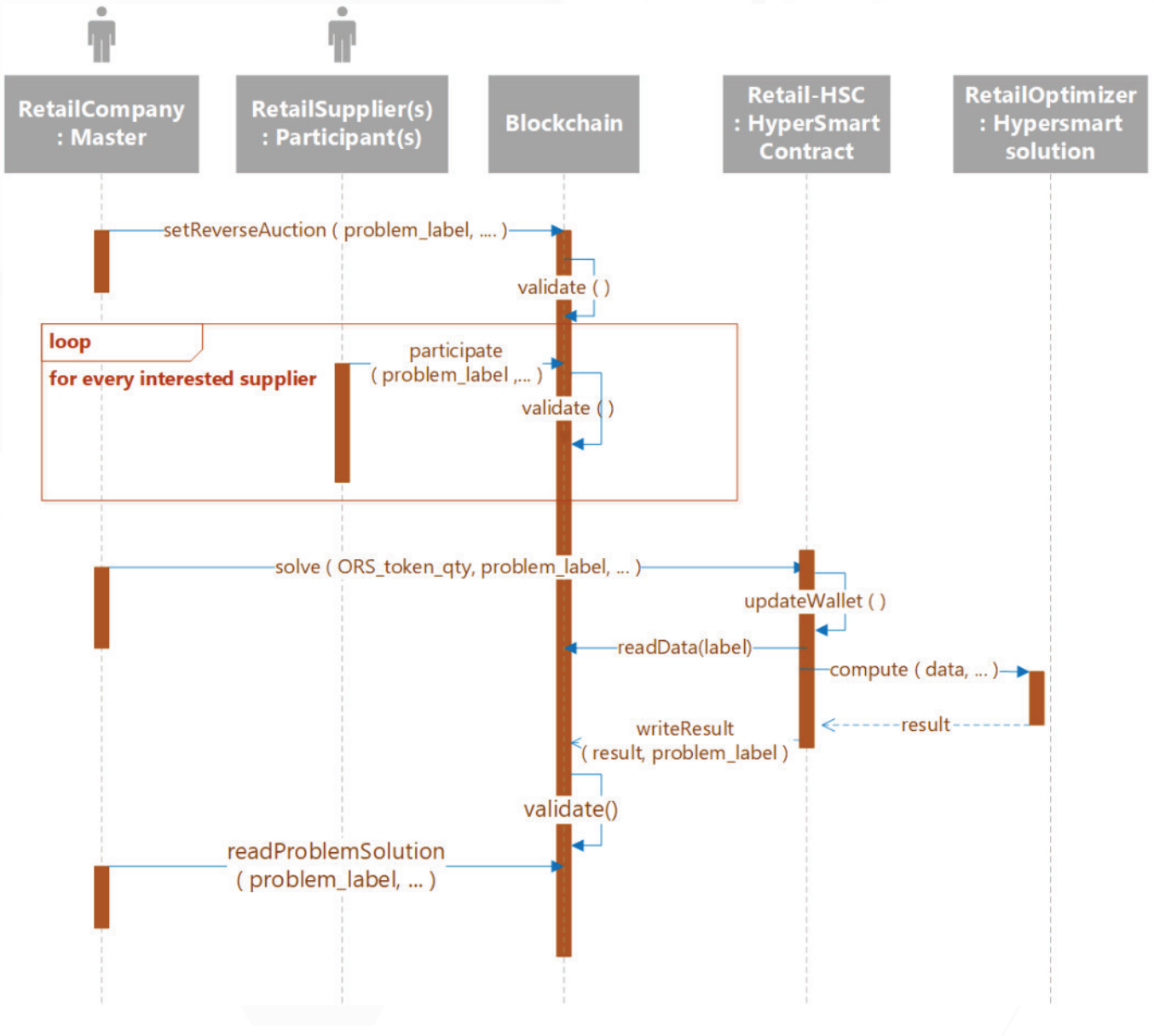

Figure 2 The use of Hypersmart contracts in the reverse auction case in supply chain