embodiments advantageously enable digital identities to be associated with physical goods, which adds value for customers making a long-term investment in a luxury good, and promotes sustainability and transparency in the manufacturing and retail process. In another example, the sourcing and manufacturing processes can benefit from the traceability and immutability of distributed ledger technology. The described embodiments provide methods and systems for registering previously grey area manufacturing, sourcing and supply chain outcomes into a transparent and traceable experience for the consumer, thus creating a valuable experience while also providing for cross-marketing and in real life (IRL) community building and partnership experiences.

[0005] In an example aspect, a system for blockchain-based asset authentication is disclosed. The system includes at least one platform server associated with a blockchain platform, at least one database configured to store information associated with an asset, and at least one application program associated with an owner of the asset, such as an original purchaser of the good. In this system, the at least one platform server configures a first pairing between the asset and an authentication mechanism that uniquely identifies and stores at least a subset of the information, and then writes to the blockchain platform, using a first application programming interface (API), a transaction that is correlated with the first pairing. This is followed by the at least one application program transmitting, to the at least one platform server using a second API different from the first API, a first message indicative of the owner acquiring the asset. Once the physical good has been purchased or otherwise acquired (e.g., either online or in-person), the at least one platform server receives, using the second API, the first message from the at least one application program. Upon receipt of the first message, the at least one platform server generates, a digital passport corresponding to the first pairing, configure a second pairing between the owner and the asset. Then, another transaction that is correlated with the second pairing is written to the blockchain platform, using the first API, such that the second pairing is immutably linked to the first pairing.

[0006] For purposes of this disclosure, “writing” a transaction to the blockchain follows the process which is similar in many blockchain technologies. For example, on Ethereum™ the process of writing a transaction to the blockchain entails a series of operations, including transaction creation, transaction signing, transaction broadcasting, transaction verification and pooling, block formation, block mining (for proof-of-work) or validation (proof-of-stake), and

ultimately addition of a block (which includes the transaction) to the blockchain to complete the transaction. For purposes of the present disclosure, the platform server can be one or more computing devices associated with the blockchain which singularly or collectively performs these various operations.

[0007] In another example aspect, a method for blockchain-based asset authentication is disclosed. The method includes receiving, by at least one platform server associated with a blockchain platform, information associated with an asset. Said information is stored in at least one database. The at least one platform server then configures a first pairing between the asset and an authentication mechanism that uniquely identifies and stores at least a subset of the information, and writes to the blockchain platform, using a first application programming interface (API), a transaction that is correlated with the first pairing. The method continues with receiving, from at least one application program (associated with the owner) using a second API different from the first API, a first message indicative of owner acquiring the asset. The at least one application program is associated with the owner. Upon receipt on the first message, the method then generates, a digital passport corresponding to the first pairing, configuring a second pairing between the owner and the asset. Another transaction that is correlated with the second pairing is written to the blockchain platform, using the first API, such that the second pairing is immutably linked to the first pairing.

[0007a] In yet another example aspect, a system for managing programmable value distribution linked to a verified physical product is disclosed. The system includes at least one platform server operatively associated with a blockchain platform and configured to maintain a distributed ledger; at least one application program associated with an owner, user, or takeholder of the product; at least one authentication mechanism uniquely paired with the product and linked to a digital passport; wherein the system is configured to: record an initial transaction linking the authentication mechanism to the product on the blockchain; generate a digital passport representing the product and associating it with one or more designated parties; detect a

transaction involving the product or digital passport, including transfer, resale, or usage; calculate a value amount based on programmable rules or a basis point structure; and automatically distribute portions of the value amount to a plurality of recipients, including manufacturers, suppliers, creators, consumers, or other parties, wherein value distribution is enforced as a condition of transaction finalization and may recur in perpetuity following issuance of the digital passport.

[0007b] In yet another example aspect, a method for managing programmable value distribution related to a physical product is disclosed. The method includes pairing the product with an authentication mechanism and generating a corresponding digital passport; recording a first blockchain transaction establishing identify and origin of the product; associating the digital passport with one or more stakeholders including at least a creator, supplier, or owner; detecting a qualifying transaction involving the product or passport; calculating a value amount using predefined rules or a basis point structure; and distributing portions of the value amount to a plurality of designated recipients, wherein the transaction is finalized only upon successful distribution, and wherein value distribution may repeat in perpetuity during the product lifecycle.

[0008] In yet another example aspect, a system for blockchain-based asset authentication is disclosed. The system includes a processor of at least one platform server associated with a blockchain platform, and a non-transitory memory, coupled to the processor, having code stored thereon, the code, when executed by the processor, causing the processor to perform a series of operations. The operations include receiving, by the at least one platform server from at least one database, information associated with a physical good. The at least one platform server then configures a first pairing between the physical good and an authentication mechanism that uniquely identifies and stores a subset of the information, and writes, using a first application programming interface (API), a transaction that is correlated with the first pairing to the blockchain platform. Next, the at least one platform server receives, from at least one application