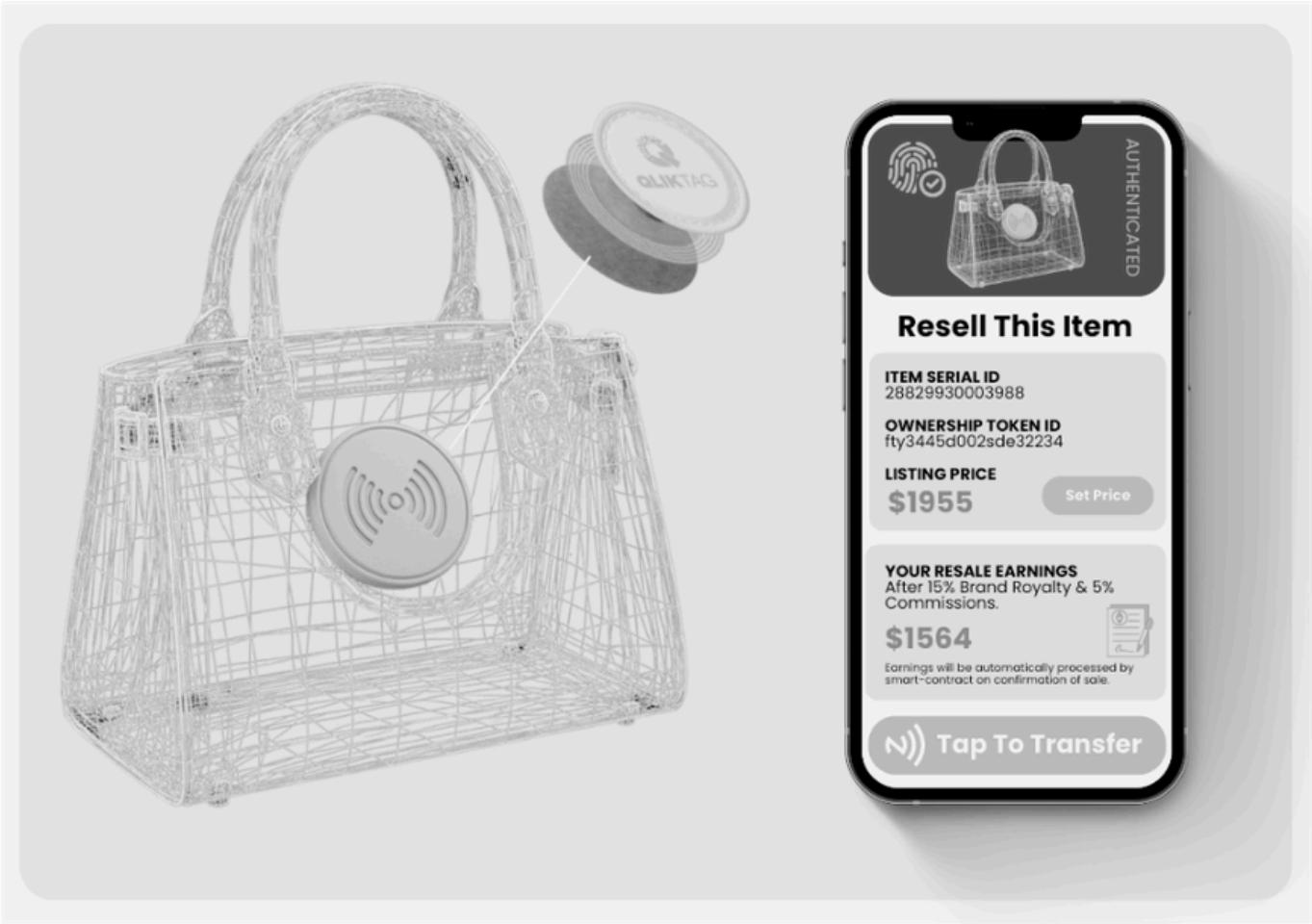


Qliktag

Owning the Circular Economy

HOW NFC, DPP, NFT & SMART CONTRACTS ENABLE BRANDS TO RECLAIM THEIR SECONDARY MARKET

QLIKTAG

The global secondary market for consumer goods is projected to exceed **$350 billion** by 2028. **Brands & manufacturers** of these products essentially get **no share** of secondary market revenue. A **massive economic opportunity lost**. This white paper presents a new architectural framework that fundamentally changes this dynamic.

An Executive Summary

Circular Revenue Models

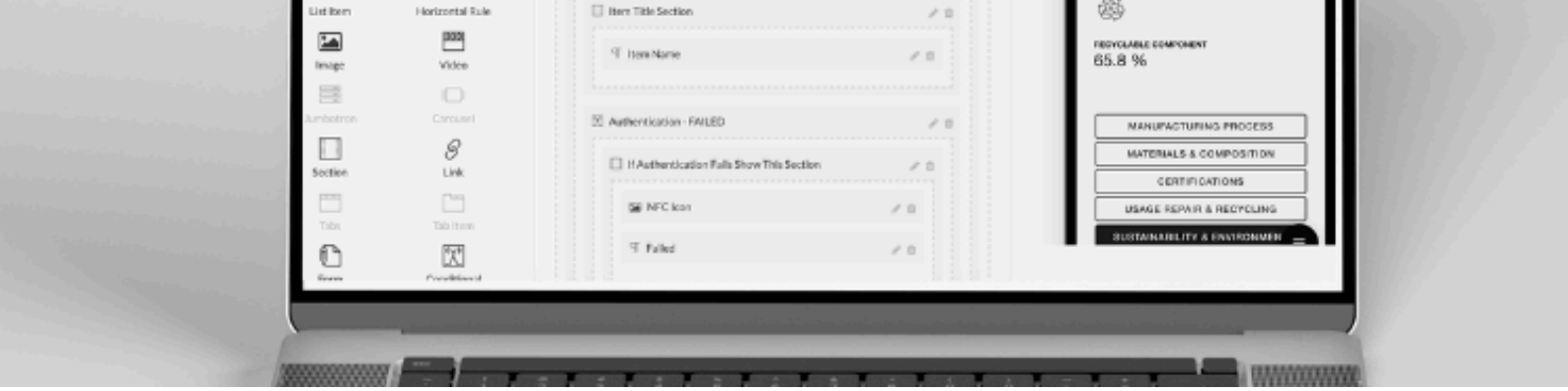
The global secondary market for consumer goods is projected to exceed $350 billion by 2028. For brands and manufacturers, this represents a massive and growing economic activity that is largely occurring outside their control — enriching third-party resale platforms while the original creators receive nothing and the customer relationship is permanently severed.

This white paper presents a new architectural framework that fundamentally changes this dynamic. By combining NFC-based Digital Product Passports with blockchain-linked NFTs and brand-controlled smart contracts, manufacturers can:

- Launch their own authenticated resale marketplace with built-in authenticity guarantees
- Capture a percentage of every secondary market transaction involving their products
- Retain the customer relationship across the full product lifecycle
- Create a structural loyalty incentive that makes their platform the preferred resale channel
- Simultaneously meet EU Digital Product Passport compliance obligations

The system does not attempt to block or restrict third-party resale. Instead, it creates a one-way economic door: sellers who transact through the brand's platform preserve full provenance and the NFT that proves legitimate ownership. Sellers who choose a third-party platform lose that status permanently. The market itself prices this differential — brand-platform resale items command a premium — without any brand intervention.

Qliktag's existing NFC-based Digital Product Passport platform provides the physical identity layer for this system. This white paper describes how adding the NFT and smart contract layers creates a complete, deployable solution for brand-controlled circularity.



Current Times ↘

1.The Circularity Imperitive

1.1 The Scale of the Secondary Market

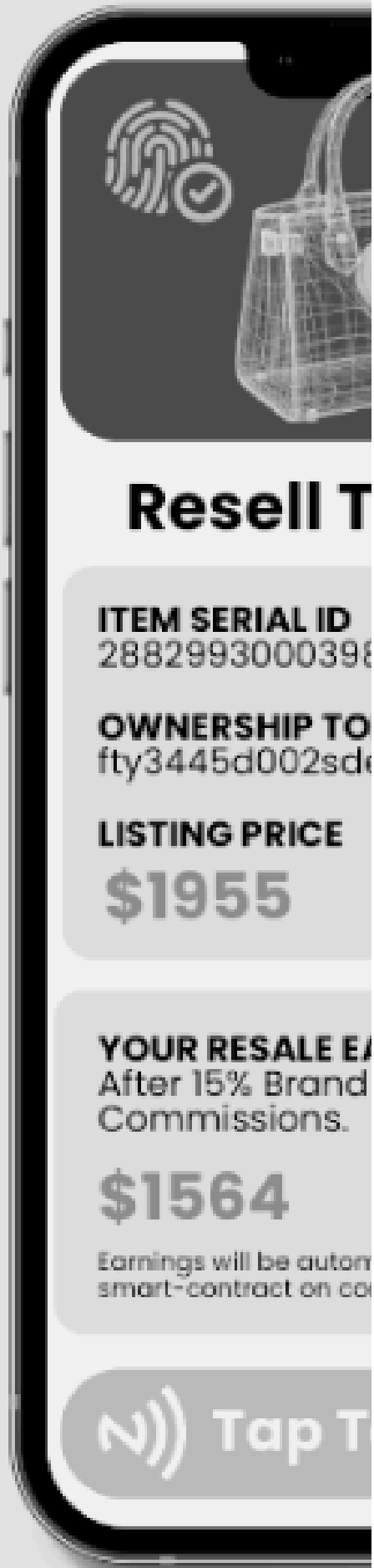
Resale is no longer a niche behavior. Driven by sustainability awareness, economic pressures, and generational shifts in consumption, the secondary market for consumer goods is growing three times faster than the primary market. Across categories including luxury goods, apparel, footwear, electronics, and sporting equipment, billions of transactions occur annually on platforms that were built specifically to capture value that brands leave behind.

Platforms like StockX, Depop, Vinted, The RealReal, and Vestiaire Collective have collectively raised billions in venture capital on the thesis that branded goods have predictable resale value — value that the original brand creator does not share in. For manufacturers of premium and aspirational products, this is an increasingly difficult position to defend to shareholders.

1.2 Regulatory Acceleration

Beyond market dynamics, circularity is becoming a compliance requirement. The European Union's Digital Product Passport (DPP) regulation, under the Ecodesign for Sustainable Products Regulation (ESPR), mandates that manufacturers of an expanding list of product categories provide digital records of product identity, materials, repairability, and lifecycle information. Initial categories include batteries, textiles, electronics, and construction materials, with broader rollout planned through 2030.

This creates a regulatory forcing function: brands in covered categories must build serialized product identity infrastructure regardless of their secondary market ambitions. The NFC-based Digital Product Passport is the natural vehicle for this compliance requirement. The insight at the heart of this white paper is that this same infrastructure, extended with NFT and smart contract layers, simultaneously enables brand-controlled resale.



Key Insight

Brands that build DPP compliance infrastructure on NFC tags are already 70% of the way to a brand-owned resale platform. The remaining investment to add NFT ownership tokens and a smart contract transfer mechanism is marginal relative to the strategic value created.

1.3 The Cost of Non-Participation

Brands that choose not to engage with the secondary market do not avoid it. They simply relinquish it. The consequences compound over time:

- Lost revenue: secondary market transactions generate zero return for the manufacturer
- Lost customer data: secondary buyers are unknown to the brand, invisible for marketing, warranty, and service purposes
- Weakened brand control: counterfeits intermingle with genuine goods in unverified secondary channels
- Missed circularity reporting: without a link to secondary transactions, brands cannot demonstrate product longevity for ESG and sustainability reporting
- Ceding the premium customer: secondary buyers of luxury and aspirational brands are often highly valuable acquisition targets — brands give this audience to competitors

2. The Problem with Existing Resale Platforms

2.1 Third-Party Platforms Are Not Brand Partners

Third-party resale platforms have invested heavily in authentication infrastructure — physical inspection services, community verification, and proprietary grading systems. For buyers, this provides reasonable confidence. For brands, it provides almost nothing.

The authentication performed by third-party platforms relies on physical examination by trained staff or, increasingly, machine learning models trained on product imagery. Neither approach gives the brand any visibility into or control over the process. Errors occur. Counterfeits pass inspection. And the brand, whose intellectual property and reputation are at stake, has no recourse and no revenue.

2.2 The Authenticity Verification Gap

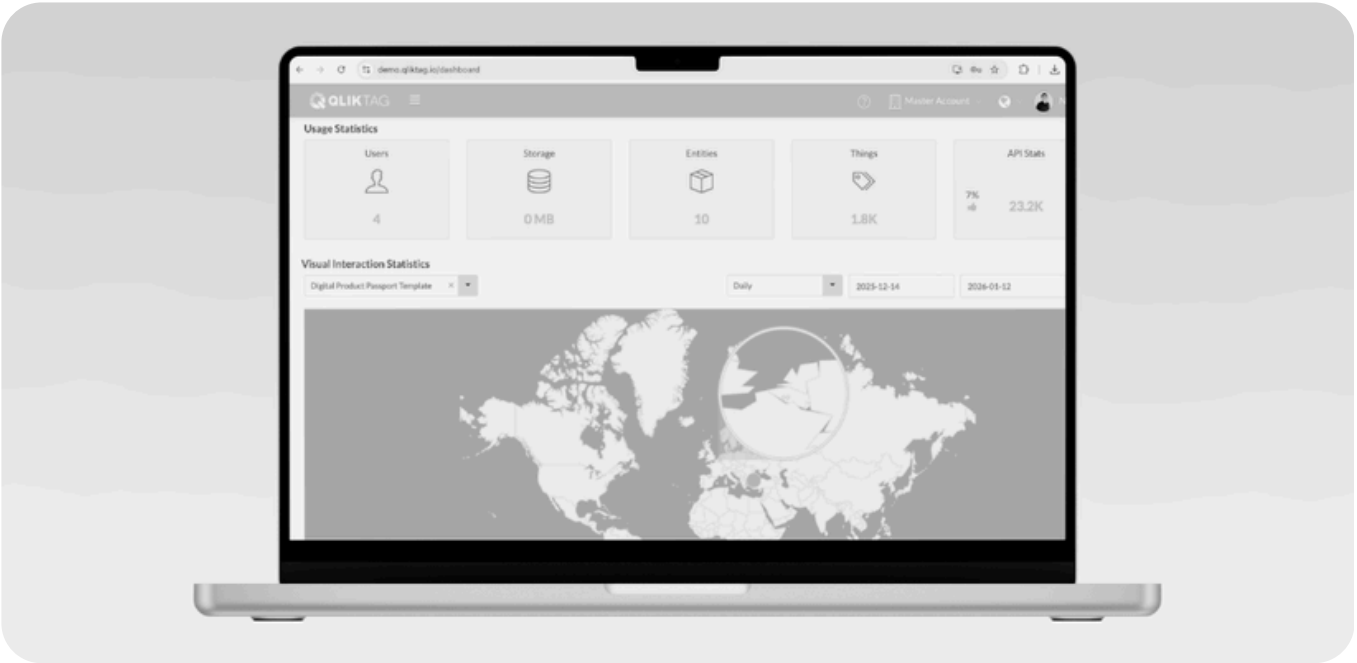
The fundamental problem with third-party authentication is that it attempts to determine at the point of resale whether a product is genuine — effectively working backwards. A product that has already been separated from its manufacturing provenance must be re-authenticated through physical examination. This is inherently less reliable than a system that establishes and maintains an unbroken chain of custody from manufacture.

Secure authentication NFC inlays with chips embedded within the product at the time of manufacturing address this problem by providing a machine-readable identity that can be verified at any point in the product lifecycle including ownership transfers. However, only the original manufacturer can do this and third party resale platforms can not.

2.3 What Third-Party Platforms Cannot Offer

Third-party resale platforms, no matter how sophisticated their authentication, cannot offer three things that a brand-controlled system can:

Capability	Why Third-Party Platforms Cannot Provide It
Brand-verified chain of custody	They have no connection to the manufacturing record; authentication starts at the point of submission
NFT ownership transfer	They have no relationship with the brand's smart contract; the token cannot transfer through their platform
Brand ecosystem onboarding	Secondary buyers transact with the platform, not the brand; the brand relationship does not exist



The Solution ↘

3. The Qliktag Framework: A Three-Layer Solution

Qliktag's approach to brand-controlled circularity operates across three distinct but integrated technology layers. Each layer solves a specific problem, and the combination creates a system whose capabilities substantially exceed the sum of its parts.

3.1 Layer One: Physical Identity via NFC

Every product manufactured under the Qliktag framework is assigned a unique, serialized NFC tag at the point of production. This tag is the product's permanent physical identity. Key characteristics:

- Each tag contains a unique identifier linked to a specific manufacturing record
- Tags are tamper-evident — designed to be destructive if removed, making physical transfer difficult
- Readable by any NFC-enabled smartphone without a dedicated app
- Linked to a full Digital Product Passport record containing materials, care instructions, warranty status, and lifecycle data
- Compliant with EU Digital Product Passport requirements under ESPR

The NFC tag solves the physical identity problem: any person holding the product can verify, in real time, that they are holding a specific, manufacturer-registered item. For resale, this means a buyer can tap the tag before completing a purchase and confirm that the item in their hands matches the manufacturer's record.

3.2 Layer Two: Digital Ownership via NFT

At the point of first sale, a corresponding NFT is minted on a blockchain and assigned to the purchaser. This token represents legitimate, manufacturer-verified ownership of the specific physical item linked and authenticated by the NFC tag. Critical design elements:

- One NFT is minted per physical item — the token and the tag are permanently paired
- The NFT is linked within the platform to both the item's unique digital identifier and NFC tag's unique identifier, making the pairing verifiable and unforgeable
- The token exists on a public blockchain, making ownership history permanently auditable
- The NFT is not a speculative asset — it is functional infrastructure that enables ownership tracking and resale listing on the brand's platform

The NFT solves the ownership problem that the NFC tag alone cannot. The tag proves the item's identity and physical custody of the item. The NFT proves that the holder of the tag has an unbroken, brand-verified ownership claim to that item. Together, they establish both physical and provenance authenticity.

3.3 Layer Three: Transfer Control via Smart Contract

The smart contract governing NFT transfers is the architectural centerpiece of the system. Its design is deliberately simple and powerful: the brand or manufacturer is the contract owner, and only the contract owner can execute an NFT transfer.

This means:

- No peer-to-peer token transfers are possible outside the brand's platform
- Every resale transaction must route through the brand's marketplace to transfer the NFT
- The brand acts as the escrow agent for every transaction, holding the NFT in trust until the buyer confirms receipt by tapping the NFC tag
- A resale fee percentage is automatically routed to the brand wallet at the moment of transfer — no invoicing, no reconciliation, no trust required
- The complete chain of custody is permanently recorded on-chain

The escrow mechanism is particularly important for consumer protection. The seller taps the NFC tag to initiate the resale listing, proving physical possession. The buyer taps the NFC tag on receipt, confirming the physical item has arrived. Only then does the smart contract execute the NFT transfer and release payment to the seller. This mirrors how escrow services work in real estate, but built directly into the physical-digital handshake — no third party required.

4. The Loyalty Moat: How the System Shapes Market Behavior

4.1 The One-Way Door

The most strategically powerful element of this architecture is not any individual technology layer — it is the behavioral incentive structure the combined system creates. Consider the decision facing a seller:

Sell via Brand Platform	Sell via Third-Party Platform (e.g., StockX)
NFC tag proves authenticity	NFC tag proves authenticity
NFT transfers to new buyer	NFT is not transferred (effectively burned from brand ecosystem)
Full chain of custody intact	Chain of custody broken at point of sale
Item can be resold on brand platform again	Item can never return to brand platform
Buyer onboarded to brand ecosystem	Buyer remains unknown to brand
Item commands provenance premium	Item sells at discount to brand-platform equivalents

The seller who chooses a third-party platform is not penalized in any legal or practical sense. They can still sell. They can still prove the item is genuine using the NFC tag. But they have permanently exited the brand's value ecosystem, and the price differential in the secondary market reflects this.

4.2 Price Stratification

Over time, as the system matures, the secondary market for affected product categories will naturally stratify into two tiers:

- Brand-platform items: NFC tag present, NFT intact, full chain of custody. Highest resale value, maximum buyer confidence.

- Third-party items: NFC tag may be present (proving original authenticity), NFT absent. Lower resale value, reflecting broken provenance chain.

This stratification creates a continuous, market-driven incentive for brand-channel loyalty — without any ongoing marketing spend, discount programs, or policy enforcement by the brand. The system runs itself.

4.3 Customer Lifecycle Extension

Perhaps the most underappreciated benefit of this architecture is what it does to the customer relationship. Today, when a product changes hands in the secondary market, the brand loses the customer. The new owner exists outside the brand's data, warranty, and marketing systems.

In the Qliktag framework, every resale transaction is a new customer acquisition event for the brand. The secondary buyer, having completed the NFC tap and NFT receipt process, is now a known, verified owner of a specific product. The brand can:

- Register the warranty from the date of secondary purchase
- Deliver personalized care and maintenance communications
- Offer accessory and upgrade recommendations
- Invite the new owner into loyalty programs
- Trigger sustainability reporting on product longevity

A product that changes hands five times over its lifetime becomes five customer acquisition events rather than one. The lifetime value of a single manufactured item expands dramatically.

Compliance + Business Growth Opportunity ↘

5. EU Digital Product Passport Compliance

5.1 Regulatory Context

The European Union's Ecodesign for Sustainable Products Regulation (ESPR) establishes the legal framework for Digital Product Passports across the EU market. The regulation requires that products carry a machine-readable identifier linked to a standardized data set including material composition, repairability information, environmental impact data, and lifecycle records.

Initial DPP requirements are being phased in by product category, with batteries, textiles, electronics, and construction materials among the first categories affected. Brands exporting to or selling within the EU must comply with requirements as they come into effect for their categories.

5.2 NFC as DPP Infrastructure

Qliktag's NFC-based Digital Product Passport directly addresses EU DPP compliance requirements. Each NFC tag links to a structured data record containing the required product information, accessible via smartphone tap without dedicated hardware. The serialized, item-level identity the NFC tag provides also satisfies the individual product traceability requirements that distinguish DPP from earlier product labeling standards.

5.3 Resale as Lifecycle Data

EU DPP requirements include tracking products through their lifecycle, including second-hand transfers. The brand-controlled NFT transfer record is, by design, an auditable on-chain record of every ownership change. Each transfer is timestamped, linked to the physical NFC tag verification event, and permanently accessible. This transforms secondary market transactions from an unrecorded shadow economy into verifiable sustainability data.

Brands using the Qliktag framework can demonstrate to regulators, investors, and consumers that their products achieve multiple ownership cycles — a core metric of circular economy performance. The resale platform is simultaneously a sustainability reporting infrastructure.

Regulatory & Commercial Alignment

Qliktag's NFC-based Digital Product Passport directly addresses EU DPP compliance requirements. Each NFC tag links to a structured data record containing the required product information, accessible via smartphone tap without dedicated hardware. The serialized, item-level identity the NFC tag provides also satisfies the individual product traceability requirements that distinguish DPP from earlier product labeling standards.

How It Works ↘

6. Implementation Architecture

6.1 System Components

Component	Technology	Function
Physical tag	NFC (ISO 14443/15693) with SUN messaging authentication	Item-level identity, authentication, DPP data access
Digital token	ERC-721 NFT (EVM-compatible blockchain)	Ownership proof, transfer eligibility, chain of custody
Transfer mechanism	Smart contract (Solidity)	Brand-controlled escrow, automated fee routing, on-chain record
Resale marketplace	Brand-hosted web/mobile e-commerce platform	Listing, buyer-seller matching, NFC verification UI
Item data & DPP data layer	Qliktag cloud platform	Regulatory data storage, API access, sustainability reporting

6.2 Transaction Flow

A complete resale transaction under the Qliktag framework proceeds as follows:

Step 1 — Seller initiates listing. Seller taps NFC tag with smartphone. Platform verifies tagged item is genuine and confirms seller holds the associated NFT ownership token. Seller confirms reserve price and list for resale. Listing is created and published on the secondary brand owned marketplace.

Step 2 — Buyer purchases. Buyer completes purchase on brand's resale platform. Smart contract moves NFT into escrow held by brand/contract owner. Payment is held pending delivery confirmation.

Step 3 — Delivery and confirmation. Seller ships item. Buyer receives item and taps NFC tag. Platform confirms the physical item matches the listed tag. Buyers confirms receipt of the item and accepts the item. Smart contract executes: NFT transfers to buyer, payment (minus brand fee & commissions) releases to seller.

Step 4 — Ecosystem onboarding. New owner is registered in brand's customer system as verified owner of the specific item. DPP record is updated with new ownership entry. Lifecycle data is updated for sustainability reporting.

6.3 Blockchain Selection Considerations

The choice of blockchain for NFT minting and smart contract deployment involves tradeoffs across transaction cost, environmental impact, and ecosystem maturity. Key considerations for brand deployments include:

- Transaction fees: high-volume consumer resale requires low per-transaction costs; Layer 2 solutions (Polygon, Base, Arbitrum) are generally preferred over Ethereum mainnet
- Carbon footprint: proof-of-stake networks have substantially lower environmental impact, aligning with sustainability positioning
- Interoperability: EVM-compatible chains allow contracts to be migrated if needed
- Consumer experience: blockchain mechanics should be invisible to end users; the NFC tap and resale interface are the touchpoints, not wallet management

Industries That Benefit ↘

7. Strategic Implications by Sector

7.1 Luxury Goods

The luxury sector has the most immediate and obvious application. Provenance is already a primary value driver for luxury buyers, and counterfeit penetration is a persistent problem. Brand-controlled resale platforms are already being explored by major luxury houses, but existing implementations rely on manual authentication processes. The Qliktag framework replaces manual authentication with cryptographic certainty, scales to millions of items, and simultaneously enables the resale fee revenue that makes the economics compelling.

7.2 Footwear and Streetwear

The sneaker resale market is among the most sophisticated secondary markets globally, with dedicated platforms, professional resellers, and active price discovery. NFC tags are already being embedded in premium footwear by some brands. Adding the NFT ownership layer and brand-controlled transfer mechanism to existing NFC deployments is a natural next step that gives brands revenue participation in a market that currently benefits primarily from their intellectual property while excluding them from the economics.

7.3 Consumer Electronics

Electronics resale is driven by rapid upgrade cycles and strong residual value for premium devices. The Qliktag framework enables manufacturers to capture resale revenue while also maintaining visibility into where devices are in their lifecycle — valuable data for warranty management, recycling programs, and spare parts logistics. EU DPP requirements for electronics make NFC deployment mandatory in this category in the near term.

7.4 Apparel and Textiles

Textile DPP requirements are among the most advanced in the EU regulatory pipeline. Apparel brands will be required to provide item-level lifecycle data for EU market access. The Qliktag framework means this compliance infrastructure simultaneously enables brand-controlled resale at a moment when platforms like Vinted and Depop are demonstrating that consumer appetite for apparel resale is massive and growing.

7.5 Industrial and B2B Equipment

While consumer applications receive more attention, industrial and B2B equipment represents a significant and growing circularity opportunity. Used equipment markets are large, asset provenance is highly valued, and the consequences of counterfeit or misrepresented equipment are severe. The Qliktag framework is equally applicable in these contexts, with the brand-controlled transfer mechanism providing a particularly valuable chain of custody for regulated equipment categories.

The Market Today ↘

8. Competitive Landscape

8.1 Current Market

The market for brand-controlled resale and digital product identity solutions is nascent but rapidly developing. Current approaches fall into several categories, each with meaningful limitations compared to the integrated Qliktag framework:

Approach	Limitation
Physical authentication services (third-party)	No brand revenue, no customer relationship, no provenance chain
QR code-based product pages	No tamper evidence, no ownership token, easily duplicated
NFC tags without NFT layer	Physical identity without ownership proof; tag transfer vulnerability
NFT-only digital certificates	No physical item link; certificate can be separated from product
Brand-owned resale platforms (manual auth)	Slow, expensive, does not scale; no automated chain of custody

The Qliktag framework is, to our knowledge, the only integrated solution that combines physical item identity (NFC), digital ownership proof (NFT), brand-controlled transfer (smart contract), and regulatory compliance (DPP) in a single deployable architecture.

8.2 Network Effects

As deployment scales, the Qliktag framework benefits from meaningful network effects. As more products in a given category carry NFC tags and NFTs, the absence of a tag on a secondary market item becomes increasingly suspicious. Buyers become accustomed to tapping tags before completing purchases. The market learns to price the NFT premium. Each new brand deployment strengthens the case for others in the same category to adopt.

Take Control ↘

9. Getting Started with Qliktag

9.1 Deployment Pathway

Qliktag works with brands and manufacturers at any stage of their digital product identity journey. For brands beginning with DPP compliance, the NFC tag deployment is the natural starting point. The NFT and smart contract layers can be added progressively, allowing brands to build capability and consumer familiarity before launching a full resale marketplace.

For brands ready to launch a complete brand-controlled resale platform, Qliktag provides the full technology stack — NFC tags, DPP data infrastructure, NFT minting, smart contract deployment, and resale marketplace integration — as a managed service.

9.2 Pilot Program

Qliktag offers a structured pilot program for brands evaluating the framework. A typical pilot covers a defined product line or SKU range, with full NFC deployment, NFT minting for initial buyers, and a limited-access resale marketplace. Pilot programs are designed to generate the transaction data and consumer behavior insights needed to build the business case for full deployment.

9.3 Integration with Existing Systems

Qliktag's platform is designed to integrate with existing brand infrastructure. Standard integrations are available for major ERP, PIM, and e-commerce platforms. For brands with existing NFC deployments, a migration pathway is available to add the NFT and smart contract layers without replacing existing physical tag infrastructure.

In Summary ↘

10. Conclusion

The circular economy is not a future scenario — it is the present market reality, accelerated by regulation, consumer behavior, and the structural economics of secondary market platforms. Brands that treat the secondary market as someone else's business are progressively ceding revenue, customers, and brand equity to platforms that were built precisely to capture what they leave behind.

The Qliktag framework offers a different path. By combining the physical identity of NFC-based Digital Product Passports with the ownership proof of blockchain-linked NFTs and the transfer control of brand-owned smart contracts, brands can own their secondary market in the most literal sense: they control the infrastructure through which authentic goods change hands, they capture a percentage of every transaction, and they maintain the customer relationship across the full product lifecycle.

The system is not coercive. It does not prevent resale outside the brand's platform. It simply makes brand-platform resale the objectively superior option for buyers and sellers who care about provenance, authenticity, and value. The market does the rest.

For brands already navigating EU Digital Product Passport compliance, the incremental investment to build this capability on top of existing DPP infrastructure is small. The strategic value — revenue participation in the secondary market, customer lifecycle extension, and competitive differentiation — is substantial and compounding.

Ready to Get Started?

Implement One-Tap Branded Resale

To learn more about the Qliktag Digital Product Passport platform and brand-controlled resale framework, visit qliktag.com or contact our partnerships team to discuss a pilot program for your product category.

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