QR codes on fiscal receipts as post-purchase digital infrastructure: the Romanian legal context, comparative practice, and service design opportunities

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Abstract
The introduction of Quick Response (QR) codes on fiscal receipts establishes a new interface between tax compliance, retail data infrastructures, and post-purchase digital services. In Romania, the reform adopted in June 2024 requires selected receipt identifiers to be printed both in human-readable form and as a QR code. The regulatory environment, however, remains transitional: the obligation exists, enforcement is phased, and legacy fiscal devices may still require adaptation where technical impossibility is confirmed. Against this background, the article argues that the Romanian receipt QR code should be interpreted primarily as a transaction identifier rather than as a carrier of proprietary business data. The study combines legal analysis, a comparative examination of official practices from Portugal, Croatia, India, and Saudi Arabia, and a design-oriented synthesis of service scenarios. On this basis, it identifies twelve application domains, including warranty activation, returns, loyalty enrollment, expense management, repair intake, recall notification, and sustainability analytics. The analysis also examines structural constraints, notably restricted payload, dependence on merchant integration, privacy and cybersecurity obligations, fragmented device readiness, and the risk of proprietary lock-in. The article concludes that Romania already possesses the legal-technical foundations for a broader post-purchase digital infrastructure, but that the institutional and commercial value of this infrastructure will depend on interoperability, governance quality, and the credibility of implementation arrangements.

Keywords: digital infrastructure; interoperability; data governance; after-sales systems; consumer trust

1. Introduction
The Quick Response (QR) code has evolved from a narrow encoding instrument into a practical interface between physical transactions and digital services. Earlier technical work showed that two-dimensional barcodes could support mobile interaction and information retrieval [1], while more recent scholarship frames the QR code as an infrastructural gateway that connects objects, users, and service ecosystems [2]. This broader interpretation becomes especially useful when fiscal documents themselves turn machine-readable.

Romania has entered this development path through fiscal regulation. Following Emergency Ordinance No. 69/2024, the fiscal receipt is gradually changing from a paper proof of payment into a machine-readable event that can support verification and

downstream services [3]. From a public-administration perspective, this development fits the wider digitalisation agenda in which standardised identifiers, interoperable records, and service integration become part of institutional modernization [4], [5].

Yet the policy opportunity does not automatically produce useful applications. The legally required Romanian receipt QR code contains only a small set of identifying elements. It does not carry full product-level information, warranty conditions, or service history. For this reason, the central design question is not whether the QR code can store business data, but whether it can reliably trigger access to richer backend data.

The article pursues four related objectives. First, it clarifies the Romanian legal position as of May 2026. Second, it situates the Romanian model within an expanded international comparison, illustrating how the same machine-readable artefact can be put to very different institutional uses. Third, it develops a structured account of twelve application domains that become feasible when the receipt QR code is reused as a transaction identifier. Fourth, it examines the principal weaknesses of this model, particularly those associated with adoption, interoperability, data protection, and cybersecurity. These issues are analytically important because public-sector digitalization succeeds only when the surrounding service environment is perceived as both useful and trustworthy [6], [7].

2. Method and scope

The study relies on three complementary methods. First, it applies doctrinal legal analysis to the Romanian rules governing fiscal receipts and QR requirements, based on official legislative sources available on May 2026. Second, it develops a comparative review of official materials issued by tax authorities in Portugal, Croatia, India, and Saudi Arabia. These jurisdictions were selected because they illustrate four distinct operational logics: taxpayer-side invoice communication, real-time authenticity verification, registered invoice identity coupled with payment facilitation, and structured payload-heavy compliance. Third, the article employs a design-oriented synthesis to derive application domains from the Romanian model and to evaluate their institutional plausibility.

The paper is analytical and conceptual. It does not report results from a deployed system, nor does it provide legal advice. Its contribution lies in connecting legal design, comparative practice, and service architecture in a way that is relevant to digital receipts, after-sales systems, and retail-facing public infrastructures.

3. Current Romanian legal context

Romania's current framework is rooted in Emergency Ordinance No. 28/1999 on the obligation to use fiscal electronic cash registers. In the consolidated version available on 13 May 2026, Article 4 provides that fiscal receipts issued by the relevant devices must include the standard receipt elements, the beneficiary's fiscal identification code on request, and the receipt identification number [8]. More importantly, Article 4(2^1) states that the date and time of issue, the receipt identification number, and the fiscal serial number of the cash register must also be printed on the fiscal receipt in the form of a QR code [8].

This rule is significant, but it is intentionally narrow. The receipt QR code is a machine-readable identifier, not a rich business payload. It does not directly encode purchased products, warranty duration, manufacturer documents, service entitlements, or loyalty information. As a result, the legally required QR code is best understood as a key for transaction resolution rather than a complete digital receipt in itself.

Implementation timing matters as much as substance. Emergency Ordinance No. 69/2024 introduced the QR requirement and explicitly acknowledged a transition problem. Under Article VI, if National Institute for Research & Development in Informatics (ICI) testing shows that a device model cannot technically print the required QR code, users of that model benefit from a maximum two-year adaptation period from the ordinance's entry into force, and ICI may issue technical documentation to authorized distributors [3]. In addition, as of May 2026, the consolidated text indicates that sanctions for issuing receipts without the new elements are suspended until 1 November 2026 [8].

For application design, the implication is direct. Romania currently offers a legally defined identifier layer, but the rollout remains uneven. Any realistic application must therefore tolerate heterogeneous fiscal infrastructure, mixed levels of merchant readiness, and partial transition in the installed base.

4. International comparison

Romania is not the first country to connect fiscal or invoice processes with QR-enabled interaction. International practice, however, shows that the same technical instrument can serve markedly different institutional purposes, ranging from voluntary taxpayer participation to mandatory cryptographic clearance of every invoice. The four cases discussed below, Portugal, Croatia, India, and Saudi Arabia, were selected because each operates along a distinct axis: incentivized citizen reporting, public anti-evasion verification, B2B registration coupled with B2C payment, and structured payload-side compliance. Reading them in parallel helps clarify where the Romanian model currently sits and which design choices remain open to it.

4.1. Portugal: Citizen-side compliance and taxpayer communication

Portugal's framework is the most consumer-oriented among the four cases. It developed incrementally from the e-Fatura programme launched in 2013 and was consolidated by Decree-Law No. 28/2019, which mandated structured fiscal data elements on every invoice. Two of those elements concern this article directly: the ATCUD (Código Único de Documento, a unique document code that traces each invoice to its issuer and series) and a two-dimensional QR code printed on the document. Both elements have been required on physical and electronic invoices since 2022, after a series of deferrals that themselves reflect the practical difficulty of synchronizing certified billing software, point-of-sale devices, and consumer-facing applications.

The QR code carries a structured payload that includes the issuer's tax identification number (NIF), the document type, the ATCUD, the invoice date, and tax totals. According to the Portuguese Tax and Customs Authority, when a buyer fails to provide a NIF at the point of sale, invoice data can later be communicated to the tax authority simply by

scanning the QR code in the e-Fatura mobile application, which links the invoice to the user's tax profile [9]. The same workflow allows the user to classify expenses for personal income tax (IRS) deductions, including those associated with regulated categories such as health, education, family expenses, and selected services [10].

Two analytical features stand out. First, Portugal couples a verifiable on-receipt payload with a concrete fiscal incentive, which converts the QR code into an instrument of voluntary tax-base completion rather than merely an audit aid. Second, the model effectively crowdsources part of the compliance work to households: by giving consumers a tangible benefit, the state recovers transactions that would otherwise be invisible. For the Romanian discussion, the lesson is not to replicate the ATCUD-plus-payload design, which would require a different legal anchor, but to recognize the importance of citizen-side incentives in any model that wants the QR code to be scanned at all.

4.2. Croatia: Real-time authenticity verification

Croatia represents the verification-centred logic. Since 2013 the country has operated a fiscalization scheme that requires every retail receipt to be transmitted in real time to the Central Information System of the Tax Administration (CIS), which returns a Unique Invoice Identifier (Jedinstveni Identifikator Računa, JIR). The receipt also carries a locally generated Issuer Protection Code (Zaštitni Kôd Izdavatelja, ZKI), and, since 2017, a QR code that encodes both identifiers together with the issue timestamp and amount. The system is currently undergoing an expansion known informally as Fiscalization 2.0, which extends fiscalization beyond cash transactions and brings additional non-cash payment flows into scope.

Operationally, the QR code on a Croatian receipt is the citizen's entry point into an instant validation service. Scanning the code in the mPorezna mobile application, or following the verification link published by the Tax Administration, queries the central system and returns whether the receipt was actually fiscalized [11], [12]. The model is striking for what it does not do: it does not reward the citizen with tax deductions, and the QR payload does not carry rich business data. Its function is to democratize the audit. By turning every consumer into a potential validator, Croatia recruits a distributed monitoring capacity that scales without proportionally enlarging the inspectorate. The Romanian receipt QR code is closest to this verification logic, although Romania has not yet built an equivalent public verification endpoint.

4.3. India: Registered invoice identity and dual-track systems

India's Goods and Services Tax (GST) framework illustrates a richer integration between invoice identity and downstream interoperability. For business-to-business (B2B) and business-to-government (B2G) transactions, taxpayers above prescribed thresholds must submit invoice data to an Invoice Registration Portal (IRP), which validates the document, returns an Invoice Reference Number (IRN), and issues a digitally signed QR code. The QR code encodes the IRN together with key invoice fields, allowing both tax authorities and trading partners to verify the document's authenticity without trusting the issuer alone [13]. This anchors the entire e-invoicing process in a trusted third-party resolver and provides the basis for automatic input tax credit reconciliation.

For business-to-consumer (B2C) flows, India layers a second instrument on top of this architecture: a dynamic QR code that links the invoice to a Unified Payments Interface (UPI) settlement path. The dynamic code expires once payment is made and carries data that allows the consumer to pay directly from a smartphone wallet. From a service-design perspective, this combines compliance assurance with a concrete consumer benefit - the ability to settle the bill in a single scan - and demonstrates that the same QR-code interface can simultaneously address tax authorities, merchants, and end users. For Romania, the relevant takeaway is not the payment mechanic, but the architectural pattern: anchoring the QR code in a trusted resolver makes downstream services materially more credible than issuer-only attestations.

4.4. Saudi Arabia: Structured payload compliance

Saudi Arabia, through the Zakat, Tax and Customs Authority (ZATCA), has rolled out an e-invoicing scheme known locally as FATOORA in two phases. Phase 1, in force since December 2021, required all VAT-registered taxpayers to generate and store tax invoices and credit and debit notes electronically. Phase 2, rolled out in successive waves from 2023, requires taxpayers to integrate their billing systems with ZATCA's platform: standard tax invoices must obtain real-time clearance, while simplified invoices issued to consumers must be reported within 24 hours of issue. Both phases require a QR code; in Phase 2, the code on a simplified invoice carries a structured minimum dataset that includes the seller's name, VAT registration number, the issue timestamp, the invoice total, and the VAT amount, together with the hash of the invoice and the cryptographic stamp applied by ZATCA [14], [15].

Two features distinguish the Saudi model. First, the QR code is itself a self-contained compliance artefact: an inspector can verify the invoice offline by parsing the encoded fields without re-querying central infrastructure. Second, the cryptographic stamp anchors the document in a trusted certificate chain, which reduces the risk that a counterfeit POS device can produce convincing receipts. Compared with the Romanian rules, the trade-off is visible: the Saudi approach places more burden on the printing device and on the certification pipeline, but delivers stronger guarantees about the receipt itself. Romania is unlikely to replicate this profile in the short term, but the case is useful as the conceptual upper bound of how much a fiscal QR code can carry before it becomes a small structured invoice in its own right.

4.5. Comparative interpretation

Taken together, the four cases sketch a spectrum of policy functions for QR-enabled fiscal documents: taxpayer-side recovery and incentivized expense reporting (Portugal), public real-time authenticity verification (Croatia), trusted registered identity coupled with payment facilitation (India), and structured payload-heavy compliance (Saudi Arabia). Romania currently sits closest to the Croatian model in terms of payload simplicity, but without an equivalent public verification endpoint, and without the citizen-side incentive layer that makes the Portuguese system self-propagating. The Indian and Saudi cases, in turn, are instructive less as templates than as illustrations of what becomes possible when the QR code is anchored in a trusted resolver or carries a cryptographically stamped

payload. This range of possibilities is what makes the Romanian framework interesting: it has a minimal legal payload but a comparatively clean conceptual starting point, which is precisely the configuration that benefits most from an identifier-based service architecture rather than from any payload-heavy reinterpretation.

5. The Romanian receipt QR code as a transaction identifier

Given the Romanian payload constraint, the analytically strongest architectural interpretation is to treat the legally mandated QR code as a transaction identifier. In operational terms, the QR code should activate a secure backend lookup in Point of Sale (POS), Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), or after-sales systems. This approach is consistent with a broader digital-governance logic in which lightweight identifiers function as trusted entry points into interoperable systems rather than as self-contained repositories of data [4], [16].

The resulting workflow is conceptually straightforward. First, the merchant system transmits a normalized transaction record to a resolver service. Second, the customer scans the fiscal receipt QR code. Third, the application extracts the issue timestamp, receipt number, and fiscal serial number. Fourth, the backend resolves the transaction and exposes the relevant service layer. This architecture reduces legal ambiguity, avoids overloading the printed QR code, and remains comparatively compatible with fragmented fiscal hardware.

6. Twelve domains of practical application

Once the Romanian fiscal QR code is treated as a secure lookup key, a sizeable portfolio of post-purchase services becomes design-feasible. The twelve domains discussed below were selected on three criteria: they correspond to real consumer or business pain points in the Romanian retail environment, they can be expressed as backend resolution against an identifier-only payload, and they raise distinguishable regulatory or governance questions. The exposition follows a common structure: practical purpose, mechanism, and the principal risk or design caveat.

6.1. Digital warranty activation

Warranty activation is the most immediate value case. Thermal-paper receipts remain the primary proof of purchase under Romanian consumer-protection rules, yet the print medium is fragile: the image fades within months under heat, light, or ordinary handling, and consumers regularly discover that they cannot exercise warranty rights for which they remain legally entitled. By scanning the receipt QR code, a dedicated application - for instance, a national platform such as eGaranție [17] - can resolve the transaction at the merchant's backend, retrieve the specific items purchased and their warranty terms, and bind that information to the customer's account. This removes manual data entry, fixes the warranty start date to an auditable fiscal event, and creates a continuous link between the consumer, the retailer, and the authorized service centre.

The deeper analytical point is that digital warranty activation reframes the receipt from a paper artefact into a service handle. Aftersales literature has documented the difficulty of moving warranty management to interoperable digital infrastructures even when the

technology is mature, because the friction sits in data exchange across retailer, manufacturer, and service network rather than at the device layer [18]. A QR-code-anchored resolver lowers that friction without forcing any party to redesign its internal systems.

6.2. Returns and exchanges

The QR-anchored receipt also restructures reverse logistics. A scan resolves the original basket, allows the merchant's return policy (such as the 14-day distance selling window or extended in-store windows) to be applied deterministically, and removes the dependency on the customer's ability to keep a paper original. Because the transaction is resolved against the merchant's own records, the verification is intrinsically harder to forge than a scanned image of a receipt processed by optical character recognition.

The risk profile here is distinct. Industry data suggest that fraudulent or abusive returns now account for a non-trivial share of total returns volume, with estimates that roughly one in ten returns has fraudulent features in mature retail markets. A resolver-based architecture mitigates the lower-sophistication end of this problem - fake printouts, edited photographs, basket inflation - without claiming to address organized return-fraud rings, which require additional controls.

6.3. Durable proof of purchase (receipt wallet)

A digital receipt wallet is the natural consumer-facing surface for the identifier architecture. Rather than store an image of the receipt, the wallet stores the normalized transaction record returned by the resolver, indexed by item, date, category, and value. This is what makes the receipt usable downstream: insurance claims, reimbursement against an employer expense policy, or warranty enforcement all depend on the receipt being parseable, not merely photographed.

From a sustainability angle, a receipt wallet is also the entry point to displacing thermal paper. Independent measurements continue to find bisphenol A and its analogues in a majority of thermal-paper samples on the open market, at concentrations that raise occupational-exposure concerns for cashiers and consumer-exposure concerns more generally [19]. The receipt wallet is the mechanism that makes opt-in to electronic receipts attractive enough to reduce that print volume in practice.

6.4. Automated personal budgeting

Personal-finance applications gain substantially from receipt-level data, because categorization at the merchant or card-statement level is too coarse for meaningful behavioural feedback. Once the QR scan resolves a transaction, the wallet receives the itemized lines and can classify spending into groups that households actually recognize: groceries by department, fuel separated from convenience purchases at the same petrol station, family expenses separable from the user's own consumption.

The interesting governance question is what the application is allowed to do with this enriched stream. Itemized receipt data is potentially sensitive - purchases may reveal health status, religious observance, sexual orientation, or political affiliation - and the design must

therefore implement strict purpose limitation and on-device processing where feasible, in line with the principles set by the General Data Protection Regulation [20].

6.5. Micro-business bookkeeping

For Romania's population of freelancers and micro-businesses, including the very large number of Authorized Individual (Persoană Fizică Autorizată - PFA), the cost of expense capture is primarily administrative. Each fuel receipt, each office-supply slip, each utility ticket has to be photographed, archived, and classified, and the receipt's thermal image is rarely legible by the end of the tax year. A QR-anchored bookkeeping flow can lift this burden by routing the resolved transaction directly into the user's accounting environment, attaching a category, and storing the digital proof in a format that the tax administration can re-validate against the original fiscal event.

What the user gains is, in effect, a paper-free expense ledger anchored in the same fiscal artefact that the state already trusts. What the application gains is an obligation: the bookkeeping path must preserve the integrity of the transaction record, document the chain of custody, and avoid silently editing items, since the ledger is now the user's defence in a tax inspection.

6.6. Loyalty enrollment after checkout

Loyalty enrollment at the cashier is well known to suffer from queue friction. The QR code on the receipt allows enrollment to be moved off the critical path: the customer leaves the store with an ordinary receipt, then scans the code later from home, and the merchant links the historical transaction to a new or existing loyalty profile. The mechanism converts the receipt into a delayed acquisition channel without changing checkout behaviour.

The corresponding caveat is consent. If a merchant interprets the act of scanning as silent authorization for marketing communications, the design slides toward dark-pattern territory and conflicts with the European framework on freely given, specific, informed consent. The cleaner pattern is to separate the loyalty binding (a discrete action) from the marketing channel (a separate, revocable opt-in).

6.7. Cashback and promotion validation

Promotion validation is the use case where resolver architectures most clearly outperform the current state of practice. The dominant industry pattern relies on users uploading photographs of receipts that are then read by optical character recognition; the approach is error-prone, fraud-friendly, and expensive to operate. A resolver-based validation matches the QR code against the merchant's record of the basket and verifies the campaign conditions – eligible product codes (SKUs), timestamp, store, minimum amount - deterministically.

The benefit accrues to all three parties. Manufacturers can run promotions whose redemption is auditable; retailers see fewer disputed reimbursements; consumers receive cashback decisions in seconds rather than days. The remaining risk is narrow but real: ensuring that the promotional logic does not implicitly profile users in categories that they have not consented to.

6.8. Installation and onboarding

For complex products - smart-home devices, large appliances, electric mobility equipment, technical furniture - the receipt QR code can be the trigger for a manufacturer-controlled onboarding path. Resolution returns the specific model and configuration purchased; the application then surfaces the correct version of the installation manual, opens a guided setup, schedules an installer where required, or routes the customer to a certified partner. The user no longer has to identify the product manually, which reduces both errors and the surface area for support calls.

6.9. Repair intake and service tickets

Service intake suffers from the same identification problem as installation. When a product fails, the consumer often cannot supply the model code, the firmware version, or the precise purchase date that warranty and repair workflows need. Scanning the original fiscal QR code lets the service application pre-fill those fields, confirm whether warranty coverage is still in force, and route the ticket to the correct repair partner. The improvement is operational rather than spectacular, but the cumulative effect on service-level metrics - first-call resolution, time to dispatch, repair-versus-replace decisions - is substantial. Existing aftersales literature highlights precisely this kind of friction as the limiting factor in warranty service performance [18].

6.10. Recall and safety notifications

Product recalls are notoriously hard to execute because the manufacturer rarely knows who bought the affected units. Empirical research on recall effectiveness consistently identifies consumer awareness as the binding constraint, and shows that even well-publicised recalls reach only a fraction of affected owners; remedy design, severity perception, and brand reputation each move the dial only modestly when the underlying notification channel is generic [21]. If a receipt QR scan has previously bound the transaction to a wallet or to a warranty record, the manufacturer can issue targeted notifications to the actual buyers of a defective batch rather than relying on press releases.

This is, by a wide margin, the strongest public-interest case for the entire model. It also constrains design: the resolver must support push notifications without functioning as a marketing channel, and the user must be able to revoke the binding without losing warranty rights. The same infrastructure that protects consumers can become a liability if it is used opportunistically.

6.11. Resale provenance and transfer of rights

The secondary market for premium goods - high-end electronics, bicycles, watches, selected branded apparel - suffers from a chronic provenance problem. A buyer cannot easily verify that the item is genuine or that the seller is its rightful owner. A receipt-linked digital record can serve as a tamper-evident proof of origin: the original buyer transfers the resolved transaction record to the new buyer, and, where the manufacturer permits, residual warranty rights are transferred together with it. The fiscal event provides the authoritative anchoring point that resale platforms have so far had to approximate through trust signals and reputation systems.

6.12. Sustainability and consumption analytics

At the household level, receipt-linked data supports environmental feedback that credit-card statements cannot: a basket-level carbon footprint, replacement cycles for durable goods, repeated purchases that indicate either loyalty or over-buying. At the ecosystem level, the same data flow underpins the displacement of thermal paper. The behavioural-economics literature has already documented that targeted nudges - pre-checked digital-receipt defaults, opt-in framing tied to a tangible benefit - substantially raise the rate at which consumers accept an electronic receipt instead of a printed one [22]. The QR code is the natural anchor for those nudges, because it gives the digital receipt something to be a digital version of.

7. Problems, weak points, and risks

The first weakness is the narrow legal payload. In Romania, the QR code alone does not provide enough information for high-value services. Everything depends on a functioning transaction-resolution layer.

The second weakness is infrastructural fragmentation. Because the legal transition explicitly contemplates devices that cannot immediately print the QR code, developers cannot assume homogeneous readiness across merchants [3].

The third weakness is adoption. A technically valid architecture is not automatically trusted or used. Research on digital public services suggests that behavioural intention is shaped by local administrative culture, perceived usefulness, and confidence in the system environment [6]. In the Romanian context, this means that practical value and clarity of benefit are critical design requirements.

The fourth weakness is data protection. Once receipt scans are linked to identifiable accounts, the system processes personal transaction history and must comply with GDPR obligations such as purpose limitation, minimization, transparency, and security [20].

The fifth weakness is cybersecurity. A QR-based service layer can become a phishing vector - the now-current term is quishing - if users are trained to trust any code-like artifact without strong domain validation, consistent interfaces, and communication safeguards. The literature on QR-code attack surfaces is older than the recent surge in incidents [23], [24], but the practical risk has grown sharply as QR scanning has become ubiquitous [7].

The sixth weakness is governance and lock-in. If every merchant creates a closed resolver and a proprietary schema, the ecosystem will fragment into isolated implementations. That outcome would reduce the public utility of the legal QR requirement and weaken long-term interoperability. This is precisely why regulatory compliance and digitalization should be treated together rather than as separate tracks [5].

8. Discussion

The Romanian receipt QR code should not be interpreted as a complete digital service in itself. Its analytical importance lies in the fact that the state has effectively mandated a standard machine-readable acquisition event. That event may support public verification, merchant operations, and consumer services if the surrounding service layer is coherently designed.

The expanded international comparison also indicates that Romania does not need to choose between tax control and consumer convenience. Portugal demonstrates the value of taxpayer-side interaction and incentive design, Croatia demonstrates public verification, India demonstrates the benefits of registered identifiers coupled with payment facilitation, and Saudi Arabia illustrates the advantages of richer, cryptographically anchored compliance structures. Romania can draw on all four models without reproducing any one of them in full.

The identifier-based architecture appears to be the most institutionally realistic path because it aligns with the present legal payload, reduces technical ambiguity, and leaves room for incremental innovation. It also fits broader public-sector digitalization principles that emphasize interoperable records, realistic regulatory implementation, and service integration across institutional boundaries [4], [5].

9. Conclusions

As of May 2026, Romania's legal framework on fiscal receipt QR codes is promising but still transitional. The legal rule exists, the required payload is clearly defined, and the state has created a machine-readable identifier for retail transactions. At the same time, enforcement is phased and infrastructural readiness remains uneven.

Within this context, the most robust application strategy is to reuse the legally mandated QR code as an identifier rather than to embed proprietary business payloads in the printed code itself. Such a strategy supports realistic deployment and allows service evolution to occur through backend integration rather than through expansive reinterpretation of the legal payload.

The twelve application domains discussed in this paper show that the Romanian fiscal receipt QR code can support a broader post-purchase digital layer, spanning warranties, returns, bookkeeping, service intake, recalls, loyalty, and sustainability analytics. The long-term value of this model, however, depends on interoperability, consumer trust, privacy compliance, and cybersecurity discipline.

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