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Abstract

This paper examines the SwissLedger blockchain, the LVGA token, and the MyLugano app as components of a publicly enabled urban infrastructure. The paper argues that their distinctive value lies in the combination of a programmable local payment rail, a cashback mechanism denominated in a territorially bounded token, and a set of targeted policy uses that support local merchants, retain spending within the city, and enable more traceable and conditional forms of public intervention. The analysis situates the Lugano case within the broader context of the platform economy, where digital infrastructures are often privately owned and extractive, and interprets MyLugano as an alternative local public platform designed to coordinate fragmented economic actors around shared incentives. It reconstructs the economic logic of LVGA, focusing on cashback settlement and merchant accounting, and shows then how the same infrastructure can be extended beyond payments to programmable urban policy, including targeted subsidies, tourism incentives, and digital identity functions.

Keywords: urban policy; complementary currency; public value; platform economy;

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1 Introduction

This paper analyzes the SwissLedger blockchain, the LVGA token issued on it, and the MyLugano app as the core of an emerging social, economic, and technical infrastructure for urban services. Rather than treating these elements separately, as a blockchain case, a payment token, or a municipal app, the paper considers them as parts of an integrated local platform designed to support economic circulation, enable targeted incentives, and expand the city's capacity to coordinate digital and territorial policy objectives. This urban infrastructure represents a public value beyond its ability to offer innovative and efficient payment methods, but more crucially as a tool to support the local economy and facilitate the provision of urban services. The core case study is the embedded incentive system and loyalty program, that strengthens the local commerce network by increasing the economic resources that circulate locally.

LVGA is a locally issued token that maintains a fixed peg to the Swiss franc, drawing from the CHF both monetary stability and ease as a unit of account. LVGA is issued and managed directly on SwissLedger, Lugano's permissioned distributed ledger, built on a public blockchain technological stack. Each transaction is securely recorded on the city's distributed ledger, providing transparency, verifiability, and interoperability with other blockchain-enabled public services.

LVGA can be used at all participating retailers and merchants, as well as to pay selected municipal fees, parking and cultural services. Users manage it through the MyLugano payment app, which helps users find affiliated businesses and enables payments in other digital currencies as well. The MyLugano app also manages the digital cashback program integrated with LVGA, through which users receive LVGA as a cashback reward on purchases made at participating businesses. Thus, LVGA can be seen at the same time as a digital token issued on a distributed ledger, as a means of payment within a defined urban network, as the unit through which a cashback incentive is distributed, and, more broadly, as an instrument designed to support local economic circulation.

The paper builds on earlier analyses of the MyLugano app and the LVGA token, in particular [1] and [2]. In [1], LVGA is introduced as a monetary innovation built on an advanced technological stack. In [2], the initiative is examined in detail as an example of blockchain adoption in local government, situated within a broader system of integrated yet modular interventions. This paper extends them in three directions. First, it interprets the platform as a response to the coordination problems faced by local commerce in a platform-dominated economy, analyzing the public value generated through the potential to strengthen the local economic and social fabric. Second, it analyzes the economic logic of the LVGA cashback system, with particular attention to settlement, accounting, delayed redemption, and the differentiated functions of backed issuance and operational allowances. Third, it shows how the same infrastructure can support programmable urban policy through targeted subsidies, tourism initiatives, and, potentially, locally grounded digital identity functions.

In this paper, public value refers to the capacity of a publicly enabled infrastructure to generate benefits that are not exhausted by individual utility or technical efficiency, but

extend to the collective organization of local economic and social life, strengthening the conditions under which a community can coordinate resources, access services, support local actors, and increase its resilience and autonomy in the digital environment.

The paper proceeds as follows. The next section frames MyLugano and SwissLedger within the broader problem of platform power and public value, arguing that a local payment platform can function as a coordination infrastructure for actors that otherwise lack the scale to build one. In a world dominated by platforms that monopolize markets globally, lock in customers, and concentrate large profits in the hands of a few actors, it is beneficial to provide local businesses as well with a shared infrastructure that allows them to offer customers specific economic advantages, strengthen their loyalty and reduce the outflow of resources.

We argue that a local payment platform is a natural anchor for this goal, since it enables the circulation of digital resources without letting the rails in the hands of global foreign players. Specifically, blockchain technology makes this possible at acceptable costs and with shared local management, while maintaining interoperability with a global network. Moreover, this technology is more naturally integrable in a local, multicentric context than in centralized, national or global governmental or corporate settings.

The following section examines LVGA as a local token integrated with digital cashback, reconstructing the settlement and accounting mechanics and discussing the economic channels through which the model supports local demand, spending retention, and circulation.

The paper then turns to the use of LVGA as a programmable policy instrument in urban interventions such as tourism incentives, cultural vouchers, and other targeted subsidies. Finally, it considers the possible extension of the infrastructure toward a digital identity layer designed according to principles of proportionality, privacy, and institutional pluralism.

2 Public Value: a Platform for those without a Platform

The contemporary digital economy has been dubbed the "platform economy", in which a small number of global digital intermediaries have extracted huge profits by reorganizing entire markets around a private, proprietary platform [3], [4]. Major platforms such as Amazon, Airbnb, Booking, Uber, and food-delivery platforms have introduced new forms of market access, increased the visibility of a wide range of products and services, and initially provided users with pricing advantages through strong network effects, data advantages, and economies of scale. In the process they have also transformed the way users interact with producers. In this respect, the platform economy should not be understood merely as a technological configuration, but also as a specific governance arrangement in which control over access, visibility, interoperability, and data is concentrated in the hands of the infrastructure owner, [3], [4]. Likewise, large providers of physical and digital technologies that emerged before the platform economy, such as Microsoft and Apple, have later developed platform-based ecosystems around their data and functionalities, to strengthen their market position and make it more inconvenient for users to exit their services.

While these firms may be regarded as examples of technological and organizational innovation, their success has also had less positive consequences, for example for local economies. Smaller enterprises and retailers have hardly benefited from this transformation, when they have not been directly harmed by it. Even those that survived and joined digital networks, had to do so in an environment in which the rules of participation, data ownership, fee extraction, visibility, and customer intermediation are determined and controlled by the platform operator, which is typically a large and often foreign private actor. Platforms reorganize value chains and embed structural asymmetries between infrastructure owners and participants, shifting value creation away from local producers and merchants toward the owners of centralized infrastructures. From this perspective, the issue is not only one of technological efficiency, but of governance logics: these infrastructures are designed primarily to maximize returns for the platform owner, extracting rents for the private profit often at the expense of local commerce, [4], [5].

Here we claim that a different kind of platform can be designed: infrastructures designed to align incentives with territorially embedded economic and social objectives, with the primary goal of strengthening local commercial networks themselves. Merchants face an obvious coordination problem in building such networks, and this is precisely where local government can play an important role, as the entity responsible for the local dimension of the economy, the most impacted by the externalities of the global platform economy. Just as private global platforms generate economic benefits for users that, in turn, foster loyalty to the platform network, local public platforms can counter this effect by bringing local shops into a shared network and offering users economic advantages that generate loyalty and repeated participation. Such platforms can be designed around a different distribution of benefits: rather than concentrating gains in the hands of the platform owner, it can be structured so that incentives reinforce the local economic circuit, increase the recirculation of spending, and collectively support small merchants.

The creation of the SwissLedger blockchain, the MyLugano app, and the LVGA currency with its integrated cashback system, offered by participating shops to users with an initial contribution, and continued support, by a local authority, can be seen as an implementation of this idea. The coordination function is particularly important in local economic contexts, where the relevant actors are numerous, small in scale, and lacking individually the network conditions, and the immediate incentives required to undertake the initial investment needed to build the platform and begin distributing economic benefits to users. It is unsurprising that the local government should play a central role in its creation.

A local public platform can function as an institutional coordination infrastructure, a socio-technical arrangement through which fragmented economic actors can be connected and enabled to participate in a common framework of incentives and transactions. The public platform can therefore reduce coordination costs, stabilize expectations, and make forms of collective action possible that would otherwise remain difficult to organize. In this sense, its main public value lies not in the services it delivers, but in the institutional architecture it creates, [5], [6]. In [7], the public value of technology investments in the public sector is not

assessed only in terms of increased efficiency or as a sum of the private benefits obtained by the directly affected citizens. Beyond this, ICT investments in the public sector can enhance the value of government itself as a public asset, by delivering increased satisfaction in the functioning of the institutions and their effect on the society, and on the wellness and fairness of the economic ecosystem they live in. In their words, "the qualities of public sector organizations are assessed on the basis of their ability to deliver the expected value to the citizens and not only by their value-for-money ratio."

2.1 Why a payment platform?

A payment platform constitutes a natural starting point for placing participating businesses within a single public network. First of all, payment infrastructures are themselves a form of platform that merchants must join to participate in the ongoing digital transformation of money, but very often the rails on which merchants rely, the upside generated by the platform, and the incentive structure governing user behaviour are external to the local territory and its economic logic. By providing a payment network that can connect to global markets and payment systems while maintaining governance distributed across local entities, an additional layer of institutional and economic value can be brought back to the local dimension, allowing local actors to participate in shaping the rules of the infrastructure on which their transactions depend. The choice of a Proof-of-Authority blockchain consensus for the SwissLedger blockchain, where local economic and institutional players have the role of validating transactions, can be seen as a component of this strategy.

Even more importantly, building the local network around a payment platform makes it possible to design directly, and fully control, incentives and transfers of value that benefit network participants and users, while also enabling the circulation of different kinds of digital records. MyLugano and SwissLedger represent a programmable institutional infrastructure, capable of embedding specific policy objectives into the economic interactions it supports. A cashback mechanism like the one embedded in LVGA, tokenized incentives, and other forms of conditional digital transfer can all be instruments for increasing the probability that value remains within the territory and circulates among local actors, rather than being extracted outward through externally governed intermediaries. Again, the advantage goes beyond efficiency and innovation, but the creation of a digital infrastructure capable of advancing broader civic and territorial goals. Shifting the attention from the efficiency of modern digital payments to redistributing advantages, supporting local merchants collectively, and creating a digital infrastructure aligned with the economic and civic interests of the territory is in line with current literature on public value, since it frames digital systems not simply as tools for service delivery, but as institutional arrangements capable of generating causally public goods, trust, inclusion, and social value, [5], [6].

2.2 Why distributed ledger technology?

When mentioning programmability and tokenization we have already linked the development of the platforms to the technology chosen by Lugano's city platform, a permissioned but transparent and verifiable version of Ethereum public blockchain, enabling smart contracts and the creation of tokens. This technology brings several technical and economic advantages in the development of a city platform. SwissLedger could use open-source decentralized technology adapting it to the local needs and creating a system of decentralized sharing of information and value that encompasses a technically secure, low-cost payment system based on a consensus algorithm adjusted for the local needs, while keeping interoperability with the global standard of the Ethereum Virtual Machine. See [1], [8], [9] for more details. Beyond the technical and economic convenience of a platform like SwissLedger, there are deeper structural and cultural reasons for adopting blockchain tech and distributed ledgers at a local level. At a national and international level, often the debate about the link between decentralized digital systems enabled by contemporary technology and public government institutions focuses on the issue of the latter regulating the former. Yet the link is more profound, since they both pursue goals that are, in different ways, public. Both create frameworks of trust, coordination, recognition, and exchange. Both seek to organize shared goods.

The real question is at what level the merge of these different but converging public interests can occur coherently. If we look at the debate about national adoption of modern digital technology by centralized governments, for example in the CBDC debate, we see fundamental reasons slowing the process down. While such tensions may be mitigated in settings characterized by a deeply rooted federal and decentralized political culture, such as Switzerland, in most cases national institutions nonetheless operate through necessarily uniform and abstract categories such as national sovereignty, legal monopoly, standardized identity, centralized monetary authority, and enforcement.

Conversely, distributed and decentralized settlement networks have a stronger bottom-up dynamics: they arise from the interactions of individuals, communities, nodes, and users who generate value through participation itself. In this respect, digital decentralized networks resemble local civic institutions more than they resemble the nation-state. In both local communities and decentralized digital environments, value is produced primarily through relationships, repeated interaction, shared rules, and distributed contributions rather than through a single sovereign centre. This makes the integration easier at local level, consistently with Elinor Ostrom's work on the management of public common assets through polycentric governance by coordinated units rooted in actual communities [10].

The uncompromising foundation of this technology was introduced by [11] with the creation of Bitcoin, the first natively digital asset. In doing so, [11] developed robust solutions, respectful of privacy and individual rights, to problems that had made the internet unsuitable for individually managed digital value, such as the absence of a persistent form of digital identity supporting the ownership of digital assets, and the the lack of an objective timestamping mechanism for asset transactions independent of individual viewpoints. An apparent solution

would be to place trust in a centralized entity within a client-server architecture. However, as shown by many of the examples discussed above, this entails surrendering control and accepting a logic of economies of scale that can rapidly lead to global monopoly by a single private app controlled by server owners, with potentially catastrophic consequences in the monetary and financial sphere. Instead, [11] addressed these issues through a peer-to-peer network based on distributed consensus and public/private key pairs, enabling persistent user control over assets while avoiding the trap of the centralization with which we began. This made Bitcoin one of the first large-scale applications of digital signatures, the core cryptographic primitive enabling self-sovereign digital identity. Despite being available since the advent of asymmetric cryptography in the 1970s, digital signatures remain underused in a world dominated by digital interactions and are frequently implemented through unnecessary centralized key-generation systems. Bitcoin is also an example of how cryptographic technology can create components of digital identity and empowerment that are neither centrally generated nor necessarily tied to other dimensions of identity that users may not wish to disclose. Aspects of digital identity are already present in the design of the LVGA platform and are expected to be further developed and improved in the future, as we see in the following. See also [12], [13].

3 Economic innovation: Digital Cashback meets Local Currency

The municipality introduced LVGA in 2020 during the COVID-19 pandemic, together with the MyLugano app and the supporting blockchain, initially called 3Achain. The parity of LVGA with CHF is maintained at a rate of 100 LVGA to 1 CHF. LVGA is issued within a local economic ecosystem as a payment token, as defined in the regulatory framework of the Swiss Financial Market Supervisory Authority (FINMA). LVGA can circulate only in the local network of merchants and institutions, representing an optimal tool for local economic incentives, see [8], [14].

The introduction of a new monetary instrument issued by a local authority is not the central feature of the MyLugano local-currency design, nor is its issuance on an innovative technology such as the one of public blockchains. More important is the embedded incentive system for local commerce based on cashback. Cashback was not designed so much as an incentive to the adoption of the digital currency but was rather intended to create an economic advantage for users that cannot be used outside the system.

This objective was part of the design from the outset: to encourage residents to spend locally while also familiarizing them with digital payment tools during the disruptions caused by the pandemic. The cashback mechanism developed from an earlier system of discounts offered by local merchants. Its combination with a local currency makes it possible to create benefits for users that could circulate only within the local network. In this sense, cashback in local currency is a particularly suitable instrument, because it keeps the monetary benefit within the same circuit. By contrast, a simple discount would generate a private saving that

could also be spent outside the local economy and would therefore serve this purpose less effectively.

The digital nature of the local currency and of the associated cashback was another crucial aspect of the design, making the application of cashback more efficient and transparent.

The cashback benefit starts at 5% for entry level users and can reach 10% for users with a verified identity document in the system. The amount that can be stored in the wallet and the spending limits depend as well on the degree of authentication and involvement of the user, with the highest level of authentication corresponding to users that upload a residency verification and that, beyond the 10% cash back, can also exchange LVGA with other users at no fee. It is relevant that the benefit is significant even at the entry level, and that the form of tiering is linked to the involvement of the user, which has in any case the freedom to choose the desired level of authentication. Tiering is frequent in cashback systems, and can be extended to other forms of differentiation, for example by different goods. A bit of history of cashback, and the specific treatment of LVGA cashback are analysed in the next subsection.

3.1 Cashback Settlement and Accounting

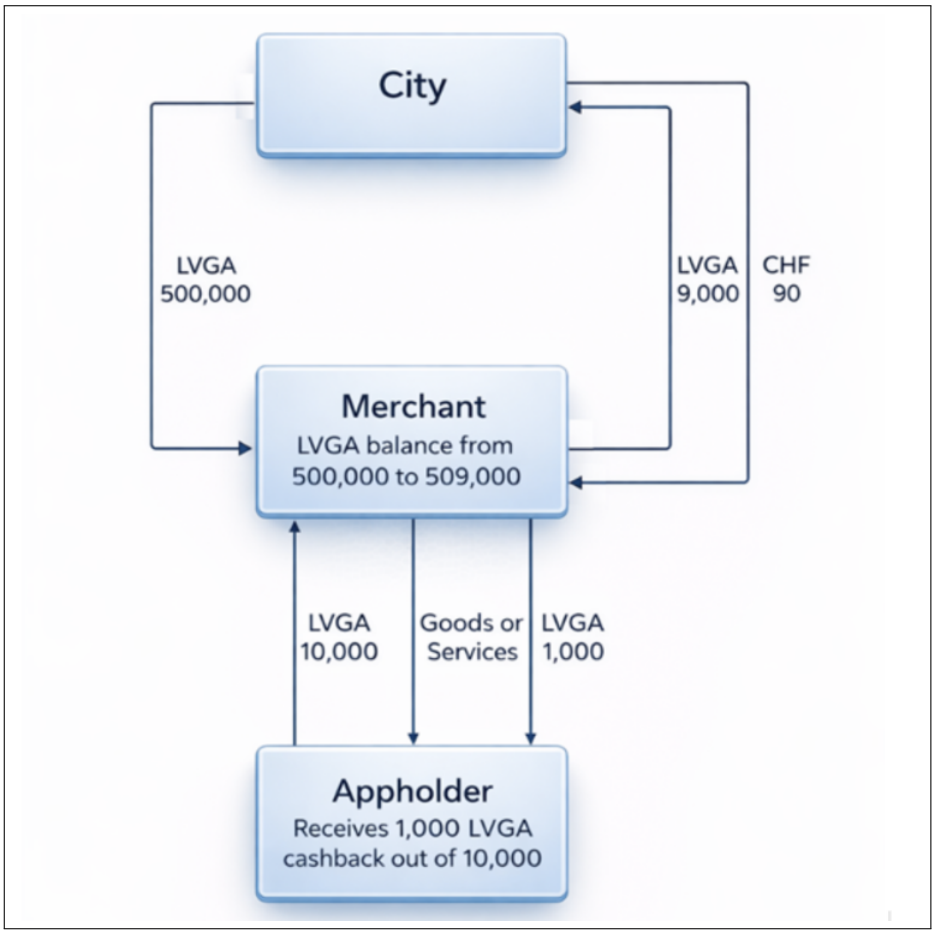
Cashback is an institute with a long history that could be traced back to the initial customer retention tools developed in the early 20th century. Its popularity started in the 70's in the USA. At that time cashback was designed to allow manufacturers and retailers to attract customers without lowering prices permanently or even explicitly. Yet the process was manual, due to lack of a suitable digital infrastructure. Earning the benefit required to mail proof-of-purchase and waiting for a check, a cumbersome procedure.

It was not until online cashback services developed later that the success of cashback really started, becoming instrumental for the diffusion of credit cards in the USA. Credit card companies understood they could apply it easily and began to recognize the potential of cashback as a loyalty tool. In 1986, Discover Financial Services introduced the first credit card with cashback rewards. They offered back a percentage of the price paid on all purchases, and they were followed by several other credit card providers, making cashback become a standard feature in the credit card industry. Another relevant moment for the purpose of our analysis is the end of the 90's, when digital cashback extends more significantly beyond credit card circuits and enters directly the platform economy. In 1998, the Silicon Valley online platform Ebates partnered with online retailers to offer consumers a percentage of their purchase back simply for shopping through their portal. In the early 2000s, the concept expands to several other countries, starting from the UK market.

It is important to understand that in most cases cashback was associated to the presence of transaction fees paid by merchants to issuers of credit cards or to the owner of the platform, and these fees were the first source to fund cashback programs. For credit cards, these fees were initially as high as 5%, usually paid in full by the retailer and becoming profit for the issuer. The redirection of a fraction of the fee for a loyalty program that could benefit - beyond the issuer itself - also the retailers affiliated with the network was acceptable for

retailers. The complex accounting and settlement of this cashback component, with the fees incorporated by the intermediaries, is illustrated by international accounting boards in [15], pag.3, Figure 1, reporting also the fees kept by the intermediaries. On top of the cashback funded by the fee, some merchants added cashback offers funded by the shop itself. The LVGA cashback design differs in several important respects from traditional models. In the LVGA case, the source of funding initially comes from a contribution by the municipality and is subsequently sustained by the merchants themselves. Compared to the examples discussed above, merchants benefit from the fact that LVGA transactions do not involve fees.

At the outset, the City provides a contribution of 500,000 LVGA (equivalent to 5,000 CHF), referred to as the Operational Allowance (OA). This allows participating merchants to begin distributing cashback in LVGA. When customers pay in LVGA, the merchant's LVGA balance increases, and any balance exceeding the Operational Allowance becomes convertible into CHF, as illustrated in the figure below.



The figure represents a simplified, prototypical transaction and its economic implications. In practice, however, the settlement of LVGA into CHF does not occur on a transaction-by-transaction basis, but rather on a net basis at the end of each month. The accounting framework distinguishes between Total Commercial Inputs (TCI)—10,000 LVGA in the ex-

ample—and Total Cashback Issued (TCB)—1,000 LVGA in the example. Together with the Operational Allowance, these determine the merchant's balance. However, only TCI and TCB are relevant for conversion into CHF.

If, at the end of the month, TCI exceeds TCB, the merchant's balance will be greater than the initial 500,000 LVGA, and the surplus (TCI-TCB) is converted into CHF by the City. Conversely, TCI-TCB may also be negative, as occurs when customers pay in CHF and receive cashback in LVGA. In this case, the merchant's balance falls below 500,000 LVGA, and the shortfall must be reimbursed to the City in CHF within 30 days. Formally:

$$TCI = \sum_{T=t}^{t+1m} \text{Input}_T$$

$$TCB = \sum_{T=t}^{t+1m} \text{Cashback}_T$$

$$\text{Merchant Balance} = \text{Operational Allowance} + TCI - TCB$$

$$\max(TCI - TCB, 0) \ : \ \text{converted in CHF by the City}$$

$$\max(TCB - TCI, 0) \ : \ \text{refunded in CHF to the City}$$

This settlement system, based on treating cashback as a distinct transaction, enables a clear separation in the accounting of balances with different economic meanings. It is designed to incentivize not only users but also merchants to favor payments in LVGA, thereby maximizing the benefit derived from the initial Operational Allowance, which remains effectively a free advantage only for participants able to expand it.

The City Token Rebalancing and Merchant Settlement model just seen, that explicitly separates the different sources of tokens within the merchant's wallet according to their economic meaning, and treats them differently in terms of conversion, underlines the continuous involvement of the administration and the institutional role of the token. Participants do not only use a wallet but enter a regulated and assisted urban ecosystem. This will become even more evident when analysing the documentation, in particular regarding the onboarding process.

3.2 LVGAnomics

The LVGA payment token does not automatically give rise to a conversion claim to general users, whereas for merchants the municipality provides redemption in accordance with the settlement procedure outlined above.This design contributes to ensure the effectiveness of the cashback incentives. In fact, users that want to benefit from the cashback acquire LVGA by

paying in CHF, at the fixed 100:1 conversion rate. Then, LVGA is not converted back into fiat, is not invested, and cannot be exchanged or spent outside the MyLugano ecosystem. Additionally, the automatic cashback is not activated for transactions with value lower than 5CHF, or for products already discounted or part of different promotions. Only merchants that accumulate LVGA through customer payments are, at the end of the reconciliation cycle, credited by the City with the CHF equivalent of the LVGA collected during the period. This lack of conversion if fiat for users, and of other speculative forms of detention, strengthens the role of Lvga and cashback as incentives for local commerce, and stresses further that the relevant policy effect is not a new form of monetary sovereignty, but the retention and recirculation of spending within the local economy. The positive effect of cashback is confirmed for example in] [16]. The paper uses time-series data from a cashback program merged with retailers' revenues and consumer average purchase amount, showing that cashback increases consumer loyalty. In turn, loyalty is a strong driver of customer average purchase and retailing revenues. Consistently with other literature, the authors find that citizens do not treat money as fully fungible but treat it differently depending on how they acquired it. Cashback money, for example, has a higher probability of being spent soon, augmenting money velocity and the recirculation of cash in the local network.

The fact that, once converted into the local token, currency is bound to circulate within the local network and is incentivized to sustain local exchanges, thereby preventing leakage from the system, is the main advantage of the model. However, the creation of a local currency scheme backed by fiat currency can also generate other beneficial economic effects.

With this regard we can distinguish different components in the issuance of LVGA. First, LVGA is issued to users who pay in fiat currency in order to convert it into local currency and gain access to the benefits of the local network, above all cashback. The fiat currency received in exchange for the token does not disappear. In the case of LVGA, the municipality has a redemption obligation only toward merchants whose balances increase, while general users are guaranteed instead by the acceptance of the currency within the participating merchant network. As a result, these LVGA are redeemed only with a delay—when they reach merchants—and only under certain conditions. This means that at least part of the corresponding fiat currency can meanwhile be spent or invested locally by the municipality, with a direct economic benefit.

Even the portion held as a reserve to meet future redemptions, or as a liquidity buffer for general purposes, can still generate economic benefits. If it is deposited with local financial institutions in accounts that are not segregated, it is likely to contribute to local lending to firms and households. Although this depends on the specific treatment of the fiat currency received in exchange for the local currency, it may have a supply-side multiplier effect, as argued, for example, in [17]. See also [18].

Additionally, there is the operational allowance granted to participating merchants: an initial working buffer that enables them to issue cashback immediately, without first having to acquire tokens themselves. This allowance, which is charged back to merchants if it is depleted, instead remains within the system in the more likely case in which LVGA flows

allow the merchant to maintain it. The allowance therefore expands the token supply available to the local economy, and does so through a mechanism designed to maximize its positive effects while minimizing the typical shortcomings of money supply increases. It is allocated to merchants rather than directly to consumers, and its purpose is to finance cashback. Cashback, in turn, functions as a price reduction for the user, but one denominated in LVGA; for this reason, the resulting benefit is itself constrained to be spent within the LVGA circuit. The expected economic effect is therefore an increase in local demand addressed to local supply, without the same inflationary implications - already quite unlikely at this scale - that would follow from a general, unconstrained increase in money supply. This is broadly consistent with the literature on complementary currencies, beginning with the seminal case of Wörgl, which tends to find their main effects in local multiplier effects, and strengthened territorial velocity of exchange. How much this happens in the case of LVGA, that has so far been deployed on a limited scale and for a few years, will be the subject of future empirical research.

A final economic benefit is that participating merchants receive promotional support and visibility through the merchant map and the project's communication channels. This creates an additional economic advantage, which could be further strengthened by other forms of social proof generated within the system, such as reputational indicators concerning the most active or most persistent users. We will return to this when analyzing the onboard documentation.

4 Programmable Urban Policy: Targeted Economic Interventions

Beyond its role as a payment instrument with cash-back incentive mechanism, LVGA has been deployed in a range of targeted economic interventions within the local urban system. These applications demonstrate how LVGA functions not merely as a payment tool, but as a programmable instrument for local economic policy. The measures described below, all implemented in Lugano in recent years, illustrate the variety of policy objectives that can be pursued through the use of a programmable token.

4.1 Attracting External Demand

So far, LVGA has been presented primarily as a payment token that, by being territorially bounded, helps retain economic resources within a given area and reduce spillovers. However, the same features can also be leveraged, particularly with the support of local authorities, to attract external resources into the local economy. A clear example is provided by an initiative developed in collaboration between the City of Lugano and Lugano Region. During the Rundfunk Festival - a highly popular music event held in Zurich since 2000, attracting national and international visitors - participants were distributed LVGA in an amount equivalent to approximately CHF 100 per user. Given that recipients were primarily Swiss-German visitors

or tourists from other regions of Switzerland and nearby Europe, and that the value of the incentive could justify a short trip, the initiative illustrates how LVGA can be used not only to retain local demand but also to attract exogenous demand into the local economic circuit.

4.2 Urban Promotion Campaigns

A related initiative, which, beyond incentivizing local commerce among residents, also produced an attraction effect for external users into the city of Lugano, was the redirection of more traditional festive urban promotion measures—such as free parking and free public transport—towards an initiative capable of more effectively capturing the attention of external visitors and generating more direct local economic benefits. Under the "City of Gifts" initiative, LVGA was distributed through QR codes placed across the urban environment. Users could scan these codes and receive randomly assigned amounts of LVGA, which could then be spent within the local merchant network, see [19]. The equivalent of CHF 130,000 was injected into the economy by the municipality in this way in 2023, while in 2024 the amount was CHF 100,000, funded by the Plan B Foundation. An initiative of this kind can produce beneficial effects on the local economy through different channels. The tourist attraction element, based on the link between digital rewards and urban exploration, is one of them. It creates an entry point into the local economic circuit, encouraging recipients to visit specific areas, interact with local businesses, and extend their presence within the city. Secondly, the use of randomized QR-based distribution introduces an element of gamification, transforming a passive subsidy into an interactive experience and increasing user engagement and participation. Finally, and most importantly, the initiative directly injects purchasing power into the local economy, ensuring that public funds are spent within the network of participating merchants. Compared to traditional indirect incentives, this approach provides a clearer transmission channel between public expenditure and local economic activity. This represents an example of how the social and economic infrastructure created enables forms of incentive design that can also be spatially programmable, improving the alignment with policy objectives both in the distribution and in the use of funds.

4.3 Involving the private sector

The LVGA local currency, while issued by public authorities, does not need to be limited to public interventions and subsidies. Also the private sector distributes bonuses and benefits beyond regular salary, and the experience of Lugano shows that local private companies can be interested in distributing benefits in the local currency. Local companies may end up to benefit themselves from the recirculation of the bonus in the local economy, and additionally the bonus in LVGA generates an additional benefit, for the users and for the local economy, through cashback.

Entity Type	Amount (CHF equivalent)
LIS (public elderly care entity)	350,000
Banks	76,000
Energy trading company	49,000
Home care services	81,250
Casino (city-owned)	10,000
Other firms	˜1,600
Total	**567,850**

Table 1: LVGA bonuses distributed since 2020

The amount of bonuses has been significant, and additionally the injection of more than CHF 500,000 into the system generates additional economic effects over time through the cashback mechanism, in the range of an additional CHF 26,000 to CHF 55,000 in induced local economic transactions, corresponding to the 5%-10% cashback benefit discussed above.

4.4 Targeted Subsidies

A direct application of the principle of programmability is provided by the "cultural voucher" distributed since 2024 to residents reaching the age of 18. Each beneficiary receives the equivalent of CHF 200 in LVGA, which can be spent exclusively on cultural goods and services. The total amount of funds disbursed is reported in the following table:

Year	Beneficiaries	Total Value (CHF)
2024	223	44,600
2025	173	34,600
2026	254	50,800
Total	**650**	**130,000**

Table 2: Cultural voucher program

Programmability operates here at two distinct levels. First, the allocation of funds is restricted to a specific category of citizens, identified on the basis of an eligibility criterion (age). Second, the use of the funds is constrained to a predefined set of merchants and institutions through a mechanism of merchant whitelisting. At the same time, once spent, these tokens behave as standard LVGA and generate regular cashback, ensuring their integration into the broader economic circuit.

This type of application is facilitated by the technological stack underlying LVGA. The use of blockchain technology enhances transparency and verifiability, while enabling mechanisms such as wallet and merchant whitelisting. The implementation makes use of the on-chain functionalities provided by SwissLedger. The digital "cultural voucher" is a specific token, designed consistently with the locally developed ERC 2980 token standard that allows to introduce additional constraints to transfer, while the cashback when spending the token

is received in standard LVGA, exploiting a conversion automated through smart-contracts. This is combined with off-chain management through the MyLugano platform, allowing for a flexible yet controlled design of subsidy schemes. In addition to the cultural voucher program, a further CHF 26,562.10 in LVGA has been distributed over time to support cultural initiatives such as events, seminars, and conferences, reinforcing the same logic of localized and targeted expenditure.

Other targeted subsidies include incentives for the purchase of specific goods that can produce positive externalities at the local level, such as electric bicycles.The e-bikes incentives were distributed in LVGA in amounts equivalent to CHF 45,000 in 2023 and CHF 55,000 in 2024. Originally provided as cash subsidies, they were converted into LVGA starting in 2023. This shift ensures that the economic benefit is directed toward local distributors involved in the relevant supply chain, such as bicycle retailers, rather than being potentially spent outside the local economy. As in the previous cases, the design of the subsidy links public expenditure to local economic activation, while maintaining control over both the allocation and the use of funds.

4.5 Further developments

The applications described above illustrate how LVGA extends beyond the role of a payment instrument to become a component of a broader social and economic infrastructure, a concrete instance of an alternative platform design, oriented towards local collective goals rather than private, centralized profit extraction. Through programmable features, including conditional allocation, targeted usage, and integration with incentive mechanisms, the LVGA infrastructure enables forms of policy intervention that are more targeted, traceable, and aligned with urban objectives. It creates economic advantages for users that reinforce participation, directing the effects toward local goals and the strengthening of the local economic network. In this sense, the system contributes to the generation of public value not only by improving efficiency, but by enhancing the capacity of the community to coordinate economic resources and direct them toward shared goals. At the same time, these interventions open a wide space for further development and growth. The number of users of MyLugano app has grown by 24% in 2025 to 56,000 users, and the number of transactions has grown by 42.5% to 114,000. This is significant at the local level, although the high rate of growth and the presence of little more than two transactions per user per year show we are still far from full potential. Also their final economic impact remains difficult to measure precisely, given the presence of multiple confounding factors in real urban environments, influenced also by national and global economic trends. This suggests the importance of treating such systems as evolving experimental infrastructures, where policy design, technological implementation, and empirical observation - including statistical and econometric analysis, currently under preparation - are closely intertwined. From a technical point of view, one possible direction for further development is the more extensive use of distributed ledger capabilities to enhance programmability and transparency. This could involve both reducing reliance on off-chain components in favor of a greater use of smart contract functionalities within existing pro-

cesses, and expanding the range of use cases that exploit the technical features of strong verifiability, reduced dependence on intermediated management, and automated conditional transfers and policy execution. From an economic point of view, one opportunity emerging from the analysis of LVGA is its possible evolution into becoming also an infrastructure for financial resilience, with the digital currency supporting more flexible and sustainable ways of managing recurring payments and selected debts, restructuring and refinancing them through micro-installments and adaptive plans. This could extend the reach of the platform from local commerce support to everyday financial sustainability. A category of developments that requires particular attention, both because of its importance and its sensitivity, concerns the improvement and the extension of digital identity, authentication, and signing functionalities within the local infrastructure. The next section is devoted to this topic.

5 Digital Identity and Local Infrastructure

The development of MyLugano and LVGA as a programmable urban infrastructure makes it plausible that, alongside payments and the above , restricted vouchers, and targeted incentives, a corresponding layer of digital identity emerges. In an ecosystem such as Lugano's, a digital identity infrastructure is justified if it enables the proportionate verification of attributes such as residency, legal age, membership in a beneficiary category, or an organizational or institutional role.The relevance of such a local development is increased by the fact that the approaches now emerging in Europe, with which the eID adopted by the Swiss Confederation also appears to align, present significant limits. The problem does not concern only data protection in the abstract, but more generally the tendency to configure identity systems that are excessively centralized, highly linkable across different contexts, dependent on a restricted number of technological and institutional intermediaries, and relatively weak, in governance terms, in their revocation and recovery functions [20]. In the following we present the model proposed for MyLugano. First of all,, authentication, credential revocation, access control, and behavioral observability are not centralized in the same place. It is important to take into account that privacy is not automatically guaranteed even when advanced techniques of selective disclosure or zero-knowledge proofs are adopted as blanket solutions. The objective must instead be to attest only what is necessary, when it is necessary, with the lowest possible degree of information exposure for attributes relevant to local public action. The privacy of a digital identity system depends on how cryptographic components are integrated into the system as a whole, on the degree of control exercised by wallets, devices, and software interfaces, on the presence or absence of stable identifiers reused across different contexts, and, more generally, on the institutional arrangement governing revocation, recovery, and auditability. It follows that the question of digital identity is not only cryptographic, but also architectural and institutional.

The proposed approachapproach of the Plan B Foundation is therefore to conduct interdisciplinary developments connected to SwissLedger in order to find a sustainable balance between full user sovereignty, which would imply complete technical self-sufficiency, and,

optionally, forms of platform-assisted custody. The basic orientation is toward a privacy-preserving identity built around simple principles: selective attestations, minimization of disclosure, reduction of linkability across different contexts, and pluralization of the sensitive governance functions of the credential. A particularly significant element, even when translated into non-technical terms, is key derivation. Instead of always reusing the same identifier or the same key, the system can derive different keys or addresses for different operations and contexts. This reduces the possibility that different interactions will be automatically linked to one another and therefore limits the formation of stable traces across the entire digital ecosystem. The MyLugano model, which will be developed as open source so that it can be adopted by other cities, remains inclusive only if it admits different degrees of user autonomy. Not all actors involved want, or are able, to manage keys, backups, recovery, and cryptographic procedures entirely on their own. For this reason, the development perspective does not rigidly oppose self-custody and delegated custody, but instead provides a choice between self-custody, in which the user maintains direct control over their keys and credentials, and assisted custody, in which the system preserves elements of user control while also integrating support and recovery mechanisms. The distinctive character of this approach lies in the possibility of avoiding the full concentration of data and powers in a single intermediary and its infrastructure. The centralization of data and de facto powers is a problem that Europe has not solved even with eIDAS 2 and the development of EUDI. In some respects, these frameworks rely on centralized cloud servers, and in others on manufacturers of mobile phone hardware and operating systems, which may be able to collect and correlate even more personal data about citizens than governments can today, while at the same time reducing the latter's ability to do so in the future. Other socially sensitive functions are being implemented for MyLugano, including systems for revocation, recovery, and loss alerts. These functions are first of all connected to plural and verifiable governance models. Our proposal for a Credential Loss Event Alert Registry (CLEAR) [21] imagines a civic microservice capable of signaling, in a privacy-preserving form, the recent loss or theft of a device used as an authentication factor, notarizing its updates through SwissLedger. The interest of this proposal, in the context of cybersecurity for citizens, lies in connecting the public report of a compromised device to temporary risk signals usable by digital services, without turning revocation or alerts into a database for generalized surveillance. The issue of revocation governance is of paramount importance for most digital identity implementations [22], while most tragically realize it later and well after the design phase. It does not concern only the formal validity of a credential, but also the ability to build civic defense tools against compromise, theft, and takeover within a framework compatible with data minimization.

5.1 Privacy by Design and the Interface

The interdisciplinary approach of MyLugano requires privacy by design to be considered also at the level of user experience. If digital identity is to become part of a local civic infrastructure, privacy protection cannot be confined to cryptographic protocols alone. It must be reflected in the interfaces through which citizens and operators understand, authorize, and

govern data processing. The material considered on this point is useful because it translates a legal principle often formulated in general terms into a set of more concrete design objectives. From this perspective, privacy by design should not be understood as a single function, but as a transversal quality of the architecture and the interface. In a civic context, this requirement takes on an additional meaning. Public institutions already possess, for legitimate reasons, broad knowledge of the population they administer. Precisely for this reason, the problem is not to increase indiscriminately the amount of data available, but to preserve its contextual integrity: the correspondence between the data, the purpose for which it was collected, and the actors who may appropriately access it. A well-designed public infrastructure should therefore make data sharing possible only where and when it is necessary for the provision of a service, the implementation of a policy, or the protection of a right, preventing information collected in one domain from being easily reaggregated and reused in others. This approach responds not only to the need for individual protection, but also to a question of institutional capacity. If local administrations are unable to govern the circulation of data according to criteria of necessity, proportionality, and purpose limitation, they end up depending increasingly on global platforms whose competitive advantage is based precisely on the accumulation, analysis, and extractive reuse of data. We therefore briefly illustrate a series of privacy-by-design principles that allow us to avoid a gradual substitution, by external private actors, of coordination and mediation functions that, from a public value perspective, should instead remain within the governance sphere of local institutions.

5.1.1 Minimize, Separate, Abstract

A first group of privacy-by-design principles concerns the need to minimize the processing of personal data. In design terms, this means limiting as much as possible the collection, storage, display, and reuse of data, selecting only the necessary attributes and providing, where appropriate, for expiration, erasure, and destruction of information that is no longer needed. In an identity system connected to urban services, this criterion implies that a given attestation should be treated as functional to a specific use, not as an implicit authorization to retain indefinitely all of the underlying data. Alongside minimization, two closely connected strategies should be added: separation and abstraction. Separation means preventing data collected in one context from being automatically reused in other contexts, thereby reducing linkability between different interactions. Abstraction instead means reducing the level of detail processed, replacing raw data with categories, thresholds, or proofs of membership in a class. Applied to the case discussed here, this is equivalent, for example, to verifying legal age without processing the full date of birth, or to verifying eligibility for a local benefit without exposing the user's entire administrative profile. From this point of view, selective disclosures and key derivation can be read as components of a broader strategy of separation and abstraction.

5.1.2 Hide and Dissociate

A second group of privacy-by-design principles concerns the need to hide data, make it unobservable, or at least make it unlinkable except by the actors who are actually authorized. This includes access restriction, encryption, obfuscation, and, more generally, all techniques that make data less understandable or less linkable for those who should not process it. This aspect is particularly important in a civic infrastructure, where protection cannot be reduced to defending data only "at rest" or "in transit", but must also include dissociation between elements that, if reaggregated, would once again make the user's profile reconstructable. The issue, moreover, does not concern only unauthorized access, but also the ordinary observability of the system. A solution can formally respect access constraints and still remain excessively exposed if it makes it easy to correlate identifiers, reconstruct individual histories, or display redundant personal data in operational screens. For this reason, the principle of "hiding" should also be considered a property of the front end, and not exclusively of the back end of an application.

5.1.3 Inform, Give Control, Make Verifiable

A third group of privacy-by-design principles concerns information, control, enforcement, and demonstrability. Data subjects must receive adequate information about which data is processed, how, and for what purposes. They must have effective mechanisms to exercise control over such processing. The infrastructure must be able not only to declare, but also to demonstrate, that data-protection rules are respected. From this perspective, consent does not exhaust the problem of the legitimacy of processing, but is only one component of it. Equally relevant are the possibility to choose, update, revoke, or withdraw data and authorizations, as well as the presence of adequate logs, audits, and verification procedures. Translated to the interface level, this approach suggests several operational criteria. First, interfaces should be designed in a human-centric way, starting from users' concrete objectives, tested in real contexts, and progressively corrected on the basis of feedback. Second, privacy protection requires user-friendly controls: relevant information and the related commands should be easy to find, simple to use, and configured by default according to the least invasive option. The informational and material context in which such choices take place also plays an important role. The comprehensibility of decisions about data depends on the device used, the moment of interaction, the user's cognitive load, and the way in which the interface presents alternatives, consequences, and possibilities for modification. In the same perspective, consent, clarity, and educational function should not be treated as separate elements. Consent, when required, should be informed, formulated unambiguously, and revocable as easily as it is given. Privacy information should be expressed in accessible language, avoiding unnecessary technical jargon and respecting accessibility criteria. More generally, a user experience consistent with privacy-by-design principles does not merely inform the user about data processing, but progressively educates them to understand which data is collected, where it is held, how it is protected, and under what circumstances it is

shared. From this point of view, minimization must also be made perceptible in the interface: it is not enough to collect less data; the system must also show less data, avoiding screens, dashboards, or verification procedures that expose more personal information than is strictly necessary.

We conclude this section with a general consideration. If MyLugano and LVGA are intended to evolve as a civic infrastructure capable of supporting targeted incentives, conditional subsidies, organizational roles, and local services, digital identity represents a plausible and, for some uses, probably necessary development. However, the distinctive contribution of an initiative of this kind would not consist in replicating a centralized identity wallet at the local scale, but in showing that identity, payments, and urban policies can be integrated according to criteria of proportionality, institutional pluralism, data minimization, and substantive privacy protection. In this sense, the most promising horizon does not appear to be the indiscriminate expansion of institutional knowledge about citizens, but rather the possibility of more limited, situated, and functional knowledge: sufficient to enable a right, a benefit, or a protective measure, but not such as to make the user's entire digital life more exposed, more linkable, and more dependent on pervasive intermediaries.

6 Conclusion

The Lugano case shows that municipal token systems are analytically more interesting when understood not as isolated monetary experiments, but as components of a broader local digital infrastructure. SwissLedger, LVGA, and MyLugano together form a platform through which payments, incentives, targeted subsidies, and potentially identity-related functions can be coordinated within a territorially bounded ecosystem. Their significance therefore lies less in the mere issuance of a local token than in the institutional architecture that links programmable digital value to concrete urban policy objectives. From this perspective, the main contribution of LVGA is twofold. On the one hand, it supports the retention and recirculation of spending within the local economy through a cashback mechanism that channels benefits back into the same merchant network. On the other hand, it enables a form of programmable public intervention in which incentives, eligibility criteria, and usage constraints can be embedded more directly into the infrastructure of local exchange. In this sense, the system operates simultaneously as a payment rail, an incentive mechanism, and a policy tool. More broadly, the paper suggests that local governments need not remain passive users of externally governed digital platforms. Under appropriate institutional and technical conditions, they can also act as builders of public digital infrastructures designed to serve territorially embedded goals. The Lugano initiative should therefore be read as a contribution to the search for alternative platform models in which the benefits of digital coordination are aligned not primarily with private extraction, but with local public value. At the same time, the case remains an evolving one. Further research and analysis will include possible improvements to enhance visibility and consequent discovery of the service, and usage continuity after the initial contact. The long-term significance of the initiative will depend

on adoption, continued merchant participation, measurable economic effects, and the quality of its future extensions, especially in the domain of digital identity and programmable public services. For this reason, the most appropriate way to understand MyLugano and LVGA is as an experimental urban infrastructure, a real living lab: one whose relevance lies not only in its current uses, but also in the institutional horizon it opens for local digital governance. In this context, the feedback loop between initial documentation, field observation, and user feedback is crucial and will be addressed later in future versions.

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