A Case for Mundialisation: Scaling Technological Innovation from Municipalities to Small States

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«Force-*les de bâtir ensemble une tour et tu les changeras en frères[...].*»
Antoine de Saint-Exupéry

Abstract

This article studies one facet of "mundialisation", exploring the role of European municipality projects as a sandbox for small and micro states' technological innovation. Drawing from the exemplary case of Lugano's Plan ₿, it shows how blockchain technology can bring positive effects to local communities that can be harnessed by European small states' policy. These solutions can turn their typical challenges into competitive advantages and opportunities not only transforming their financial infrastructure and fostering regional economic development but also enhancing international collaboration, community building, and social integration. New technology implementation shall therefore represent the social glue capable of reaching and further promoting Europe's constituting aim of social peace among its partner countries; by merging the existing gaps and reducing current inequalities within and across European local communities.

Keywords
Small states; Mundialisation; Municipalities; Blockchain technology; Innovation.

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Introduction

Whereas "globalisation" refers to the globe, "mundialisation", originated in the Latin word *mundus* (i.e. world), refers to much more than the mere geographical, spatial perspective. It includes the complexity of the human dimension, the customs, the language, and the ideas of a particular community (Cha, 2001). With this broader social dimension in mind, this article aims to draw a parallel between the situation of municipalities and that of European small and micro states by exploring the role of technological innovation (i.e. blockchain technology) in their socioeconomic development.

European small and micro states have been studied under multiple perspectives, with scholars analysing their economic (Timothy, 2020), geopolitical (Catudal, 1975), historical (Klieger, 2012), and institutional factors (Katzenstein, 1985) as well as their foreign policy vis-à-vis the European Union (EU thereon) (Wivel & Steinmetz, 2016). However, very few authors looked at their geographical and political challenges as opportunities for technological innovation (see for instance Ornston, 2012). This article seeks to fill this gap, highlighting the role of small states in fostering new technologies by referring to the existing exemplary cases increasingly spreading both globally and in Europe.

Our work especially highlights the link between European small and micro states' technological innovation and smart city innovation at the municipality level by drawing upon the successful case of Lugano's Plan ₿, a current example of new technology implementation bringing positive effects to the local community. We conclude that technological innovation in European small and medium-sized cities can represent an important opportunity to: (1) enhance socioeconomic development at the local level, (2) foster collaboration at the European level, and (3) implement the conditions for community building required to maintain the social cohesion upon which the EU was founded.

After defining small states with a focus on European microstates, this article shows how their typical challenges can turn into significant opportunities for technological innovation. Concentrating on blockchain technology, we outline some examples of European small states whose socioeconomic development recently leveraged upon cryptocurrencies, particularly bitcoin, and Distributed Ledger Technologies (DLTs thereon). Like in the case of Lugano, Switzerland, municipalities of a similarly small size to that one of European microstates can – through smart city innovation and new technology implementation – bring positive socioeconomic effects to the local community that can be eventually harnessed at the continental level.

Small States: Definitions and Characteristics

One generally refers to small states as those states that are small in absolute territorial size and/or population (i.e. *quantitatively* small). According to the International Monetary Fund (IMF thereon), small states have a population of under 1.5 million and microstates of under 200,000 (IMF, 2013). As a result, roughly 20% of IMF members and 60% of United Nations (UN thereon) members can indeed be considered small states (Jahan & Wang, 2013; Diplo, 2022). Nonetheless, states are also considered as small either when they are relatively less developed, resourceful, and powerful (i.e. *qualitatively* small) than others (e.g. their neighbour countries) or as long as they identify themselves like that (i.e. *self-identified* as small).

The tri-part definition suggested above can lead to some interesting exceptions, in the case of states that are considered small using one criteria but do not satisfy the others. For example, states with larger territories or populations can still be considered "small" if compared to their bigger counterparts within their region or globally (e.g. El Salvador, Mongolia, Jamaica). Similarly, states that are objectively small might not have the same distinguishing features as other small states; for instance, because they are relatively richer in terms of income per capita (The World Bank, 2021a). This is the case, in particular, of European small states (i.e. Luxembourg, Andorra, Liechtenstein, Malta, Monaco, San Marino, Iceland, Cyprus) (for

an account of the challenges and opportunities of small states in the EU see Wivel & Steinmetz, 2010).

In Europe, small states share comparable levels of development with larger states; that is, they benefit from a similar income per capita distribution and high standards of living. However, they distinguish themselves for peculiar features, risks, and opportunities compared to their bigger counterparts (Catudal, 1975; Klieger, 2012; see also Ornston, 2012). For instance, they are usually more open economies allowing for a greater circulation of both capital and people; a factor that – albeit representing a downturn in challenging times (The World Bank, 2023) – makes a positive difference in the commercial European arena.

From Geographical Challenges to Technological Opportunities

Small states' limited size directly influences their availability of both material and human resources (Tan & Meddeb, 2022; Jahan & Wang, 2013); typically leading to a concentrated market structure characterised by poor competition, lack of diversification, and dependent upon strategic import-export activities' price fluctuations (IMF, 2013; Diplo, 2022; see also Charles, 1997) as well as the revenues derived from tourism (Timothy, 2020). Their high costs of trade and levels of public debt per GDP lead to diseconomies of scale, a weak fiscal balance, high commercial bank lending rates, and a poor financial infrastructure relying on the aid of international finance, foreign investments, and occasionally offshore services for nonresidents (IMF, 2013; The World Bank, 2022).

Despite their size, however, small states can overcome their challenges by turning them into opportunities for institutional, political, and technological development in a way that larger countries cannot. Their political autonomy becomes a competitive advantage for fostering multilateral diplomacy and building economic partnerships with larger states as well as setting regional arrangements with other small states (Tan & Meddeb, 2022; see also Armstrong & Read, 1995). Furthermore, few governance complications and faster coordination between the public and private sectors give

them the needed agility to scale up technological innovation and eventually leapfrog their larger counterparts (Bitzinger, 2018; Diplo, 2022).

In addition to being an ideal ground for companies willing to either explore new markets or test new products, small states also share a particular ability to scale a new technology and eventually set global industry standards and best practices. Indeed, their institutional and structural features make them a perfect location for circumventing the trial-and-error process typical of policymaking, thus fostering technological experimentation and digital innovation. Their role as sandboxes and testbeds for larger states' policy implementation increases their political influence and allows them to adopt innovative solutions for their local challenges, especially when established technology is not enough to tackle them (Tan & Meddeb, 2022).

Technological Innovation in European Small States

Some of the most popular technological innovations are made possible by the use of blockchain technology, for instance, through the adoption of cryptocurrencies. Invented in the aftermath of the global financial crisis of 2008, Bitcoin is a digital currency enabling the immutability, instantaneity, disintermediation, and decentralisation of financial transactions (Fabri & Fabri, 2019; Koenig, 2018; Cover-Kus, 2021). These features can substitute the need for small states to create government bonds, and facilitate the creation of a Central Bank Digital Currency (CBDC) for issuing and regulating their own fiat[1] currencies (e.g. Bahamas' Sand Dollar); thus allowing for macroeconomic stability and more independence from international finance.

Recent examples of local implementation of blockchain and bitcoin technology show small states increasingly investing in DLTs and leveraging it as a competitive advantage in the regional and international arena. These

[1] Whereas in the past currencies were typically backed by physical commodities such as precious metals, since the end of the "gold standard" (i.e. the direct convertibility of the US dollar into gold) in 1971 "fiat" currencies – whose value is not intrinsic but based on the creditworthiness of the issuing government – have been established.

small states are then translating digital innovation into visibility, attractiveness, and soft power, thus counterbalancing their relatively disadvantaged position in terms of economic development. Malta, for instance, has been adopting advanced tailored regulations to foster the crypto industry and consequently attract foreign crypto companies (Kamberi, 2018). As another example, Iceland is using its wind farms – and potentially its geothermal energy (Kumar, 2022) – to power the mining of cryptocurrencies in a sustainable manner.

New technologies can not only bolster the financial sectors of small states but also strengthen their governance, develop the local population's skills, improve public spaces, and enhance citizen engagement (Handforth, 2020; Tan & Meddeb, 2022). For instance, small states can improve their governmental services by using smart contracts and the full digitalization of bureaucracy. Following a wave of relentless cyberattacks in 2008, Estonia took the opportunity to rebuild its bureaucratic infrastructure by offering its citizens the option to conduct digitally almost all interactions with their government; today, Estonia's e-governance system and cyberspace regulation serve as an exemplary case for bigger states across the globe (Jermalavičius, 2018).

From Small States to Smart City Innovation: The Case of Lugano's Plan ₿

At least in the European context, small states and microstates can be easily compared to cities. In terms of their population size, European small states are easily comparable to Europe's middle towns (World Population Review, 2023). In the case of European microstates, this is also true for their territorial size (The World Bank, 2013). Therefore, the aforementioned examples of technological innovation in small states and microstates can be informative for larger countries' cities of similar size. In particular, the introduction of new blockchain-derived technologies such as crypto assets, e-government, and smart city innovation can indeed offer municipalities significant development opportunities.

It is in this spirit that the Swiss city of Lugano, situated in the Southern,

Italian-speaking region of Ticino, supported its autonomous project "Lugano's Plan ₿" to «accelerate the use of and leverage bitcoin technology as the foundation to transform the city's financial infrastructure» (Lugano's Plan ₿). The city of Lugano is not only supporting local businesses to convert their payment solutions into bitcoins but also accepting them as payment for municipal taxes and access to some public services (Lugano's Plan ₿; see also Volpicelli, 2022). As a result, Lugano is the first European city to accept cryptocurrencies by providing the status of legal tender to Bitcoin (the first cryptocurrency issued internationally), Tether USD₮ (a stablecoin backed in USD), and LVGA (the local cryptocurrency issued by the municipality, functioning similarly with a stablecoin backed in CHF). The bitcoin infrastructure and the local blockchain technology also allows for «implementing bitcoin mining solutions using local green energy» and «facilitate access to credit facilities, including peer-to-peer solutions» (Plan ₿, 2022).

Since March 2022, through a public-private partnership with the bitcoin company *Tether*, the municipality of Lugano is supporting startups to develop blockchain technology applications and fostering the local adoption of cryptocurrencies. As anticipated by the authors of the program, when properly exploited, this – first and foremost – attracts existing crypto industry businesses and incentivses them to relocate to Lugano, bringing know-how and specialised expertise to the area.

Secondly, the program serves as a driver for Lugano's economic development and regional competitiveness in relation to the rest of Switzerland (Volpicelli, 2022). This project in fact aims to transform the city into one of the European Crypto Valleys (see Gibbons, 2022) and «a main hub for digital innovation with a focus on blockchain technology» (Plan ₿, 2022; see Tether, 2023). For instance, the Lugano's Plan ₿ Forum, taking place in Lugano each autumn, attracts thousands of participants from all over the world: global enterprises, startups, young talents, business practitioners, and experts within the sector of blockchain technology and Bitcoin. Furthermore, a physical «hub to house 300+ blockchain experts and enthusiasts» is being set up in the city center to «encourage networking and knowledge sharing» through meetups and workshops among professionals and business practitioners of the crypto industry (Lugano's Plan ₿).

Thirdly, collaborations with local tertiary education institutions (*Università della Svizzera italiana*, *Scuola universitaria professionale della Svizzera italiana*, and *Franklin University Switzerland*) allow for the development of dedicated training programs about Bitcoin, Lightning Network, Stablecoins[2], Peer-to-Peer Technologies, Mining, Blockchain Analysis, Regulation, Self-Custody, and others. The Lugano's Plan ₿ Summer School offers grants to students and young workers interested in blockchain and bitcoin technology; by participating in the program, they will be equipped with cutting-edge know-how «to fulfil the vast demands of blockchain-related roles and contribute to the growth of a new and exciting industry in Lugano» (Lugano's Plan ₿).

Nonetheless, targeted executive courses are being developed to educate local small and medium enterprises on the benefits of the adoption of blockchain technology and the functioning of Bitcoin overall (see B4B Blockchain for Business). Here, locally based CEOs, directors, and managers who are involved in service-based activities (e.g. wealth management, private banking, commodity trading, consulting, real estate) can learn about the crypto world and eventually integrate blockchain-based solutions in support of their businesses. These programs are managed by the Lugano Living Lab, a transversal, collaborative, open innovation laboratory that promotes and facilitates technological and digital innovation by bringing together private and local public actors to create, test, develop, and support projects on digital transformation (Lugano Living Lab).

Finally, Lugano's Plan ₿ fosters social cohesion between the members of the online community and the offline business by the adoption of LVGA. Specifically, the MyLugano app – developed by the municipality of Lugano – is using LVGA as a fidelity token, with products and services of over 200 local businesses (a number that is continuously increasing) being purchased. Payments made in person by Bitcoin, Tether or LVGA are awarded a 10% cashback in LVGA, to be further used for other transactions involving the businesses who are members of the program. Furthermore, this helped the city increase the inhabitants' physical presence in the commercial and social

[2] A stablecoin is a cryptocurrency whose price is pegged to that of real-world currencies like the dollar. Both Tether and LVGA are stablecoins.

areas, as an alternative to the online shopping and social media interactions inevitably favoured during the pandemic; thus supporting the local businesses and encouraging citizens' social cohesion.

Lugano's initiative follows other examples of Bitcoin adoption at the country level (e.g. El Salvador) (Tether, 2022; see also IMF, 2021) and inspires other local governments to implement the Bitcoin infrastructure themselves (Volpicelli, 2022; see Talty, 2018). The diffused scepticism of central banks, the interests of institutionalised private banks, and the potential risks of implementing Bitcoin in terms of financial volatility, integrity, stability, consumer protection, and money laundering (IMF, 2021) did not discourage the program's founders. It quickly became clear that creating a safe regulatory environment and providing the right facilities for the blockchain technology to flourish would attract significant foreign investments and benefit locals, both in terms of financial access and socioeconomic development (Barber, 2022).

Positive Spillover Effects and Socioeconomic Development

If in the Global South, multi-island, highly biodiverse states, blockchain-based technology serves as a driver for nature protection through the tokenization of nature-related rights such as the creation of biodiversity tokens (see Invest Conservation, a company tokenizing the biodiversity of tropical forests, who chose to relocate in Lugano; see also Recelio) and carbon credits (e.g. Moss Amazon NFT, Klimadao, Save Planet Earth, Toucan), in the Global North it represents an opportunity for socioeconomic development at multiple levels. AsLugano's Plan ₿ will «positively impact all facets of daily life for the residents of Lugano» (Lugano's Plan ₿), similar municipality projects and European microstates' initiatives in the blockchain technology industry shall provide relevant long-term impacts for the local community, as well as continentally and even globally.

Firstly, adopting DLTs, blockchain and various cryptocurrencies means fostering collaboration between different social actors: governmental agen-

cies (i.e. local municipalities, innovation agencies[3]), small and medium enterprises, and multinational firms specialising in blockchain technology, among others. Secondly, the process also triggers positive loops of innovation, technology networks, and economic growth enhancing regional competitiveness by attracting foreign investments, young talents, and specialised startups to relocate their businesses to the area. Thirdly, it fosters social inclusion by integrating foreign technological migrants into the city's social texture, so providing a more diverse social environment, and reducing the digital divide, thus merging the gap between different demographics.

These positive effects ultimately reflect into an increase of (1) vertical integration, both technological and social, reducing the gap between less and more digitised portions of the population (i.e. digital divide) and among social classes, eventually lowering inequality; and (2) horizontal integration, both technological and social, aligning occasional and frequent cryptocurrency users by democratising blockchain technology and thus increasing local access to the financial system. Furthermore, the potentials derived from a 'diverse' civil society eventually contribute to tackling the demographic problems of the area such as population ageing (for an account of the demographic issues in Southern Switzerland see Dandrea & Slerca, 2022).

Last but not least, European microstates could transform technological innovation into an opportunity to level their structural unbalance between capital and human resources. Since the capital-to-people ratio in these territories typically faces a disequilibrium in favour of the former, some micronations resemble the features of limited companies where shareholders' capital exceeds the value of human capital. However, the positive effects of technological innovation outlined above might end up rebalancing the gap between their small population and high concentration of capital, making the two factors attract each other by internalising foreign investments into local capital resources and further fostering sociodemographic development.

[3] In Switzerland, *Innosuisse* is the official governmental innovation agency.

Conclusion

Albeit benefiting from similar levels of income per capita, European small states and microstates share many features and challenges derived from their limited size and peculiar conformation. For instance, they are typically highly specialised economies that are strongly dependent on external shocks and foreign capital investments. They also face significant opportunities for technological innovation due to their generally more efficient internal coordination and faster policymaking processes. Due to their role as sandbox for larger states' policy implementation and through regional cohesion and international cooperation, small states can scale new technology and set global standards and best practices.

Blockchain technology is innovatively transforming the technical support for financial transactions, potentially bringing important benefits to small states. Besides payment efficiency and decentralised financial systems through cryptocurrencies and other tokens, the creation of a blockchain-based community also creates competitive advantages in terms of international attractiveness and soft power, as well as positive socioeconomic consequences. It improves citizen engagement, enhances community building and social inclusion, fosters public and private collaboration, attracts foreign capital and people, increases technological and social integration, and eventually solves rooted territorial demographic imbalances.

Similar in terms of population and territorial size, European municipalities can be compared to microstates. The former often have the autonomy for independent policy implementation and can benefit from their structural agility and bureaucracy; exactly as the latter do. In this sense, the exemplary case of Lugano's Plan ₿ can serve as an opportunity not only for scaling up technological innovations but also for fostering collaboration with other small and micro states at the forefront of blockchain technology implementation. In this regard, we see three possible future scenarios.

In the technologically optimistic scenario, the use of cryptocurrencies is expected to rise in the years to come (Grand View Research, 2022). In this case, more and more municipalities around the world will eventually adopt them in similar ways as Lugano's Plan ₿ (e.g. Dubai, Miami) (see

Talty, 2018). This, in turn, will eventually unleash the mechanisms described in this article by leveraging, *bottom-up*, the potentials of blockchain technology innovation; thus fostering technological transformation not only in other towns and cities but also in small and micro states (e.g. Liechtenstein, Singapore).

In the technologically pessimistic scenario, there might be various types of resistance for a wider use of cryptocurrencies (e.g. path dependency, political reasons) that could impede their spontaneous adoption (see for instance Shishan et al., 2022). In this case, a 'natural' rise in the use of cryptocurrencies is unlikely and the process might have to be actively encouraged and put in place, *top-down*, by governmental authorities at the national or international level. As a result, small states and municipalities shall follow and adapt; by having to comply with supranational regulations (e.g. EU Directives).

In a technologically neutral scenario, transcending the other two, the process of adoption of cryptocurrencies will be rather 'horizontal'; needing to be supported and facilitated by a network of international associations and organisations from the blockchain industry. In this case, the technological transformation will have to be promoted by the establishment, for instance, of tailored bilateral and multilateral agreements between innovative European municipalities (e.g. Lugano, Ljubljana, Amsterdam) and *avant-garde* small and micro states (e.g. Liechtenstein) already adopting cutting-edge technology.

Nonetheless, we argue that in all three scenarios the implementation of new technology such as blockchain and Bitcoin shall not only transform the technological infrastructure but also enhance community building and social integration, among other socioeconomic impacts. In the European arena, *technological* innovation shall thus play the role of a *social* glue further fostering Europe's foundational aim of preserving peaceful relationships across its territories (see Schuman declaration, 1950). Projects like Lugano's Plan ₿, regardless of their mode of diffusion, ultimately serve as modern drivers for enhancing social peace among and between European communities. The cooperation of municipalities with small and micro states, as an alternative to the state-to-state cooperation, ultimately allows

small communities to share their values and develop a new type of international relations, as another facet of mundialisation.

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